

KERALA WATER AUTHORITY



DETAILED PROJECT REPORT

SEWERAGE SYSTEM TO KANHANGAD MUNICIPALITY PHASE 1 - CONSTRUCTION OF 7MLD CAPACITY SEWAGE TREATMENT PLANT AT NILANKARA VAYAL AND LAYING SEWERAGE NETWORK



**KERALA WATER AUTHORITY
PPD & SEWERAGE VERTICAL
KOZHIKOD**

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ACKNOWLEDGEMENT

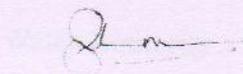
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We express our gratitude to the authorities of Kanhangad municipality for their support, without which this endeavour would not have been possible. We extend our sincere gratitude to M/S Crowned Eagle Survey & Development Pvt.Ltd. for timely completing the DGPS survey work. We trust that the project will become a reality as per the timeline shown, and it would be beneficial to reduce the pollution load on the Neeleswaram River and improve people's living standards in Kanhangad municipality.


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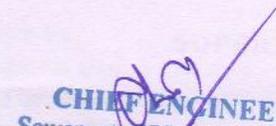

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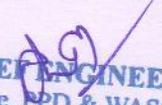
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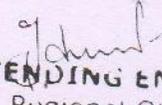
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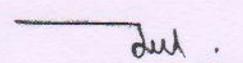

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PROJECT AT A GLANCE

Sl. No.	Item	Description
1	Name of the Project	Sewerage System to Kanhangad Municipality - Phase 1- Construction of 7 MLD capacity Sewage Treatment Plant at Nilankara Vayal and Laying Sewerage Network.
2	Name of District	Kasaragod
3	Name of Municipality	Kanhangad
4	Project area covered(km2)	39.54
5	Population Benefitted Network (in year 2054)	102508
8	STP Capacity	7 MLD
9	Total Network Length	56014 m
10	Number of Wells	1
11	Number of Pumping Stations	26
12	Number of Manholes	2057
13	Number of Connections	5000
14	O&M cost for 10 Years including 18% GST (including electricity charges)	643337674.2
15	Electricity charge for one year	24928547.35
16	Amount required for Land acquisition	50000000
17	Total cost including 10years O&M cost	2410000000
21	Implementation agency	Kerala Water Authority
22	Period of execution	2 Years


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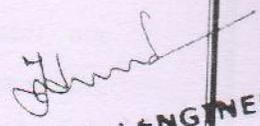
ABSTRACT OF ESTIMATE

SL NO	HEADING DESCRIPTION	AMOUNT IN RS
1	Cost of STP	114745367.15
2	Cost of ELECTRO MECHANICAL ITEMS	75124781.38
3	Cost of NETWORK (Including sewer connection charges)	1121633351.59
4	O&M charges for 10 years (STP + Network)	545201418.81
5	Centage @10% (1+2+3+4)	185670491.89
6	GST @18% (1+2+3+4)	334206885.41
7	DPR PREPERATION CHARGES @2.5% (1+2+3)	32787587.50
8	Unforeseen items (including LS round off)	630116.27
9	Grand Total	2410000000.00
	Rupees Two Hundred Forty-One Crore only	


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EXECUTIVE SUMMARY

Environmental protection has been widely accepted as a vital aspect of sustainable development. Proper sewage and septage management are a crucial parameter in achieving this. Though considerable achievement has been marked by the state in the drinking water sector, the development in sewerage sector is lagging much behind. Unplanned urbanisation and poor sewage management has resulted in large scale pollution of water resources. This has become a complex challenge to the environment as well as to the public health. Realizing the threat, the government, in recent years, has made much deliberations and initiatives to address the situation. Moreover, the Honourable National Green Tribunal (NGT) has given mandate to implement sewerage system in whole of the state in a time bound manner.

The local bodies, who have been constitutionally entrusted with the responsibility of environmental protection, have only limited infrastructure and expertise to tackle the situation. Hence Kerala Water Authority, being a state wide establishment with qualified and experienced personnel in Public Health Engineering, has been considered by the government to take up the responsibility. As per the Kerala Water Supply and Sewerage Act, 1986 KWA has the function of rendering services in collection and disposal of waste water. KWA, as a knowledge partner, service provider and central agency for coordinating the activities related to the planning and implementation of sewerage systems for LSGIs can contribute in scientific and systematic way. To meet the growing demand for waste water management, KWA established a Sewerage Vertical Wing, led by the Chief Engineer, PPD & WASCON. The former Sewerage Circle office in Kochi, which had a Superintending Engineer, one Executive Engineer, and two Assistant Executive Engineers, has now been merged with this. In addition to their existing responsibilities, the PPD Wing's three circle offices in Thiruvananthapuram, Kochi, and Kozhikode have been designated as Sewage Circle offices. This wing is responsible for the investigation, planning, design, and DER preparation of sewerage projects.

This Detailed Engineering Report envisions the establishment of sewerage facilities to the Kanhangad Municipality's Nilankara Vayal zone is designed to meet the sewerage demand up to the year 2054, using 2024 as the base year and a design period of 30 years. In this phase Kanhangad Municipality one sewer zone based on topography, population, railway line, and other factors. The entire Municipality area except sewer zone is considered as septage zone. Furthermore, septage treatment is proposed in densely populated areas where there is no road network. The ultimate sewage load for this Zone is 7 MLD including non-domestic demand and infiltration.

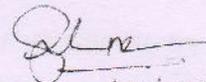
The scheme covers (network coverage) 9.54 km² area in Kanhangad Municipality's Nilankara Vayal zone with the design population of 30367. Co- Treatment is proposed along with the Sewage Treatment Plant for Zone covering entire septage zones of Municipality. This proposal includes 7 MLD STP with MBBR technology at Nilankara Vayal in Kanhangad Municipality, a sewer network of 56.014 km, 2057 manholes, 1 pumping station near Chinmaya Vidhyalaya and 26 lifting stations. Manholes at 30 m intervals and at all intersections are proposed to facilitate maintenance operations. Total Estimated cost of the project including 10-year O&M cost is 241 Crores.



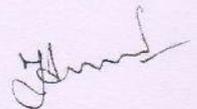
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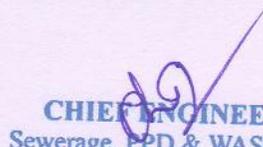
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Chapter 1 INTRODUCTION

1.1 BACKGROUND

Provision of drinking water and sanitation facilities has always been a key priority in our country as it is directly related with the health of the community and the responsibility for providing these services lies with the public domain. With unplanned urbanization the sewage management and pollution of water resources has become a complex challenge to the environment as well as to the public health. Even though Kerala State has achieved significant results in terms of improved water supply coverage through Kerala Water Authority, the sanitation sector could not cope up with the water supply sector. Immediate removal of sewage from its source of generation followed by proper treatment and safe disposal into environment in an eco-friendly manner or reuse is highly necessary to protect the public health and environment.

1.2 SCOPE OF THE REPORT

The scope of this work consists of planning and design of a comprehensive sewerage scheme for Nilankara Vayal zone of Kanhangad Municipality of Kasaragod district in Kerala State. The project proposes a well-planned sewerage pipe line network for the core area of Municipality, pumping stations, and sewerage treatment plant with MBBR technology so as to ensure the quality of effluent as per KSPCB standards. Septage management facility will be provided for the area where laying sewerage network is not feasible.

1.3 PROJECT AREA

Kanhangad lies at 12°18'0"N 75°5.4'0"E in the geographic map of Kasaragod. It is a coastal town which has a varied topography with plain areas in the centre of the city. The historical place Bekal fort, built by Sivappa Nayak in 1650 is near Kanhangad Municipality. Kanhangad is well connected to Kannur, Kozhikode, Kasaragod, Madikeri and Mangalore through Road. NH-66, which runs from Panvel (in Maharashtra) to Kanyakumari (in Tamil Nadu), passes through Mavungal which is 3 km east to Kanhangad town in a north-south direction and connects with Kasaragod, Mangalore, Udupi, etc. in north and Kannur, Kochi, Thiruvananthapuram, etc. in the south. SH 57, a 29.0 km State Highway connects Kasaragod to Kanhangad via Bekal and Udma in the north and it merges with the NH-66 at Kanhangad south. Kanhangad is connected to Madikeri, Coorg, Mysuru and Bangalore via Kanhangad Panathur Madikeri Highway which is planned to be upgraded as National Highway. NH-66 meets with Kanhangad-Panathur-Madikeri Highway and forms a junction in Mavungal. The nearest airport is Manglore international airport situated at a distance of about 90 km from municipal area. The importance of Kanhangad is that it lies in the exact centre between the two major cities Mangalore and Kannur, equidistant from their respective district headquarters. Kanhangad Municipality is in Hosdurg Taluk of Kasaragod district consists of 43 Wards and comes under Kasaragod Parliament Constituency and Kanhangad Assembly Constituency.

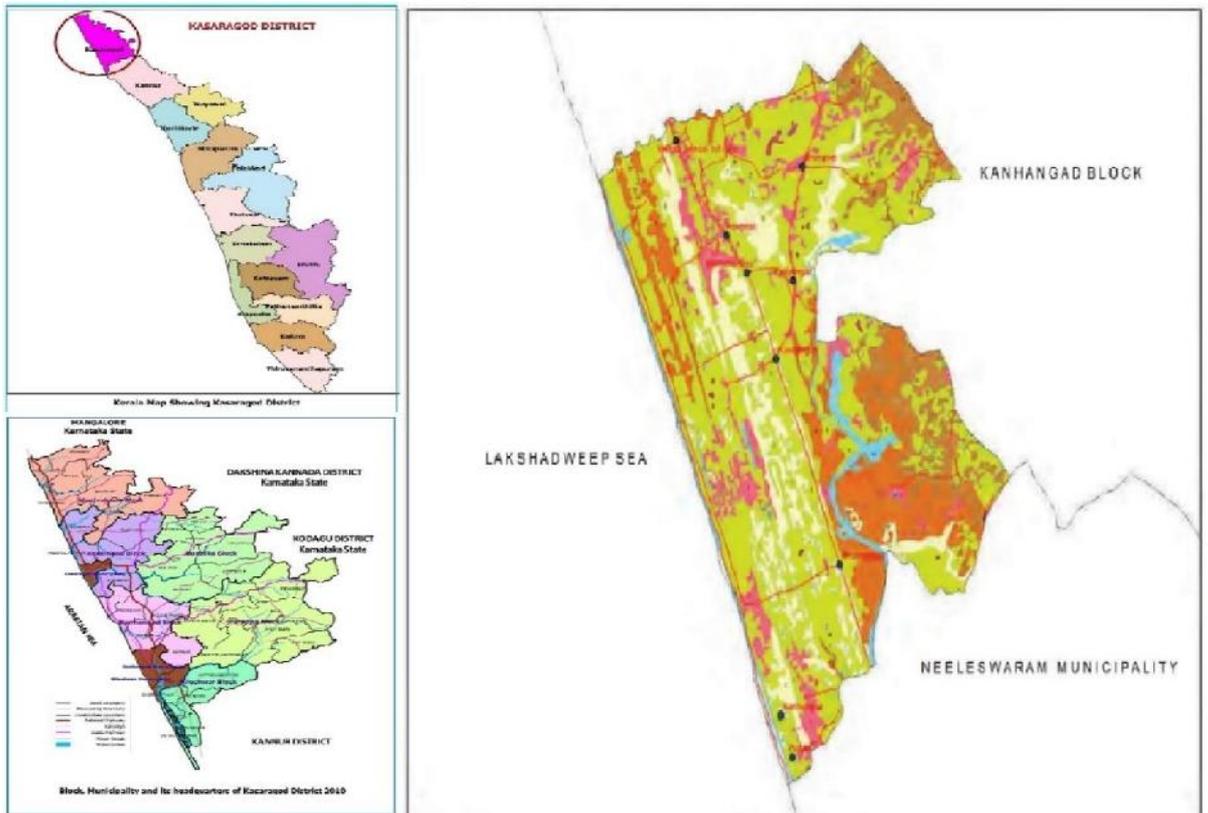


Figure 1.1 Project Area

1.4 POPULATION

Kanhangad is a Municipality + Outgrowth city situated in Hosdurg taluka of Kasaragod district. The Kanhangad city is divided into 43 wards for which elections are held every 5 years. As per the Population Census 2011, there are total 27,579 families residing in the Kanhangad city. The total population of Kanhangad is 125,564 out of which 58,564 are males and 67,000 are females thus the Average Sex Ratio of Kanhangad is 1,144. Density of population is 1900/sq.km. Schedule Caste (SC) constitutes 3.2% while Schedule Tribe (ST) were 0.7% of total population in Kanhangad.

1.5 SOCIO-ECONOMIC PROFILE

Kanhangad Municipality is located on the estuary. The number of business establishments is increasing year by year as lots of construction activities are going on in Municipality. Literacy rate of Kanhangad is 92.6%, which is lower than Kerala average of 94.00%. Around 15% of total population are engaged in cultivation and as agricultural labourers, industrial labourers etc. majority of population is engaged in business or employed in private establishments, Government offices etc. Agriculture and fishing are the primary sources of income for residents of the region. The soil and topography allow for a diverse selection of crops: Rubber, pepper, cashew and ginger are the important crops that are grown in the eastern part of the region, which comprises forests and hilly areas. In the coastal areas are grown: coconut, rice and tobacco. The entire administrative area of Kanhangad lies in Hosdurg or Puthiyakotta. It includes all administrative units and offices like Municipality office, Taluk Office, Judicial Magistrate Court, Mini Civil Station, Police station, Fire station, District Educational Office, District Medical Office, Regional Transport Office, Revenue Divisional Office, District Homeopathy Hospital, Government Veterinary clinic and so on.

1.6 GEOGRAPHICAL FEATURES

Kanhangad Municipality covers area of 39.54km² and the boundaries are

South - Nileswaram Municipality

North - Ajanur Panchayath

East - Madikai Panchayath

West - Arabian Sea

1.7 RAINFALL & TEMPERATURE

Kanhangad Municipality has an average summer temperature of 35⁰C and winter temperature of 20⁰C. The mean annual rainfall is 3350mm. The south west monsoon occurs between May and October. There is an average 160 rainy days in a year. Excessive rain fall causes frequent floods in rivers and canals causing submerges in low level areas.

1.8 LAND USE

The current land use pattern indicates that 37.5% of the land is for residential use which comprises houses in individual plot scattered all over the city. Commercial area is comparatively less and comprises small establishment.

Table 1.1 Land use Pattern

SI No	Land use	Percentage
1	Residential	37.5
2	Transport	3
3	Agriculture	53.5
4	Water bodies	1
5	commercial	1
6	Common land	1.19
7	others	2.81

1.9 SOIL TYPE

Two distinct soil types are dominant in the area, sand/silt and Charnockite group of rocks. Geologically crystalline rocks of Archaean Age occupy the entire district except along the coast. Charnockites and gneisses are the crystalline rocks. Soil classification of Kanhangad Municipality is given below.

Table 1.2 Soil Classification

Sl. No.	Category	
1	Acidic rocks	2.8%
2	Charnockite group of rocks	16.0%
3	High grade meta sedimentary rocks	0.2%
4	Khondalite groups of rocks	5.7%
5	Peninsular gneissic complex	1.8%
6	Sand and silt	73.7%
7	Sandstone and clay with lignite interc	8.2%

1.10 DRAINAGE AND DRAINAGE PATTERN

Nileswar River passing through the South East boundary of Kanhangad Municipality. Rising from Kinanur in Hosdurg taluk, the Nileswar River is known as Kubal Pallichal in its initial reaches. Its two main tributaries are the Aryangalthodu and the Baigote. It joins the Kariangode River at a place called Kottapuram near Achanthuruthu situated south-west of Nileswar town.

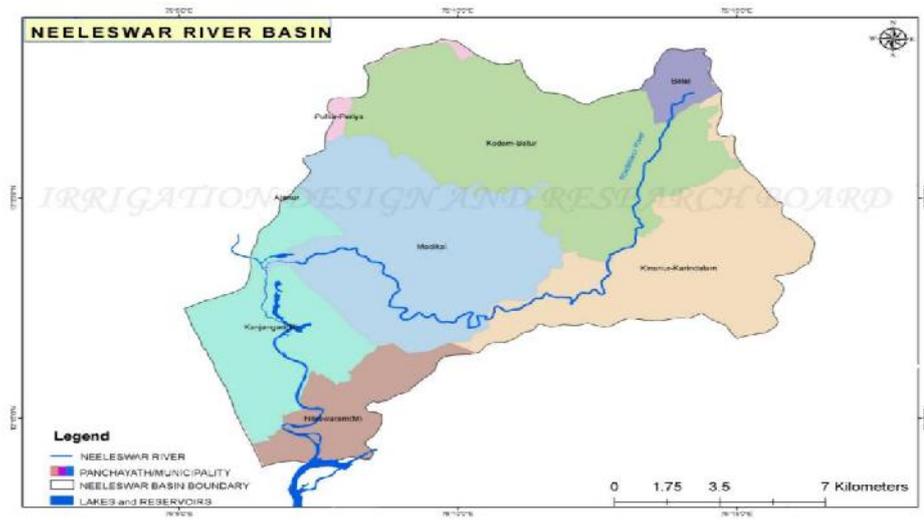


Figure 1.2 River Basin Map

Chapter 2 PROJECT RATIONALE AND METHODOLOGY

2.1 SANITATION – VISION, STATUS AND GOALS

To address the situation of inadequate sanitation facilities to the urban population, the Government of India has formally approved the National Urban Sanitation Policy in 2008 which envisions the creation of totally sanitized cities and towns. The policy articulates awareness generation and behaviour change, open defecation free cities in which all urban dwellers have access to safe sanitation, integrated city-wide sanitation planning and sanitary and safe disposal of urban wastes.

The vision of the policy is that the municipality shall be totally sanitized, healthy and liveable and ensure and sustain good public health and environmental outcomes for all the citizens with a special focus on hygienic and affordable sanitation. The policy articulates the following goals-

1. Awareness Generation and Behavioural Change
2. Open Defecation Free Cities
3. Integrated City-Wide Sanitation
4. Sanitary and Safe Disposal
5. Proper Operation and Maintenance of all Sanitary Installations

Wastewater disposal and treatment is a major problem in cities in Kerala. The wastewater from toilets has been disposed through septic tanks and soak pits and grey form of wastewater from kitchen and bathrooms is directly discharged into the sludge drains without any treatment. As per Census 2011, 45.45% of the urban households have “no drainage”. There are 14.32% of the households connected to centralized sewerage system. About 97.43% of the households in the urban areas of Kerala state have a toilet within their residential premises. Almost 56.69% of them are connected to septic tanks, 21.87% to pit latrines while households having connection to the centralized sewer system are about 14.32%. There are both technical and institutional dimensions to the problem of septic tanks in the state of Kerala. The septic tanks design does not comply with the national guidelines with reference to planning, design and construction. Local masons are unaware of the existing design and construction guidelines to construct and design the septic tanks. There are multiple agencies involved in operation and maintenance of water and sanitation services in Kerala. Septage management is viewed as private provision with limited role of urban local bodies. Another set of reasons cited for urgency in taking up septage management is the occupational hazards for emptying the septic tanks. The Prohibition of Employment as Manual Scavengers and their Rehabilitation Act, 2013 has expanded the definition of workers engaged in such sanitation works by including the practice of septic tank emptying and manual handling of such faecal sludge. The revised Manual Scavenging Act will require states to gear up the Municipal bodies in discharging their responsibilities effectively. In the absence of efficient waste water treatment systems and solid waste management systems, untreated domestic and industrial wastes, and agriculture-runoff flow into the rivers polluting the rivers in Kerala. There has been widespread bacteriological contamination of faecal origin in ground and surface water which relate to proximity of

increasing numbers of leach pit latrines, leakages from septic tanks, washing, bathing and other domestic activities. Hence the goals for setting a sewerage strategy for a district will involve multi-faceted approach to cover every habitation and other institutions and establishments. This will render adequate results in both short term and long-term development plans. If a plan has been chalked out which can provide a systematic and flexible implementation mode, stage by stage implementation and better control over the system can be achieved. A district level plan document for sewerage prepared by KWA will create a backbone for the subsequent formation of detailed engineering reports for ULBs.

National Green Tribunal (NGT) while considering various OAs related to pollution of river trenches, pollution of coastal regions, pollution of ground water and restoration of water bodies in various States and UTs has ordered that all States and UTs shall ensure that various measures are taken to prevent the pollution of river stretches, water bodies and coastal areas on priority basis and within specified time limits. One of the directions is to ensure 100% treatment of sewage at least to the extent of in-situ remediation. Following this, being the agency for ensuring sewerage services in the State, Kerala Water Authority (KWA) has created a separate Vertical with in it exclusively for preparation of DPR sewerage works across the State. The newly formed Sewerage Vertical of KWA has prepared Preliminary Engineering Report for establishing a sewerage network/ septage management across the State.

As per order no GO(Rt) No.352/2021/P&EA dated 16/8/2021 Administrative Sanction has been accorded for conducting DGPS levelling survey work for 28 Urban Local Bodies and DPR preparation of 4 corporations in Kerala and Kanhangad Municipality is one among them. PPD and Sewerage Vertical Circle, Kozhikode is assigned with the task of preparation of DPR for sewerage scheme for Kanhangad Municipality.

2.2 NEED FOR SEWERAGE SCHEME

The sewerage project in respect of which considerable public and social resources are being used, form a basic infrastructure for the country and an indisputable indicator of civilization and development. The works cover a number of substantial social needs and aim to improve the quality of life and to protect public health and the environment. Some of the benefits and advantages of the sewerage system are as follows:

(a) Upgrading the quality of life

The quality of life and the hygienic conditions in the areas where the system operates have already improved. The operation of the sewerage system has relieved these areas to a great extent from previous problems that were caused by the continuous emptying of cesspools. In the past, hotels and blocks of apartments were required to empty and maintain septic tanks and soak ways. The sewerage system provides a healthier and more appropriate way to manage liquid wastes.

(b) Preserving the natural environment

Previously, all sewage waste was discharged in septic tanks and cesspits, resulting in the pollution of the ground water of the areas where such waste was discharged. Polluted waters then ended in the sea and caused various risks and other environmental problems.

With the operation of the sewerage system no more pollution of ground water is affected and the discharge of sewage waste has significantly been reduced moreover, the wastewater treatment plant produces by-products such as treated bio solids and methane. Treated sludge is used as a soil-improving substance mainly for tree cultivations whilst methane is being used for electricity generation, covering part of the power, required to operate the plant.

c) Saving and processing waters

Water is a substantial natural resource for our country and it should be managed in the best possible manner. The tertiary treated effluent at the wastewater treatment plant is reused for agricultural and other purposes. On completion of the project, the amount of water to be saved is expected to exceed 1.45 million cubic metres per year.

(d) Economic development and tourism

The most significant advantage of the system is maintaining sustainable development, the protection of the environment and improvement of the quality of life in our town, with a further impact on the development of tourism and the economy in general.

(e) Standard of living

As a result of the above, the sewerage system contributes to further development and increase of the standard of living of the town of Kanhangad inhabitants. Considering all the above advantages, there is no doubt that if we all cooperate, ourselves and our children will enjoy a better quality of life in the years to come and that we will secure a better environment



Figure 2.1 Wastewater

2.3 PRESENT SEWERAGE SYSTEM- OVERVIEW

Like all other Municipalities in Kerala, Kanhangad Municipality is also not having a sewerage system. All the residential building, commercial buildings, institutional establishments are having their own septic tanks for collecting sewage from latrines and grey water is either collected in leach pits or directly disposed to drainage system and nearby canals. Most of septic tanks are unscientifically constructed and do not have the facility for treating the effluent resulting in contamination of surroundings and the ground water. Even though Hospitals and other institutions are having their own independent facilities, in most cases partly treated effluent is discharged to nearby drains or water bodies. Most of dwellings have their own wells as drinking water source and proximity to the septic tanks leads pollution in well water also. Coliform bacteria is detected in 70% of wells in Kerala and emphasising the need for a well-planned sewerage system.

2.4 WATER SUPPLY FACILITIES

2.4.1 PRESENT SYSTEM

At present there are two numbers of water supply schemes within the municipality area, they are

1. RWSS to Kanhangad
2. WSS to Vazhunnoradi

All these schemes are very old and not functioning satisfactory due to many reasons such as quality problem, inadequacy of source, frequent leak in pipe lines, break down with old pump sets, etc. The distribution system laid very long back, which is now in redundant stage.

Table 2.1 Water Tank details

Tank Location	Capacity (LL)	Type
Puthiyakotta	0.6 LL	OHSR
Melangottu	0.6 LL	OHSR
Mukundu	4 LL	GLSR

2.4.2 ONGOING AND PROPOSED WATER SUPPLY SYSTEM

The proposed new project is – WSS to Kanhangad, Nileswar Municipality and Kinanoor Karinthalam panchayaths under KDP. The DGPS survey work has been completed.

2.4.3 GROUND WATER SOURCES

Most of the people depends ground water source, open wells and shallow tube wells for their drinking water needs. Studies have revealed that

- Almost all samples were contaminated with Total Coli forms
- Level of bacteriological contamination is very high during monsoon

- Elevated areas had comparatively lesser level of contamination
- Contamination was higher in the vicinity of onsite sanitation structures especially in open wells situated within 10-15 m from latrines
- In a number of cases cause of contamination is of human origin

2.5 METHODOLOGY FOR PREPARATION OF SEWERAGE MASTER PLAN

The following tasks have been performed during the planning of the proposed Sewerage System:

- Data Collection and Field Visits
- Review of adequacy of existing sewerage system
- field levelling survey using DGPS
- Social survey
- Population Projection and Sewage Flow Estimation
- Design of Sewage Collection System
- STP site identification, assessing area requirement
- Phasing of construction of STP
- Capital cost and O & M costs

2.6 FIELD INVESTIGATIONS

General Field investigations like topographic survey, geotechnical investigation to be conducted to ascertain the topography of the area, the soil classifications and to ascertain its characteristics for designing the type of treatment, which forms the basis for proceeding further in designing the sewerage system.

2.7 SURVEY WORK

Topographical Survey Topographical survey forms a very important component in formulating the sewerage project. A detailed topographical survey has been performed covering the area using DGPS and Total Station.



Figure 2.2 DGPS Survey

Topographical survey of the project area was conducted using DGPS and Total station. Ground Levels have been taken along the roads at suitable intervals along straight portions and at all junctions of alignment. Important features and obligatory points like junctions such as culverts, major drains, and public utilities, cross roads, railway line have been captured. Using the topographical survey data and detailed base map showing the features like roads, land marks, public buildings, parks etc. has been developed.

2.8 SOCIAL SURVEY

Social Survey was carried out for locating each building for arriving the sewer load in manholes. Identifying and arriving possible shock loads from institutions such as, flats, and other establishments are very important for avoiding overflows in manholes. Identifying the buildings which are not feasible to be connected to network, for arriving septage load /separate pumping arrangements is also carried out in social survey. Moreover, the areas likely to be developed in future are to be identified for arriving sewer load to be incorporated in design.

Chapter 3 DESIGN CRITERIA

3.1 SEWAGE COLLECTION & CONVEYANCE SYSTEM

The sewerage system or storm water carriage system can be separate system or combined system or partially separate system depending on domestic sewage and rain water are drained through two separate set of pipes or through single set of piping. However, the combined system is not quite suitable in tropical Indian conditions as;

- i) Heavy and concentrated rainfall occurs during the monsoon period and thus there is a large variation in the quantity of sewage during different months of the year,
- ii) Dry weather flow is generally a very small proportion of the total flow and hence sewers are likely to get silted up due to low velocity of flow in lean periods,
- iii) Capital funds are limited,
- iv) Treatment costs and pumping costs are significantly reduced in separate system due to reduction in quantity.
- v) If the system is overdesigned, external flushing to attain the areas where the self-cleansing velocity is not attained which will increase the O&M cost. It affects system efficiency.

The pipes for collection can have;

- i) Zonal pattern in which entire city is divided into suitable zones and a separate interceptor is provided for each zone,
- ii) Radial pattern in which sewers are laid radially outwards from the center of the city to dispose sewage at multiple points,
- iii) Interceptor pattern in which sewers are intercepted by large size sewers laid along the natural watercourses or,
- iv) Fan pattern in which the STP is located at a certain point and the entire sewage flow is directed towards this point.

3.2 ESTIMATION OF QUANTITY OF SEWAGE

Separate drainage system is proposed for rain water as such only dry weather flow will pass through sewers. The connection of roof, backyard and foundation drains to the sanitary sewers should be avoided and hence shall not be considered for estimation of sanitary sewage. The prevalent sewerage systems in India do receive rain water even if separate system for rain water exists but sewers are designed for 30 years and have spare capacity in early phases of implementation and considering that by end of 30 years sewerage system will become water tight to rain water, it is appropriate to design system assuming no rain water penetration in sewers. The quantity of domestic sewage can be best estimated by quantity of water supply consumption minus evaporation plus sewage flow from personal water sources which are other than those of community water supply and this water reaching to sewers. Another important factor in Indian cities is generally less connectivity of sewage to the sewerage system as many people continue to use on site sanitation i.e., septic tanks and soak pits etc. particularly in colonies where sewerage system

is laid after a long gap of construction of houses which is a general phenomenon in Indian cities. In actual practice about 70-80% of the water supplied is reaching to sewers. As such 80% of quantity of water supply can be taken as sewage generation.

3.3 INFILTRATION AND LEAKAGE.

Some quantity of ground water or subsoil water may infiltrate into sewers through defective joints, broken pipes etc. This is significant when water table is high and head of ground water is more than the head of sewage in sewers. Some quantity of sewage may leak out from defective joints and defective pipes when head of sewage is more in sewers than head of ground water outside. Infiltration and leakage mainly depend on quality of construction and water table levels. Infiltration can be considered 5000-50000 litres per day per hectare or 500-5000 litres per day per km length of sewers or 250-500 litres per day per manhole for sewers laid below ground water level.

3.4 ESTIMATION OF INDUSTRIAL SEWAGE

The quantity of industrial sewage will vary with type and size of industry, the manufacturing processes involved, degree of water reuse and onsite treatment methods that are used, if any. However, in general the quantity of industrial sewage may be taken 80 to 90 % of quantity of water supplied through public water supply system. Some industries develop their own source of water supply and may discharge their liquid waste into sewers. This should be estimated separately for large industries. It may, however, be stated that industrial sewage should be treated to the standards prescribed by the Pollution Control Boards before being discharged into sewers.

3.5 DESIGN PERIOD

Sewerage projects are normally designed to meet the requirements over a period of 30 years after their completion. However, the period of 30 years may be modified in respect of certain components of the project depending on their useful life or the facility for carrying out extensions when required and rate of interest, so that expenditure far ahead of its utilization is avoided. As such design period for various main components has been taken as indicated in Table below.

Table 3.1 Design Period of Sewerage Components

Sl.NO	Design Component	Design Period	Remarks
1	Land Acquisition for STP, SPS, sewers etc.	30 Years	Land acquisition in future difficult
2	Sewer network (laterals, Trunk mains, Outfall etc.)	30 Years	Replacement difficult and costly
3	Pumping mains	30 Years	Cost may be economical
4	Pumping Stations- Civil Work	30 Years	Life of civil structure is 30 years
5	Pumping Machinery	15 Years	Life of pumping machinery is 15

			years
6	Sewage Treatment Plants	30 Years	The construction shall be modular in phased manner as actual population less than design population and in Indian cities initially flows are much less due to connectivity problems
7	Effluent disposal and utilization	30 Years	Provision of design capacities in the initial stages itself is economical

3.6 VARIATION IN RATE OF FLOW

The rate of flow of sewage varies from season to season (seasonal or monthly variation), from day to day (daily variation) and from hour to hour (hourly variation). For design of sewers maximum or peak flow rates are adopted. The value of peak factor (ratio of maximum flow to average flow) depends on the contributing population and the values recommended in the Manual on Sewerage and Sewage Treatment prepared by CPHEEO are given in Table below.

Table 3.2 Peak Factor

S.NO	Contributing Population	Peak Factor
1	Up to 20,000	3.00
2	20,000 – 50,000	2.50
3	50,000 – 7,50,000	2.25
4	Above 7,50,000	2.00

The variation between maximum and average rates of flow is large for domestic and lateral sewers because they receive the flow directly from the source. This variation gradually diminishes as the flow reaches the branch or sub main sewers and the main sewers. Minimum rate of flow: The minimum rate of flow may vary from 0.5 to 0.33 of the average flow.

3.7 HYDRAULIC DESIGN OF SEWERS

The design for sewage collection system presumes flow to be steady and uniform. The unsteady and non-uniform sewage flow characteristics are accounted in the design by proper sizing of manhole. The sewage is mostly liquid containing about 0.1% of solid matter and hence follows same laws of flow as water. However the difference in design for water supply network and sewer network is, i) In order to avoid clogging of sewers due to settlement of heavier particles of solids, sewers are to be laid at such gradient that self-

cleansing velocity is achieved at all values of discharge and that the inner surface of the sewers should be capable of resisting the wear and tear due to abrasive action of solid particles and ii) sewage flows under gravity as open channel flow and as such sewers are laid at continuous downward gradient.

3.7.1 DEPTH OF FLOW

The sewers shall not run full as otherwise the pressure will rise above or fall below the atmospheric pressure and condition of open channel flow will cease to exist. Moreover, from consideration of ventilation, sewers should not be designed to run full. In case of circular sewers, the Manning's formula reveals that:

The velocity at 0.8 depth of flow is 1.14 times the velocity at full depth of flow.

The discharge at 0.8 depth of flow is 0.98 times the discharge at full depth of flow.

Accordingly, the maximum depth of flow in design shall be limited to 0.80 of the diameter at ultimate peak flow.

3.7.2 HYDRAULIC FORMULAE FOR DESIGN OF SEWERS

Manning's formula has been used for design of sewers in case of gravity flow. For pressure flow (Pumping Mains), the Hazen-William's formula has been used. Sewer Network design has been done with the help of Manning's Formulae i.e.

Velocity $V = [(1/n) \times (R^{2/3} \cdot S^{1/2})]$ (in m/s)

For Circular Sections

$V = (1/n) (3.968 \times 10^{-3} D^{2/3} S^{1/2})$ $Q = (1/n) (3.118 \times 10^{-6} D^8/3 S^{1/2})$

Where, Q = discharge in lps; S = slope of hydraulic gradient; D = internal dia of pipe line in mm; R = hydraulic radius in m; n = Manning's Coefficient of roughness

3.7.3 PER CAPITA SEWAGE FLOW

The rate of water supply has been adopted 150 LPCD at consumer end throughout the whole design period as water supply schemes are designed with per capita supply of 150lcd in Kerala. 80 percent of the water supply has been considered as sewage flow into the sewerage system

3.7.4 MINIMUM VELOCITY OF FLOW

A minimum velocity of 0.6 m/s for present peak flow and 0.8 m/s at design peak flow is recommended for sanitary sewers. Thus, the sewers are designed on the assumption that although silting might occur at minimum flow, it would be flushed out during peak flows.

3.7.5 RECOMMENDED SLOPES FOR MINIMUM VELOCITY

For sewers running partially full, for a given flow and slope, velocity is little influenced by pipe diameter. As such for present peak flows up to 30 lps, the slopes given in Table below may be adopted which would ensure minimum velocity of 0.6 m/s in the early years.

Table 3.3 Recommended slope

SL.NO	Present Peak Flow in LPS	Slope per 1000
1	2	6.0
2	3	4.0
3	5	3.1
4	10	2.0
5	15	1.3
6	20	1.2
7	30	1.0

3.7.6 EROSION AND MAXIMUM VELOCITY OF FLOW

Erosion of sewers is caused by sand and other gritty material in the sewer and also by excessive velocity. Non-scouring or limiting velocities in sewers of different materials are given in CPHEEO manual. Accordingly maximum velocity for cement concrete pipes is 2.5- 3.00 m/s.

3.7.7 SEWER TRANSITIONS

Sewers shall be designed to ensure that the energy gradient is a continuous smooth line, thus transitions from larger to smaller diameters shall not be made. The crowns of sewers shall be kept continuous. In no case, the hydraulic flow line in the large sewers shall be higher than the incoming sewer. To avoid backing up, the crown of outgoing sewer shall not be higher than the crown of incoming sewer

3.7.8 MINIMUM PIPE DIAMETER

Minimum pipe diameter recommended in CPHEEO manual is 150 mm except that in hilly areas, where extreme slopes are prevalent, 100 mm can be used. Some states and ULBs have started adopting minimum diameter as 200 mm or even 250 mm. The logic is Maintenance of sewer system is generally not good and 150 mm dia sewer will block frequently and remain un-attended for some time, Quality of construction in smaller size RCC main such as 150 mm is not good, The sewerage system is not totally closed one and undesired waste such as solid waste and drains finds way in sewerage, making smaller size sewer lines more prone to frequent blocking, The cost of pipe line element is only about 15 percent of total project cost and increase in pipe size from minimum of 150 mm to minimum of 200 mm size will increase cost of project by 2 percent whereas flow capacity increases by more than 80 percent.

The minimum diameter may be adopted as 200 mm for cities having present / base year population of over 1 lakh. However, depending on growth potential in certain areas even 150 mm diameter can also be considered. However, in towns having present / base year population of less than 1 lakh, the minimum diameter of 200mm shall be adopted.

The house sewer connection pipe to public sewer shall be (a) minimum 100 mm or higher

based on the number of houses / flats connected and (b) subject to the receiving public sewer being of higher diameter. In this project 225 mm outer diameter have been suggested as minimum diameter in design of sewerage network.

3.8 MATERIAL OF CONSTRUCTION FOR GRAVITY SEWERS

Brickwork is used for large diameters as sewers can be constructed in any shape. However now it is not common. Concrete pipes are commonly used now as can be manufactured to any reasonable strength and laying is easy and jointing is leak proof. However, these pipes are subject to corrosion where acid discharges are carried or where velocities are not sufficient to prevent septic conditions or where the soil is highly acidic or contains excessive sulphates. Only high alumina cement concrete should be used when it is exposed to corrosive sewage or industrial wastes. Salt glazed stoneware pipes are mostly manufactured in sizes 80-1000 mm but sizes greater than 380 mm are generally not used due to economic considerations. The length of these pipes is 60 cm, 75 cm and 90 cm. These pipes are good for corrosion resistance and erosion resistance. However due to less length, more joints, difficulty in jointing, requirement of special bedding and less compressive strength of pipes manufactured in India; use of these pipes is reducing in India.

Table 3.4 Pipe material Comparison

Sl. NO	EVALUATION CRITERIA	RCC PIPES	DI PIPES	PE PIPES	DWC PIPES	PE PIPES
1	Type of Joint	Available in both collar and S&S joints.	Tyton joint With rubber gasket	Butt fusion welding process.	Simple push fit joints with Elastomeric sealing Ring for online system or with extra couplers.	
2	Weight	Heavy	Lighter than R.C.C.	Light	Very Light in Comparison of Other Solid Wall Pipes.	
3	Corrosion resistance	To prevent corrosion sulphate resistant cement concrete to be used for pipe	Protective layers are Required to protect corrosion	Highly corrosion resistant	Highly corrosion resistant	

		manufactu re.			
4	Remarks on Cost	NP2isChe apest among all materials	Costlier than other pipes but cheaper than PE pipes.	Smaller diameter pipes are cheaper and higher diameter Pipes are costlier.	Uses minimal material for equal strength, therefore cost cheaper from other pipes.
5	Infiltration	Infiltration is less	Infiltration is very less	Infiltration is very less	Infiltration is very less
6	Workabilit y	due to heavy weight handling to be done with care	Good	Light weight for easy handling.	They are user friendly, very fast and inexpensive in installation
7	Jointing	Jointing is easy in S&S pipes with Rubber ring joints.	Jointing is easy in S&S pipes with Rubber ring joints.	Jointing is expensive	Jointing time is 2-5 minutes per joint
8	Maintenan ce	Almost nil if proper velocity is maintaine d.	Minimum	Pipe may get damaged due to rodding	Maintenance is low because of non-adherence of sewage elements.
9	Previous Experienc e/Perform ance	In use for long period and performan ce is Good	It is durable pipe. Performance is yet to be proven	Recent use started in India. It is durable.	They are maintenance free and therefore, once installed, willie underground for years.

10	Trenchless compatibility	Micro tunneling	Micro tunneling	HDD & Micro tunneling	Not suitable for Trenchless
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AC pipes cannot stand high superimposed loads, subject to corrosion from acids in sewage and high sulphate soils, require special bedding and weak against erosion where high velocities are encountered; as such use of AC pipe is not prevalent. Cast iron, DI and steel pipes are not used due to high cost. UPVC pipes are manufactured in sizes 75, 90, 110, 140, 160, 250, 290 and 315 mm outer dia. PVC pipes are smooth, light, and easy to joint and have leak proof joint. Rates are also low. These days these pipes are used for making connection from house to sewer but not prevalent in street sewers.

GRP pipes are widely used in other countries where corrosion resistant pipes are required at reasonable rates. When using concrete or reinforced concrete, high density sulphur resistant cement should be used. These pipes are made of slag cement that contains fewer calcareous (CaOH₂) particles than pipes made of Portland cement. These particles react with the sulphuric acid (created by bacterial dissipation of hydrogen sulphide) in sewers, causing the aforementioned crown corrosion. If this particular cement is not used, lifetime of concrete sewers cannot be expected more than 30 years. A comparative study of characteristics of various pipe options for gravity sewers is presented in table above.

3.8.1 BENEFITS OF PE PIPES FOR SEWERS

When compared to other common wastewater piping system materials, such as PVC, ductile iron, or concrete, PE pipe offers significant benefits. Some of these include:

- Chemical Resistance. Hydrogen sulphide gas (H₂S) corrosion is a serious threat to conventional sewer lines, like concrete and ductile iron, greatly reducing their service life. WL Plastics PE pipe is not attacked, corroded or degraded by H₂S, ensuring a service life of 100 years.
- Anti-corrosive properties. PE piping systems are immune to the harmful effects of corrosion and tuberculation, common factors that reduces the operational life of concrete and ductile iron wastewater systems. PE also resists other corrosive or harmful agents, including scaling and organics such as fungi, bacteria, and other microbial contaminants.
- Leak-free. PE pipe is joined together via heat fusion, creating a welded, leak-free joint unlike conventional bell and spigot joints. These leak-free joints prevent infiltration and exfiltration making it a truly sanitary piping system.
- Durability. PE pipe is resistant to fatigue from water hammer and surge events in sewer force mains. PE pipe is also abrasion resistant, ensuring that flowing water and slurries won't damage the pipe throughout its service life.
- Lightweight. PE pipes are much lighter in weight compared with ductile iron or concrete alternatives, which makes transportation and installation significantly easier and safer.
- Cost-effectiveness. PE pipe is cost competitive with other sewer pipe options. PE pipe is faster, easier, and safer to install due to longer cut lengths and more linear footage per truck,

which significantly reduce the overall project costs. With low maintenance costs and long service life, PE pipe is the ideal solution for wastewater systems.

However, PE pipes are slightly costlier compare to RCC pipe but as of now most of sewer pipes are laid through Trenchless technology method and because of this, plastic pipes like PE/ uPVC are most suitable and easy to use for trenchless as well as open cut trench method for pipe laying. The use of PE pipes are more economical and to be considered for smaller diameter pipes up to 110mm where they are available on coils thereby avoiding joints. Hence lesser number of joints thereby reducing leaks and the rates of pipes are reasonable. As a general pipe policy decision, the use of PE pipe shall be preferred up to 200mm & occasionally upto 350mm (source- KWA pipe policy, page 19).

Therefore, considering the above benefits of PE pipe over RCC pipes, PE pipes are recommended to use for maximum stretch of network. The pipe policy of KWA also favours adoption of PE pipes. However, RCC pipe (PE lined) has been recommended for higher diameter pipe (i.e. above 700 mm) as PE pipes for higher diameter pipes are not easily available and very costly for large diameter and generally not manufactured.

3.9 MANHOLES GENERAL

A manhole is an opening constructed on the alignment of a sewer for facilitating a person to access the sewer for the purpose of inspection, testing, cleaning and removal of obstructions from the sewer line. Manholes will be located at:

- Change of direction
 - Change of slope
 - Change of pipe diameter
 - Change of material
 - Ginning of each line at points of branches
- Manhole Sizes

Table 3.5 Recommended Size of manholes

SI.No.	Depth of Manhole(m)	Diameter of Manhole(m)
1	Above 0.9m and up to 2.5m	1.2m(TYPE-I)
2	Above 2.50m and up to 6.5m	1.5 m(TYPE-II)

3.10 TYPE OF MANHOLES

3.10.1 STRAIGHT – THROUGH MANHOLES

The simplest type of manhole is that built on a straight run of sewer with no side junctions. Where there is change in the size of sewer, the soffit or crown level of the two sewers should be the same, except where special conditions require otherwise.

3.10.2 JUNCTION MANHOLES

A manhole is provided at every junction of two or more sewers, and the curved portions

of the inverts of tributary sewers have been formed within the manhole. The gradient of the smaller sewer may be steepened from the previous manhole sufficiently to reduce the difference of invert level at the point of junction to a convenient amount.

3.10.3 DROP MANHOLES

As per CPHEEO manual, drop manhole is to be provided when a sewer connects with another sewer, where the difference in level between water lines (peak flow levels) of main line and the invert level of branch line is more than 600mm or a drop of more than 600mm is required to be given in the same line and it is uneconomical or impractical to arrange the connection within 600mm.

The drop pipe may be either outside the manhole shaft and encased in concrete or supported on brackets inside the shaft. If the drop pipe is outside the shaft, a continuation of the sewer should be built through the shaft wall to form a rodding and inspection eye, which should be provided with a half blank flange. If the drop pipe inside the shaft, it should be in cast iron/ductile iron and it would be advantageous to provide adequate means for rodding and water cushion of 150mm depth should also be provided. The drop pipe should terminate at its lower end with a plan or duck-foot bend turned so as to discharge its flow at 45 degrees or less to the direction of the flow in the main sewer and the pipe, unless of cast iron, should be surrounded with 150mm concrete.

3.10.4 FLUSHING MANHOLES

Where it is not possible to obtain self-cleansing velocities due to flatness of the gradient especially at the starting point of branch sewers which receive very little flow, it is essential that some form of flushing device to be incorporated in the system. Flushing can be very conveniently accomplished using a fire hydrant or tanker and hose pipe.

The upper reaches of lateral sewers, the discharges shall be partially full even at the ultimate design flow conditions, because of necessity of adopting the prescribed minimum size of sewer. In such situations, flushing arrangements have to be provided in the initial years.

3.11 MATERIAL OF CONSTRUCTION FOR MANHOLE

3.11.1 BRICK MASONRY MANHOLES

Bricks used for construction of manholes shall conform to the relevant Indian Standards. They shall be sound, hard and homogeneous in texture, well burnt in kiln without being vitrified, table moulded, deep red, cherry or copper coloured, of regular shape and size and shall have sharp and square and parallel faces. The bricks shall be free from pores, chips, flaws or humps of any kind. Bricks containing unground particles and/or which absorb water more than 1/6 th of their weight when soaked in water for twenty-four hours shall be rejected. Over burnt or under burnt bricks shall be liable to rejection. The bricks shall give a clear ringing sound when struck and shall have a minimum crushing strength of 35 Kg/sq.cm unless otherwise noted in drawing

The class and quality requirements of bricks shall be as laid down in IS: 1077. The size of the brick shall be 23.0 x 11.5 x 7.5 or unless otherwise specified. Mortar for brick masonry shall be prepared as per IS: 2250. Manholes shall be constructed in brick masonry with cement mortar (1:4), 20 mm thick inside plaster with plasticized water proofing material

consisting of 12 mm thick backing coat in CM 1:3 and 8 mm thick finishing coat in CM 1:1 and 15 mm thick outside plaster in CM 1:3. Whenever a pipe enters or leaves a manhole, bricks on edge must be cut to a proper form and laid around the upper end of the pipe so as to form an arch. All around the pipes, there shall be a joint of cement mortar (1:2) 13 mm thick between it and the bricks. The manhole base has been kept as 150mm for manholes upto 1m depth, and 200mm for manholes from 1 to 2 m depth and 300 mm for greater depths. In all cases, the thickness shall be counter checked for uplift conditions based on maximum ground water elevations at the site on the soil side by considering empty manhole conditions.

The thickness of walls shall be typically one brick up to 1.5 m deep manholes, one and a half brick for depths greater than 1.5 m. The actual thickness in any case shall be verified on the basis of engineering design in difficult soil conditions

3.11.2 RCC MANHOLES

The idea of RCC manholes is essentially to quicken the work of construction in the roads by adopting precast sections assembled at site. Thus, the issues related to their construction are more of design itself and quality control in casting. In general, plain and reinforced concrete work for manholes shall be carried out in accordance with the specification given in CPHEEO manual otherwise specified in this specification. Wherever good quality of brick and workmanship of the construction cannot be ensured, it is advisable to go in for RCC manholes. The provisions of IS: 456 and IS3370 Part I, II and IV shall inter alia apply to the design. The entire structure shall at all times be designed to the condition where the ground water is at ground level itself and the inside is empty and there is no superimposed load on the manhole and not considering the skin friction of the manhole side wall with the soil.

Now the newly available precast RCC chambers shall be conveniently used for the manholes up to 6.0m or more depth. This will make the construction very easy and faster. So, the same are proposed for Kanhangad scheme.

3.11.3 PE MANHOLES

Polyethylene manholes remain leak-free because there is no chemical attack. The toughness of polyethylene eliminates the chance of cracking during installation. There is no infiltration of external ground water, reducing the amount of treatment required. There is no exfiltration of sewage to the environment. PE manholes are available with ladders installed. Ladder design has been inspected and meets all OSHA dimensional requirements.

Chapter 4 PROPOSED SEWERAGE SYSTEM

4.1 POPULATION PROJECTION

Population of the city normally depends on factors such as birth and death rates, migration, industrial development, general environmental conditions etc. Usually, the population forecast of a city is made on the basis of methods of population forecast as provided for in section 1.5 of the CPHEO manual for sewerage and sewerage treatment. The latest available census records are that of 2011. As far as Kerala is concerned it is quite different from other states on education, health, life expectancy etc. The demographic pattern of the state therefore is quite different and need to take into account all the developmental parameters so as to avoid undue over designs.

The anticipation of future growth in any community in terms of population or commercial and industrial expansion forms the basis for preparation of plan for providing the amenities including installation of sewers in the area to be served. The anticipated population, its density and its waste production is generally estimated for a specified planning period. The recommended planning period is 30 years.

Decadal growth of 8.58% is adopted for population projection, as the district average for the decade from 2001 to 2011 is 8.58%

Decimal increase	8.58%
Current Year	2022
Execution Period	2 Year
Design Year	2054
Design Period	30 Years

Based on topography, population etc municipality is divided into sewer zone and septage zone. Population for this zone has been worked out and provided as per the projection the designed population is as follows

Table 4.1 Population Projection

Sl No	Name	Area	2011	2021	2024	2039	2054
1	Kanhangad	Municipality	73342	79635	81523	92016	102508
2	Sewer zone	Nilankara Vayal	21726	23590	24150	27259	30367

Table 4.2 Zone Boundary

Zone	West	East	south	North
Sewer Zone	Rail line	NH-66, Nilankara Vayal and Nileswar River	Nileswar Municipality	State Highway, Ajanoor Panchayath

Based on the population density a septage zone is also proposed to area where population density is below 1900/km². In addition, in the high density populated areas but where there is no road network, septage treatment is proposed.

Table 4.3 STP Capacity

Design Period	30 years
Decadal increase in Population	8.58%
Sewerage return ratio	80%
Septage return ratio	10%

Year	Population	Projected Population				Rate of supply	Water Demand (MLD)			
	2011	2021	2024	2039	2054		2022	2024	2039	2054
Kanhangad Municipality	73342	80265	81523	92016	102508	150lps	12.04	12.23	13.8	15.38
Network area	21726	23590	24150	27259	30367	150lps	3.54	3.62	4.09	4.55
Septage area of Zone	51616	56045	57374	64759	72143	150lps	8.41	8.61	9.71	10.82

Year	Non-Domestic Demand	Non-Domestic Water Demand (MLD)				Sewerage Flow (MLD)			
		2021	2024	2039	2054	2021	2024	2039	2054
Kanhangad Municipality	20%	2.41	2.45	2.76	3.08	11.56	11.74	13.25	14.77
Network area	20%	0.71	0.72	0.82	0.91	3.4	3.47	3.93	4.37
Septage area of Zone	20%	1.68	1.72	1.94	2.16	1.01	1.03	1.17	1.3

Total sewage flow (Dry weather flow)	4.37	MLD
Total septage load	1.3	MLD
Maximum infiltration limited to 5000 Ltr/km/day	0.28	MLD
Number of persons giving un authorised connection	1 in 50	
Number of households in 2021	5195	
Number of households in 2054	6073	
Number of houses giving unauthorised connection	122	
Unauthorised water entering the sewer	0.671	MLD
Capacity of Sewage Treatment plant Say	7	MLD

Sewer Zone coverage area is 9.54 km². This is the residential and commercial area of Kanhangad Municipality and is thickly populated. The total length of sewer network comes to 56014 m. The proposed location of treatment plant is near Nilankara Vayal. 1 pumping station near Chinmaya Vidhyalaya and 26 lifting stations. The capacity of the plant is 7 MLD. Co-Treatment is proposed along with the Sewage Treatment Plant for Zone. The capacity of Plant is arrived adding the full septage load in Kanhangad Municipality.

4.2 COLLECTION SYSTEM

The collection system has been designed for ultimate year peak flow. The cumulative flows and the cumulative contributory population are discussed zone wise in the succeeding sections. The design diameter and slope have been finalized based on the minimum flow velocity of 0.60 m/s (present peak flow) with maximum velocity of 3.00 m/sec.

Design calculations are shown in Annexure attached. The sewerage system network has been so planned to limit lifting and pumping stations. The Maximum depth of the sewer lines are kept at 4.54 m from the existing ground level.

4.3 SEWERAGE NETWORK AND MANHOLES

Design & estimates of the sewer collection system has prepared so as to limit the depth of excavation and to accommodate changes in location of STP. It is proposed to have a common STP for all sub-Zone.

Zone has 24 lifting stations. Pumping route of each Lifting stations are given in table.

Table 4.4 Pumping route of Lifting stations

SI.No.	Lifting Station	To Manhole ID
1	LS-1	381
2	LS-2	1525
3	LS-3	403
4	LS-4	451
5	LS-5	1552
6	LS-6	538
7	LS-7	148
8	LS-8	741
9	LS-9	605
10	LS-10	132
11	LS-11	48
12	LS-12	104
13	LS-13	739
14	LS-14	748
15	LS-15	524
16	LS-16	376
17	LS-17	317
18	LS-18	193
19	LS-19	210

20	LS-20	1666
21	LS-21	615
22	LS-22	583
23	LS-23	220
24	LS-24	639
25	LS25	301
26	LS26	646

Based on the analysis of the topography of the city area and its surroundings, the existing and future land use of the area, the existing status of water courses, the proposal for network, manholes have been arrived.

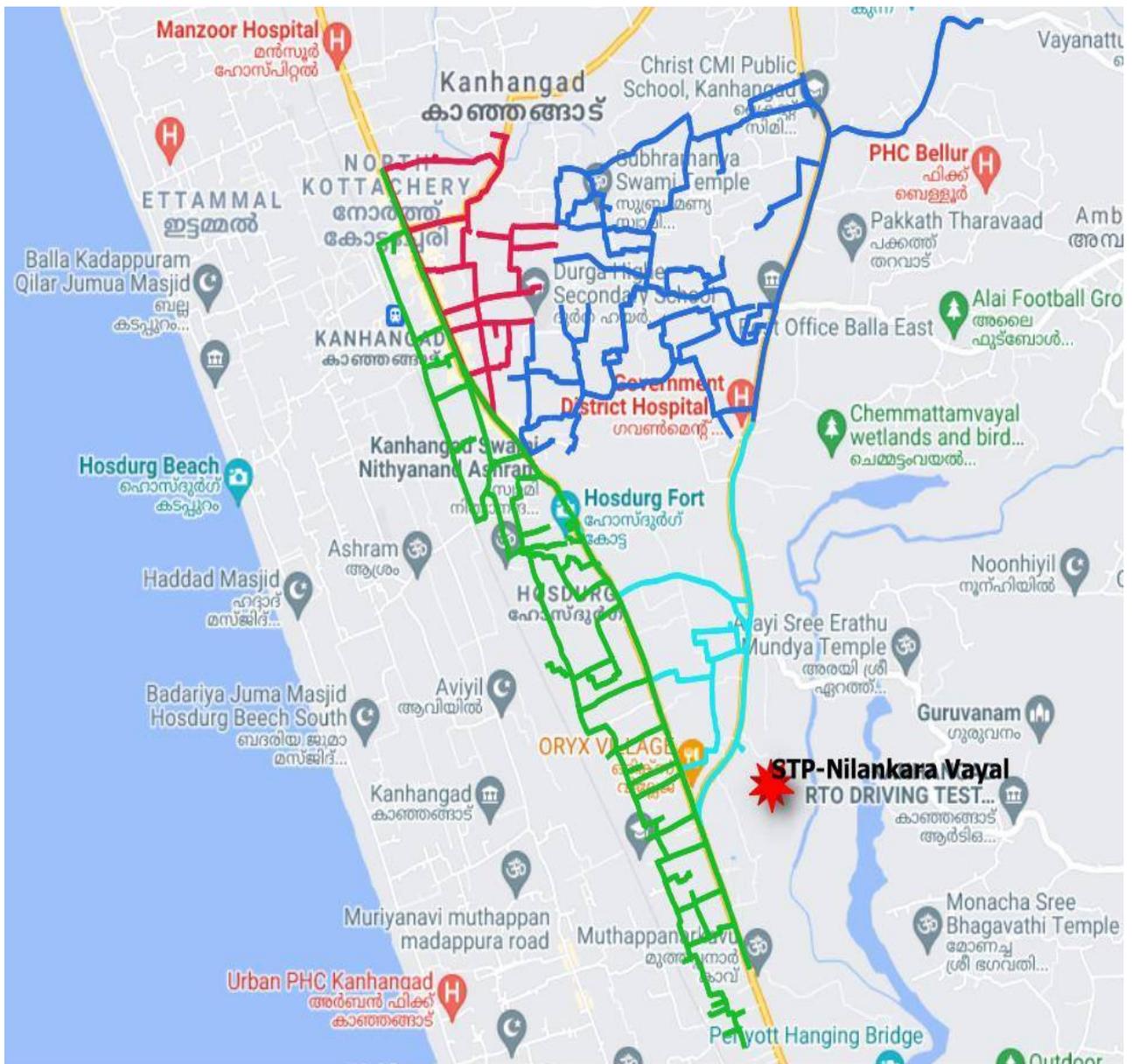


Figure 4.1 Network Sketch

4.3.1 DETAILS OF SEWER NETWORK

Abstract of sewer network is furnished below

Table 4.5 Network details

SI NO	Diameter in mm	Pipe Material	Length in metres
1	225	PE PE100	49459.70
2	250	PE PE100	2181.90
3	280	PE PE100	596.80
4	315	PE PE100	1326.80
5	355	PE PE100	464.00
6	400	PE PE100	699.80
7	450	PE PE100	186.60
8	500	PE PE100	1047.70
9	560	PE PE100	50.70
	Total		56014.00

Upto 3 meter depth of sewer line open cutting is proposed and above 3 m depth pipe laying through HDD method is proposed.

Table 4.6 Excavation Details

Diameter (mm)	Open Cut in metres	HDD in metres	Total
225	42537.90	6921.80	49459.70
250	1545.70	636.20	2181.90
280	564.30	32.50	596.80
315	502.30	824.50	1326.80
355	236.80	227.20	464.00
400	159.80	540.00	699.80
450	-	186.60	186.60
500	738.80	308.90	1047.70
560	50.70	-	50.70

4.3.2 MANHOLES

Total number of manholes comes to 2057

Table 4.7 Details of Manholes

Manhole depth in Meters	No of manholes
Up to 1.5	1020
1.5 to 2.5	505
2.5 to 3.5	339
3.5 to 4.5	188
4.5 to 5.5	5
Total	2057

4.4 PUMPING STATION AND RISING MAIN

4.4.1 GENERAL

Pumping or force mains deliver wastewater discharged from a pumping station to its destination, which may be a treatment plant or the final disposal point.

4.4.2 LIFTING STATION /PUMPING STATION

Pump stations are normally required in a sewage collection system to lift the sewage against a gradient or to limit the depth of cutting of the pertinent sewer line. A simplified form of the pump station, called a Lift Station, is also employed for the same purpose. The primary difference between a pump station and a lift station is that the Pump Station shall handle greater flows with arrangements for removal of floating material and grit prior to pumping through a force main. Lift Stations will have only an enlarged manhole as a wet well with pumps installed and a small control room adjacent to it, for lifting the sewage to ground level.

Lift stations are generally used to restrict the depth of cutting and discharging normally to the manhole in a downstream trunk sewer. No screens and grit wells are provided in lift stations.

Pumping and lifting stations shall use submersible pumps, such stations have a single well, circular or rectangular, in which pumps are installed. Superstructure requirement is minimum. The pump stations have been designed considering easy removal and reinstallation of the pumps without disturbing the connecting delivery pipe work.

Hydraulic Criteria:

According to the existing ground level contour from the topographic survey, the number of pumping stations has been finalized. Lift stations are generally proposed where depth of cutting exceeds 5.5 m. The location of pumping stations is at lower points of the network, but away from public and flood areas. Overflow is not allowed

4.4.3 DETAILS OF PUMPING STATIONS

Table 4.8 Pumping station details

Sl No	Wet well No	Peak Flow in LPS	Detention Period in Minutes	Storage Capacity m ³	SWD in Metres	Diameter in metres	Total Depth in metres
3	PH3-MH35	77.775	10	46.67	3.5	5	5.33

4.4.4 DETAILS OF LIFTING STATIONS

Table 4.9 Lifting station details

Sl No	LS No	Peak Flow in LPS	Detention Period in Minutes	Storage Capacity m ³	SWD in Metres	Diameter in metres	Total Depth in metres
1	LS-1	1.425	10	0.855	1	2	5.123
2	LS-2	0.6	10	0.36	1	2	4.988
3	LS-3	13.65	10	8.19	1.75	3	5.872
4	LS-4	15.75	10	9.45	1.8	3	5.994
5	LS-5	16.725	10	10.035	1.5	3	5.881
6	LS-6	5.55	10	3.33	1.25	2	5.331
7	LS-7	6.15	10	3.69	1.3	2	5.499
8	LS-8	13.05	10	7.83	1.3	3	5.387
9	LS-9	21.975	10	13.185	1.3	5	5.376
10	LS-10	54.075	10	32.445	2	5	5.593
11	LS-11	3.9	10	2.34	1	2	5.649
12	LS-12	1.65	10	0.99	0.75	2	4.922
13	LS-13	3.825	10	2.295	0.75	2	5.764
14	LS-14	22.5	10	13.5	3	3	5.392
15	LS-15	4.425	10	2.655	2	2	3.19
16	LS-16	1.8	10	1.08	1.5	2	2.69
17	LS-17	6.525	10	3.915	1	3	5.586
18	LS-18	7.65	10	4.59	1.2	3	5.739
19	LS-19	11.175	10	6.705	1.25	3	5.356
20	LS-20	1.425	10	0.855	0.75	2	5.286
21	LS-21	30.825	10	18.495	1.5	5	5.419
22	LS-22	3.975	10	2.385	0.75	3	5.801
23	LS-23	2.1	10	1.26	1	2	5.09
24	LS-24	2.85	10	1.71	1	2	4.924
25	LS-25	1.05	10	0.63	0.75	2	5.053
26	LS-26	7.575	10	4.545	1.25	3	5.346

4.4.5 PUMPING MAINS AND LIFTING MAINS

Table 4.10 Pumping mains and Lifting mains

SI. No	Name	Length in metres	Diameter in mm	Material	Route
1	LS-1	5	100	DI	LS-1 to 381
2	LS-2	5	100	DI	LS-2 to 1525
3	LS-3	5	150	DI	LS-3 to 403
4	LS-4	5	150	DI	LS-4 to 451
5	LS-5	5	150	DI	LS-5 to 1552
6	LS-6	5	100	DI	LS-6 to 538
7	LS-7	5	100	DI	LS-7 to 148
8	LS-8	5	150	DI	LS-8 to 741
9	LS-9	5	150	DI	LS-9 to 605
10	LS-10	2190	250	DI	LS-10 to 132
11	LS-11	5	100	DI	LS-11 to 48
12	LS-12	5	100	DI	LS-12 to 104
13	LS-13	5	100	DI	LS-13 to 739
14	LS-14	1550	200	DI	LS-14 to 748
15	LS-15	390	100	DI	LS-15 to 524
16	LS-16	245	100	DI	LS-16 to 376
17	LS-17	5	100	DI	LS-17 to 317
18	LS-18	5	100	DI	LS-18 to 193
19	LS-19	5	150	DI	LS-19 to 210
20	LS-20	50	100	DI	LS-20 to 1666

21	LS-21	657	200	DI	LS-21 to 615
22	LS-22	330	100	DI	LS-22 to 583
23	LS-23	5	100	DI	LS-23 to 220
24	LS-24	5	100	DI	LS-24 to 639
25	LS-25	5	100	DI	LS25 to 301
26	LS-26	5	100	DI	LS26 to 646
27	PH1- MH35	4570	300	DI	
28	Well at STP to Receiving chamber	30	400	DI	Well to Receiving Chamber
29	Septage Tank to Receiving chamber	30	150	DI	

4.5 PUMP AND OPERATION CONTROL

Fluid level activated switches will be provided to start and to stop the pumps depending upon the quantity of sewage available in the pump house. This will ensure that the pumps will not run dry. A sluice valve will be provided on the suction side and a sluice valve and a non- return valve will be provided on the delivery side. Flow meter (digital type) will be provided to measure the quantity of sewage flowing out of the pumping station. It will be an integrating type indicating instantaneous flow and the cumulative flow

4.6 DETAILS OF PUMP SETS

Table 4.11 Details of pump sets

S1 NO	Name of LS/PH	Number of Pump sets	HP	Type	Remarks
1	LS-1	2	0.5	Submersible	
2	LS-2	2	0.5	Submersible	
3	LS-3	2	2	Submersible	
4	LS-4	2	2	Submersible	

5	LS-5	2	3	Submersible	
6	LS-6	2	1	Submersible	
7	LS-7	2	1	Submersible	
8	LS-8	2	2	Submersible	
9	LS-9	2	3	Submersible	
10	LS-10	2	20	Submersible	
11	LS-11	2	1	Submersible	
12	LS-12	2	0.5	Submersible	
13	LS-13	2	1	Submersible	
14	LS-14	2	10	Submersible	
15	LS-15	2	2	Submersible	
16	LS-16	2	0.5	Submersible	
17	LS-17	2	1	Submersible	
18	LS-18	2	1	Submersible	
19	LS-19	2	2	Submersible	
20	LS-20	2	0.5	Submersible	
21	LS-21	2	6	Submersible	
22	LS-22	2	2	Submersible	
23	LS-23	2	0.5	Submersible	
24	LS-24	2	0.5	Submersible	
25	LS-25	2	0.5	Submersible	

26	LS-26	2	1	Submersible	
27	PH1-MH35	3	35	Submersible	
28	Well at STP to Receiving chamber	3	40	Submersible	
29	Septage Tank to Receiving chamber	2	2	Submersible	

4.7 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.

4.7.1 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 fore warn 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 tress passing 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 back filled.
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.

4.8 GANTRY

Gantry of adequate capacity having floor control pendant will be provided for handling heavy parts of equipment's, valves etc. during erection and maintenance of pumping stations. Proper opening to lift the heavy equipment will be provided at motor floor slab in pumping station.

4.9 ARRANGEMENTS FOR POWER SUPPLY

KSEB will supply power at 11/22KV HT supply or 440 V LT supply for the operation of pumps in the pumping stations and for operation of equipment in the STP. In respect of

HT supply, suitable transformers would be provided to step down the voltages to 440V. In case the Horse Power of pump set is less than 75HP, 440V LT supply will be availed. Each pumping station shall have Motor control centre for start-stop and other controls for protection and safety of motors and other auxiliary equipment. Capacitors of suitable capacity would be provided to improve the power factor to so that power consumption can be brought down.

Chapter 5 PROPOSED SEWERAGE TREATMENT PLANT

5.1 GENERAL

The constituents of concern found in wastewater are removed by physical, chemical, and biological methods. The individual methods usually are classified as physical unit operations, chemical unit processes, and biological unit processes. Treatment methods in which the application of physical forces predominate are known as physical unit operations. Examples of physical unit operations include screening, mixing, sedimentation, gas transfer, filtration and adsorption. Treatment methods in which the removal or conversion of constituents is brought about by the addition of chemicals or other chemical reactions are known as chemical unit processes. Examples of chemical unit processes include disinfection, oxidation and precipitation. Treatment methods in which the removal of constituents is brought about by biological activity are known as biological unit processes. Biological treatment is used primarily to remove the biodegradable organic constituents and nutrients in waste water. From practical observations, the rates at which physical, chemical and biological reactions and conversions occur are important, as they will affect the size of the treatment facilities that must be provided. The rate at which reactions and conversions occur, and the degree of their completion, is generally a function of the constituents involved, the temperature, and the type of reactor. The fundamental basis for the analysis of the physical, chemical and biological unit operations and processes used for wastewater treatment is the material mass balance principle in which an accounting of the mass is made before and after reactions and conversions have taken place.

5.2 CHARACTERISTICS OF SEWAGE

5.2.1 INFLUENT CHARACTERISTICS

Table 5.1 Influent Characteristics

Parameters	Units	Value
Bio chemical Oxygen Demand(BOD ₅)	mg/l	250
Chemical Oxygen Demand(COD)	mg/l	400
pH	Units	6.00-7.00
Total Suspended Solids(TSS)	mg/l	400
Total Dissolved Solids(TDS)	mg/l	800
Total Organic Nitrogen(Kjeldhal)	mg/l	>35<55
Oil and Grease	mg/l	>1<10

5.2.2 EFFLUENT CHARACTERISTICS

Table 5.2 Effluent Characteristics

Parameters	Units	Value
Bio chemical Oxygen Demand(BOD5)	mg/l	<10
Chemical Oxygen Demand(COD)	mg/l	<50
pH	Units	6.5– 7.5
Total Suspended Solids(TSS)	mg/l	<10
Total Dissolved Solids(TDS)	mg/l	100

5.3 CAPACITY CALCULATION OF STP

The details of forecasting of population and demand for Nilankara vayal zone is shown below

Population for sewerage zone-2011	21726
Decennial increase	8.58 %
Current year	2022
Design period	30 Years
Execution period	2 Years
Projected population 2054	30367 Persons
Per capita water supply	150 LPCD
Waste water generated	80% of water supply
Quantity of waste water generated	3.64 MLD
Groundwater Infiltration for pipeline & Manholes	5000L/km/day
Total Ground water infiltration	5000x 56.21 = 0.281 MLD
Number of persons per house	5Persons
Average roof area	55m ²
Rainfall intensity	100mm/day
Number of house hold sin 2054	6073 Nos
Waste water generated accounted for Rain water	0.671 MLD
Non domestic demand	0.73 MLD
Total sewerage load	5.32 MLD
Septage load for co-treatment	1.3 MLD
Total	6.62 MLD
Say	7 MLD

5.4 UNIT OPERATIONS IN TREATMENT OF SEWAGE

Table 5.3 Unit Operations

Sl No	Unit	Function	Unit Operations /Phases
1	Primary	<ul style="list-style-type: none"> Removal of rags, floating matter, grit, oil and grease etc. 	<ul style="list-style-type: none"> Screening Grit removal Oil and grease trap
2	Secondary	<ul style="list-style-type: none"> Removal of Bio degradable organic matter and suspended solids Also include nutrient removal (Nitrate and Phosphate) in advanced technologies 	<ul style="list-style-type: none"> Aerobic suspended growth (Aerobic and anaerobic)Lagoon Nitrate and phosphate removal Chemical oxidation Suspended growth Nitrification/De-nitrification Air stripping Ion exchange Chemical treatment Biological nutrient removal
3	Tertiary	<ul style="list-style-type: none"> Polishing the effluent for reuse application 	<ul style="list-style-type: none"> Pathogen removal Chlorine compounds O₃ ,UV Radiation Membrane filtration Filtration variation Carbon Adsorption Iron exchange

5.5 THE PROPOSED PFD PROCESS FLOW DIAGRAM OF PROPOSED STP

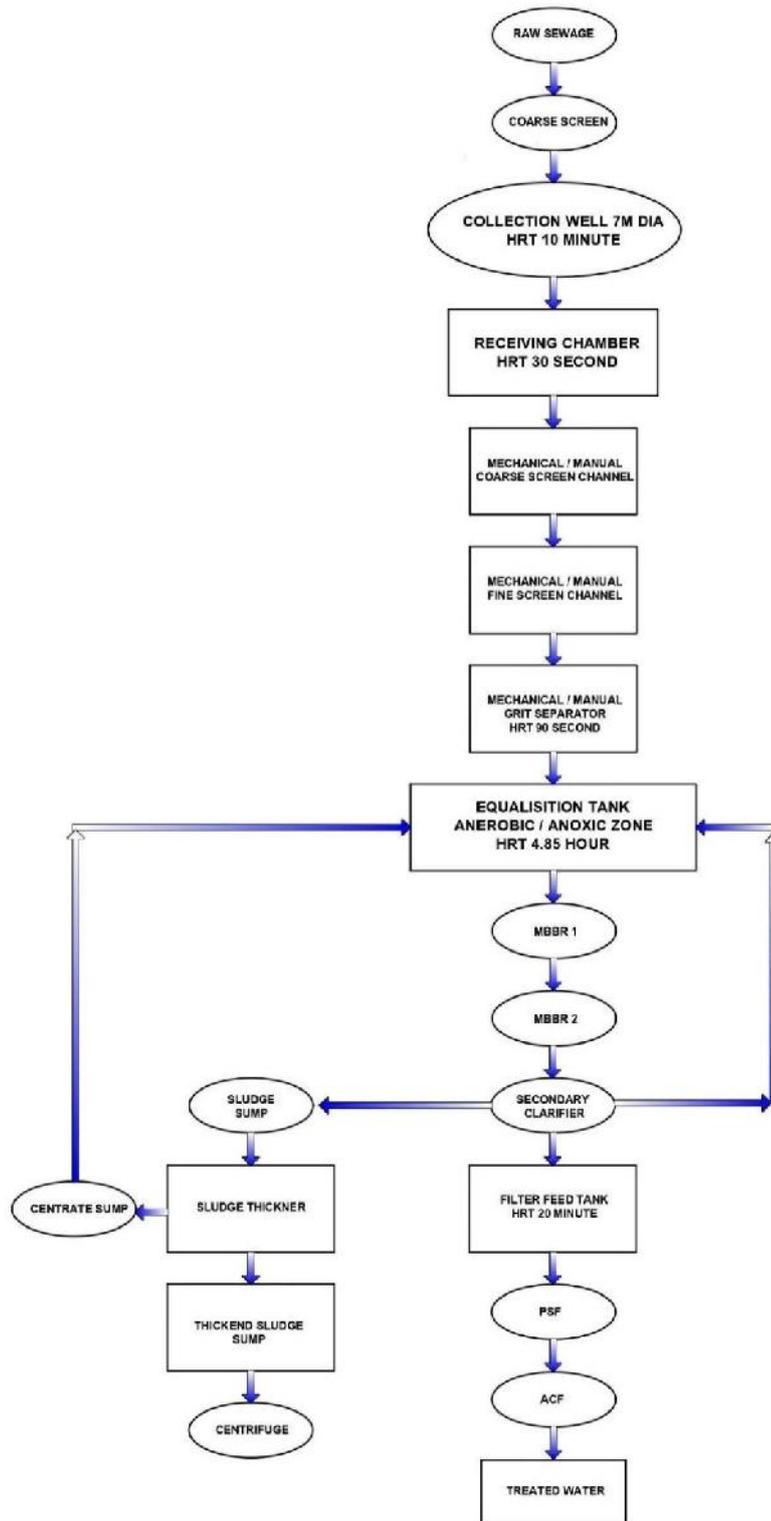


Figure 5.1 Process Flow Diagram

5.6 SELECTION OF TECHNOLOGY FOR THE PROPOSEDSTP

MBBR Technology is opted for secondary treatment in this project for following reasons.

1. MBBR has been in existence for a long time, also in India is approved technology.
2. Minimum foot print
3. Better Stabilized sludge
4. Better Effluent Quality
5. Less sophisticated
6. Spare parts available
7. Lower life cycle cost
8. Nil odour nuisance and other environmental hazards

5.7 FEATURES OF MBBR

Biochemical oxygen demand (BOD) is an indirect measure of the concentration of biodegradable organic matter in water or wastewater. Organic matter (as measured by BOD) is one of the major constituents removed from wastewater in domestic wastewater treatment plants. The reason for being concerned about organic matter in water is its effect on dissolved oxygen in the receiving stream. Dissolved oxygen in water is essential for much of aquatic life, so organic contaminants that affect dissolved oxygen level in water are of concern.

The two major reactions that take place in the organic carbon cycle are biological oxidation of waste organic matter and photosynthesis, which is the process by which green plants produce organic matter from carbon dioxide and water in reactions that are catalysed by sunlight and the chlorophyll in the green plants. Through the biological oxidation process, aerobic microorganisms utilize oxygen in breaking down organic matter to carbon dioxide and water together with small amounts of other end products.

The process takes place as aerobic microorganisms utilize the waste organic matter as their food (energy) source. The process uses oxygen, so if it is taking place in a water body, dissolved oxygen is consumed. A large quantity of organic matter in the water will result in multiplication of microorganisms and rapid removal of dissolved oxygen, leading to oxygen depletion below the level needed by aquatic life. This is also the process that takes place in biological oxidation processes in wastewater treatment plants for removal of organic matter from the incoming wastewater.

The MBBR process for wastewater treatment was invented and initially developed by Professor Hallvard Ødegaard in the late 1980s at the Norwegian University of Science and Technology. Use of this wastewater treatment process has spread rapidly.

The MBBR process is an attached growth biological wastewater treatment process. That is, the microorganisms that carry out the treatment are attached to a solid medium, as in trickling filter or RBC systems. By contrast, in a suspended growth biological wastewater treatment process, like the activated sludge process, the microorganisms that carry out the treatment are kept suspended in the mixed liquor in the aeration tank. In the conventional

attached growth biological treatment processes, like trickling filter or RBC systems the microorganisms are attached to a medium that is fixed in place and the wastewater being treated flows past the surfaces of the medium with their attached biological growth. which are described in more detail in the next section. The MBBR treatment processes typically take place in a tank like an activated sludge aeration tank. In contrast, an MBBR process utilizes small plastic carrier media, which are kept suspended by a diffused air aeration system for an aerobic process or by a mechanical mixing system for an anoxic or anaerobic process. A sieve is typically used at the tank exit to keep the carrier media in the tank.

MBBR processes use plastic media support carriers like those shown in Figure 11. As shown in Figure, the carrier is typically designed to have a high surface area per unit volume, so that there is a lot of surface area on which the microorganisms attach and grow. Two properties of the carrier are needed for the process design calculations are the specific surface area in m^2 / m^3 and the void ratio. The specific surface area of MBBR carriers is typically in the range from 350 to 1200 m^2 / m^3 and the void ratio typically ranges from 60% to 90%. Design values for these carrier properties should be obtained from the carrier manufacturer or vendor (Harlan H. Bengtson).

The MBBR wastewater treatment process is quite flexible and can be used in several different ways:

1. Single stage BOD removal
2. Two stage BOD removal
3. Two stage BOD removal and Nitrification
4. Single stage tertiary Nitrification
5. Pre-Anoxic Denitrification
6. Post-Anoxic Denitrification (Harlan H. Bengtson).

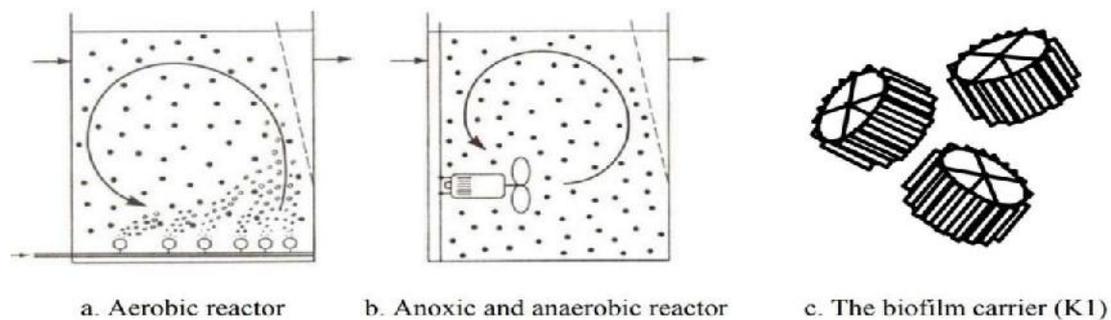


Figure 5.2 MBBR Carrier media in a MBBR tank

The idea behind the development of the moving bed biofilm process was to adopt the best from both the activated sludge process and the bio filter processes without including the worst. Contrary to most biofilm reactors, the moving bed biofilm reactor utilises the whole tank volume for biomass growth, as does also the activated sludge reactor. Contrary to the activated sludge reactor, it does not need any sludge recycle, as also the case in other biofilm reactors. This is achieved by having the biomass grow on carriers that move freely in the water volume of the reactor, kept within the reactor by a sieve arrangement at the reactor outlet. Since no sludge recirculation takes place, only the surplus biomass must be separated – a considerable advantage over activated sludge process. The reactor may be used for both aerobic, anoxic or anaerobic processes (H. Ødegaard).

The key design parameter for sizing the MBBR tank is the surface area loading rate (SALR), typically with units of g/m^2 /day, that is g/day of BOD coming into the MBBR tank per m^2 of carrier surface area. Using design values for wastewater flow rate and BOD concentration entering the MBBR tank, the loading rate in g BOD/day can be calculated. Then dividing BOD loading rate in g/day by the SALR in g/m^2 /day gives the required carrier surface area in m^2 . The carrier fill %, carrier specific surface area, and carrier % void space can then be used to calculate the required carrier volume, tank volume and the volume of liquid in the reactor (Harlan H. Bengtson).

As an improvement over the attached growth systems, the concept of trapping the microbes into the attached biomass concentration and long solids retention time in a biological reactor can limit the waste sludge production for a given reduction of BOD. This is due to the higher biomass concentration in the reactor due to the immobilized biomass and hence the Food/Microorganism ratio Nitrification going beyond the extended aeration. It is stated that during aeration, the synthesis and accumulation of readily biodegradable storage compounds are observed and these can be used for de nitrification under starvation conditions.

Enhancing active biomass concentration, prolonging the life of immobilized carrier and improving the stability of immobilized microorganism play important roles in the process efficiency. The construction, operation, preventing clogging and reducing renewal costs are challenges in the commercial engineering of this technology. However, the fact remains that there are commercially operating STPs built with this technology in our country using various patented media of the respective vendors and with their own design criteria. As such, this technology holds the potential of reducing the footprint of the STP especially in land locked high density urban centres and thus merits its relative consideration.

The requirements for reactor media are high specific surface area, high percent void space, resistance to abrasion or disintegration during placement, insolubility in sewage and resistance to spalling and flaking. The inbuilt configuration must permit hydraulic self-cleaning of the media itself and thereby safeguarding the need to take the reactor out of service to attend for cleaning the clogged media.

Netting to hold back media is an important requirement and is usually provided near the top outlet of the treated sewage in the form of spread-out netting across the entire plan area or a

netted cowl around the off take of the outlet pipe. Care is needed periodically to renew these.

5.7.1 NITRIFICATION

Biological nitrification/denitrification is a two-step process. The first step is nitrification, which is conversion of ammonia to nitrate through the action of nitrifying bacteria. The second step is nitrate conversion (denitrification), which is carried out by facultative heterotrophic bacteria under anoxic conditions.

There are two groups of chemoautotrophic bacteria that can be associated with the process of nitrification. One group (Nitrosomonas) derives its energy through the oxidation of ammonium to nitrite, whereas the other group (Nitrobacter) obtains energy through the oxidation of nitrite to nitrate. Both the groups, collectively called Nitrifiers, obtain carbon required, from inorganic carbon forms.

Combined system is favoured method of operation as it is less sensitive to load variations - owing to larger sized aeration tank - generally produces a smaller volume of surplus sludge owing to higher values of q_c adopted, and better sludge settleability.

Care should be taken to ensure that the oxygenation capacity of aeration tank is sufficient to meet oxygen uptake due to carbonaceous demand and nitrification. Recycling of sludge must be rapid enough to prevent denitrification (and rising sludge) owing to anoxic conditions in the settling tank. This is rising sludge happens, the tertiary filters will chock very fast and will result reduction in plant capacity.

In separate system, the first tank can be smaller in size since a higher F/M ratio (Food to Microorganism Ratio) can be used, but this makes the system somewhat more sensitive to load variations and also tends to produce more sludge for disposal. An additional settling tank is also necessary between the two aeration tanks to keep the sludge separate. A principal advantage of this system is its higher efficiency of nitrification and its better performance when toxic substances are feared to be in the inflow.

5.7.2 DENITRIFICATION

The biological reduction of nitrate (NO_3) to nitrogen gas (N_2) by facultative heterotrophic bacteria is called Denitrification. "Heterotrophic" bacteria need a carbon source as food to live. "Facultative" bacteria can get their oxygen by taking dissolved oxygen out of the water or by taking it off of nitrate molecules.

Denitrification occurs when oxygen levels are depleted and nitrate becomes the primary oxygen source for microorganisms. The process is performed under anoxic conditions, when the dissolved oxygen concentration is less than 0.5 mg/L, ideally less than 0.2. When bacteria break apart nitrate (NO_3^-) to gain the oxygen (O_2), the nitrate is reduced to nitrous oxide (N_2O), and, in turn, nitrogen gas (N_2). Since nitrogen gas has low water solubility, it escapes into the atmosphere as gas bubbles.

Free nitrogen is the major component of air; thus, its release does not cause any environmental concern.

5.7.3 PHOSPHOROUS REMOVAL

The consciousness to restrict the phosphorous in the treated sewage before Discharge into the environment to curtail eutrophication is being recognised. The phosphorous can be removed by a process called as the luxury uptake. There are at least six different variations of these processes which have all been developed in advanced countries and every situation will need a separate evaluation and validation.

An alternative process is to introduce a chemical precipitation either in the secondary clarifier or as a separate tertiary stage where phosphorous is precipitated by coagulating with Ferric or Aluminium salts. There is also another technology of high Lime followed by acidification or carbonation whereby in addition to phosphorous removal, colour, heavy metals, fluorides, silica and magnesium can also be simultaneously removed. It is necessary to conduct lab studies to establish the efficiency and the type of chemicals.

5.7.4 A2O PROCESS

The combined removal of carbon, nitrogen and phosphorus can be achieved by several biological treatment processes. Two common biological treatment processes are the A2O and Barden-pho processes. The A2O process is a modification of A/O phosphorus removal process is to include an anoxic stage for denitrification. Influent and return activated sludge flow into the anaerobic tank while nitrified liquor is recycled with a circulating pump from the aerobic (nitrification) tank to the anoxic (denitrification) tank. Ammonia nitrogen is oxidized to nitrite or nitrate in the aerobic tank, and then nitrite or nitrate is denitrified to nitrogen gas in the anoxic tank

5.8 PROPOSED TREATMENT UNITS

5.8.1 RECEIVING CHAMBER

The sewage received in the collection well located at the plant premises is pumped to the receiving chamber. The average quantity of flow in to the receiving chamber is assumed to be 304.35 cum/hr whereas peak flow is taken as 684.78 cum/hr. Dimension of receiving chamber is 2.25×1.7×2m with a freeboard of 0.5m.

5.8.2 SCREEN CHANNEL

After receiving chamber, sewage passes through screening chambers provided. The principal role of the fine screening is to remove floating materials from the sewage that could damage subsequent process equipment, eliminate materials that may inhibit the beneficial reuse of bio solids and reduce overall treatment process effectiveness. Screened materials are mechanically removed by the scrappers. In case of emergency, the screen chamber can be by passed to the manual screen chamber so that the treatment is continuously ensured.

5.8.3 GRIT SEPARATOR

The grit chamber is used to remove grit, consisting of sand, gravel, cinder, or other heavy solids materials that have specific gravity much higher than those of the organic solids in waste water. Grit chambers are provided to protect moving mechanical equipment from abrasion and abnormal wear; avoid deposition in pipelines, channels, and conduits; and to reduce frequency of digester cleaning. Two numbers of grit chambers are provided in

the plant (one stand by) with a dimension of 4.3x4.3 x3 m.

5.8.4 APPROACH CHANNEL FOR PARSHALL FLUME

A Parshall flume is a fixed, hydraulic structure that is placed in a flow stream to determine the flow of water. The flume accelerates flow by both a contraction of the parallel sidewalls and a drop in the floor elevation in the throat. It is used to measure volumetric flow rate in industrial discharges, municipal sewer lines, and influent/effluent flows in waste water treatment plants.

5.8.5 EQUALISATION TANK

Flow equalization is used to minimize the variability of water and waste water flow rates and composition. Each unit operation in a treatment train is designed for specific waste water characteristics. Improved efficiency and control are possible when all unit operations are carried out at uniform flow conditions. The equalization tanks are provided (i) to balance fluctuating flows or concentrations, (ii) to assist self-neutralization, or (iii) to even out the effect of a periodic "slug" discharge from a batch process. The design is done to have a hydraulic retention time of 5.45 hours. Two circular tanks with diameter of 15.4m is proposed with a depth of 5m. Equalization tank is divided into Anaerobic and Anoxic areas with the help of baffle wall for denitrification

5.8.6 MIXING EQUIPMENT

Mixers are often employed in equalization basins to achieve homogeneity in and to aerate the wastewater. Various types of mixers are available. The classification of mixers depends on the flow pattern the mixers produce.

5.8.7 MOVING BED BIO REACTOR(MBBR)

Moving Bed Biofilm Bioreactor (MBBR) process uses the whole tank volume for biomass growth. It uses simple floating media, which are carriers for attached growth of bio films. Biofilm carrier movement is caused by the agitation of air bubbles. This compact treatment system is effective in removal of BOD as well as nitrogen and phosphorus while facilitating effective solids separation. Design of the reactor is based on the actual wastewater characteristics and local conditions. MBBR units are placed in series based on the load entering each reactor. Two circular MBBR tanks are designed with 15.1m diameter and depth of 5m and two circular MBBR tanks with 14m diameter and 5m depth.

5.8.8 AIR BLOWERS

Aeration is the most critical component of a treatment system using the Moving Bed Bio Reactor. A well-designed aeration system has a direct impact on the level of sewage treatment it achieves. An ample and evenly distributed oxygen supply in an aeration system is the key to rapid, economically-liable, and effective waste water treatment. Four numbers (3W+1S) of air blowers of 52 HP with a discharge of 1657 cum/hr are provided.

5.8.9 SECONDARY CLARIFIER

Clarifiers are settling tanks built with mechanical means for continuous removal of solids being deposited by sedimentation. A clarifier is generally used to remove solid particulates or suspended solids from liquid for clarification and (or) thickening. Secondary

Clarifier is a circular basin in which effluent from the MBBR process is held for a period of time during which the heavier biomass (microorganisms) settles to the bottom as “activated sludge”. There is no need for sludge recirculation in MBBR due to its high MLSS values. So secondary settling tanks are just used for removing excess settleable solids present in the effluent comes out from MBBR tanks. Two number of secondary clarifiers with 14.70m diameter and 3.3m depth is provided with a retention period of 3.10 hrs.

5.8.10 SLUDGE SUMP

Total sludge generated in the secondary clarifier is calculated as 1600.31 kg/day. Sludge sump is designed to have a hydraulic retention time of 2hrs. One number of sludge sump having circular shape with diameter 3m and depth 2.35 m is provided.

5.8.11 THICKENER FEED PUMP

The major function of sludge thickener feed pump is to transfer the sludge from sludge sump to sludge thickener. Two numbers (1W+1SB) of non-clog, submersible pumps are provided with a discharge of 31.38 cum/hr

5.8.12 SLUDGE THICKENER

Sludge thickening normally refers to the process of reducing the free water content of sludge or Thickening is a procedure used to increase the solids content of sludge by removing a portion of the liquid fraction.

5.8.13 CENTRIFUGE FEED PUMP

The major function of Centrifuge feed pump is to transfer the sludge from thickened sludge sump to Centrifuge. Two numbers (1W+1SB) of non-clog, submersible pumps are provided with a discharge of 9.6 cum/hr

5.8.14 SLUDGE CENTRIFUGE

Centrifugal thickening and dewatering of sewage sludge is a high-speed process that uses the force from rapid rotation of a cylindrical bowl to separate wastewater solids from liquid. The centrifugal force in the decanters is utilized to separate the solids from the water. The use of organic flocculants, the poly electrolytes, made it possible to coagulate the fines sludge particles to relatively large sludge floc in the centrifugal field so that reliable separation of solids and water could take place.

5.8.15 PRESSURE SAND FILTER (PSF)

The treated water which is collected in the filter feed tank shall be pumped into the Pressure Sand Filter using the Filter Feed Pumps. They are the most popular method for removal of turbidity from water. The Pressure Sand Filter consists of a multiple layer of sand with a variety in size and specific gravity. These Filters are designed to remove turbidity and suspended particles present in the feed water with minimum pressure drop. Raw water flows down wards through the filter bed and as the suspended matter, which is treated by addition of a coagulant like alum or poly electrolyte, is retained on the sand surface and between the sand grains immediately below the surface. There is steady rise in the loss of head over a period of time and the flow reduces once the pressure drop across the filter is excessive. The filter is then taken out of service and cleaning of the filter media is

effected by flow reversal also called as backwash. To assist in cleaning the bed, the backwash operation is sometimes preceded by air scouring by way of agitation through the under-drain system. The air scouring agitates the sand with a scrubbing action, which loosens the intercepted particles.



Figure 5.3 Pressure Sand Filter

Pressure sand filter is designed to have a dimension of 2.4m \varnothing and 2.5m height. The work pressure is 3.5bar and it can be increased up to a maximum of 3.50 bar. Materials used in pressures and filter are sand and anthracite (Dual media).

5.8.16 ACTIVATED CARBONFILTER(ACF)

Filtered wastewater from Pressure sand filter is then passed through the Activated Carbon Filter. They are generally employed in the process of removing organic compounds and/or extracting free chlorine from water, thereby making the water suitable for discharge.

Activated carbon is commonly used for removing organic constituents and residual disinfectants in water supplies. This not only improves taste and minimizes health hazards; it protects other water treatment units such as reverse osmosis membranes and ion exchange resins from possible damage due to oxidation or organic fouling. Activated carbon is a favored water treatment technique because of its multifunctional nature and the fact that it adds nothing detrimental to the treated water. Most activated carbons are made from raw materials such as nut shells, wood, coal and petroleum.

Carbon filtering is a method of filtering that uses a bed of activated carbon to remove contaminant sand impurities, using chemical adsorption. Each particle/granule of carbon provides a large surface area/pore structure, allowing contaminants the maximum possible exposure to the active sites within the filter media.

The dimension of Activated Carbon Filter is 2.6m \varnothing x2.5m height.



Figure 5.4 Activated Carbon Filter

5.8.17 TREATED WATER TANK

The treated water is finally fed in to the treated water tank having a capacity of 304.35 m³. Treated water from Activated Carbon filter is pumped in to the treated water tank of dimension 9.4x9.4x3.8m. Hydraulic retention time of 60 minutes is given in the treated water tank.

5.8.18 CHLORINE CONTACT TANK

No separate Chlorine contact tank is proposed. Treated water tank is proposed as chlorine contact tank itself.

5.8.19 EFFLUENT CHANNEL

Effluent Conveyance System called as Effluent Channel is provided to carry treated effluent from STP to the sea.

5.8.20 OUT FALL

The disinfected clear effluent shall be let out to the sea through a RCC covered channel of adequate slope.

5.8.21 DETAILED DESIGN

Detailed design of the Sewage Treatment Plant with MBBR Technology is provided in the annexure

5.9 POWER REQUIREMENT

The total running power requirement is 334.5HP/279.53KW and the installed capacity is 456HP/340.17 KW. The single largest motor capacity is 52HP (Air blower). An Indoor type transformer and a Generator is proposed with the following capacities.

- a. Transformer : 350KVA
- b. Generator : 350KVA

5.10 OTHER FACILITIES

Following provisions are also included in the proposal

5.7.13 Comfort room cum office in the laboratory

5.7.14 Internal Roads

5.7.15 Storm Water Drain

5.7.16 Providing Lawns

5.7.17 Planting trees

5.7.18 Bye-passing Arrangements

5.7.19 Walk ways for all major elevated units

5.7.20 Walkways/ground pavements

5.7.21 Water Supply and sanitation arrangements

5.7.22 Laboratory

5.11 PLAN FOR REUSE OF RECYCLED SEWAGE

In the planning and implementation of water reclamation and reuse, the reclaimed water application will usually govern the wastewater treatment needed to protect public health and the environment, and the degree of reliability required for the treatment processes and operation (Metcalf and Eddy). The major waste water reuse categories are as follows:

- a] agricultural irrigation, crop irrigation and commercial nurseries
- b] Landscape irrigation
- c] industrial recycling and reuse
- d] groundwater recharge, groundwater replenishment and saltwater intrusion control
- e] recreational/environmental uses
- f] Non potable urban reuse

5.12 MAINTENANCE OF AN ECO-FRIENDLY SYSTEM

Since the treated water contains plant nutrients also, it will be beneficial for the environment when discharged as soil infiltration. Care has also been taken to properly treat the sludge produced during the operation. It has also been decided to impart a green environment to the STP units with special methods of growing plants at the exterior of plant components and space between units. Maximum utilisation of space has been taken at the planning and design stage itself and using the natural treatment properties of the soil, such as decentralized systems provide good opportunities to use the natural environment. They can help reduce the level of difficulty and cost to treat pollutants, such as nutrients, and keeping them from entering lakes, rivers, and streams. The soil acts as a natural filter and provides final treatment by removing harmful bacteria, viruses, and nutrients.

5.13 PRELIMINARY STRUCTURAL DESIGN OF COMPONENTS

For the various units of the STP structural analysis and design have been performed in accordance with the stipulations of all relevant Indian Standard Codes of practice. For the reinforced concrete elements, special attention has been given to arrive at the preliminary dimensions to satisfy norms and conditions for the water retaining structures. For the metallic structures like pressure filter units, similar approach has been adopted. Since the units are constantly in contact with aggressive environment like sewage, non-corrosive coating for reinforcing steel and water proofing application for the inner side of reinforced concrete structures are recommended. These provisions are already given in the detailed estimates. During the execution stage, a detailed structural analysis of the components can be performed. However, the dimensions are expected to fall within the limits of the values obtained from the preliminary analysis. In the case of foundations, simple raft and beam-slab type raft is adopted for safety considerations. Since the soil nature is observed to be satisfactory to withstand medium loading conditions, deep foundations are not suggested. Soil analysis reports available for the locality has been examined to arrive at a decision. However, during the execution stage, detailed soil investigations can be performed. Cover for the reinforced concrete elements is to be given in accordance with the exposure conditions given in the IS 456 Code of practice.

5.14 SEPTAGE

Septage or septic tank waste refers to the partially treated matter stored in and pumped out of a septic tank. In other words, fecal sludge from septic tanks is known as Septage, but fecal sludge and Septage are interchangeably used in India. Septage is a by-product of pretreatment of household wastewater in a septic tank where it accumulates overtime. It is generally pumped out of a septic tank or onsite sanitation system using a vacuum tanker. Septage is the liquid and solid material that is pumped from a septic tank, cesspool, or other such onsite treatment facilities after it has accumulated over a period of time.

5.14.1 SEPTAGE MANAGEMENT

Sanitation often focuses only on the provisioning of physical infrastructure toilets or latrine in order to increase the 'coverage of toilets', or to look at the epitome of sanitation: ODF cities. But in order to provide tangible and sustainable sanitation, there is a need to focus on the entire 'sanitation chain'. In simple terms, a sanitation chain is an outline for understanding how fecal waste flows through each system. It sets out interlinked steps vital to manage septage and effluent from generation to disposal or end use, thereby summarizing the city-level outcomes and current status of the same.



From generation to disposal or end use, thereby summarizing the city-level outcomes and current status of the same.

5.14.2 TRANSPORTATION OF SEPTAGE

Transportation is a very vital stage in the sanitation value chain and so are safety measures involved in it. Vehicles that carry Septage act as mobile sewer networks for OSS. Ideally, an ultimate discharge point of collected Septage is an STP or Septage treatment plant. The two main types of vehicles used in India are:

1. Truck-mounted vacuum tankers: These trucks have vacuum pumps with sizes based on lift elevation, pumping distance, volume of sludge to be removed, and volume of the tank. Their capacity varies between 3,000-10,000liters

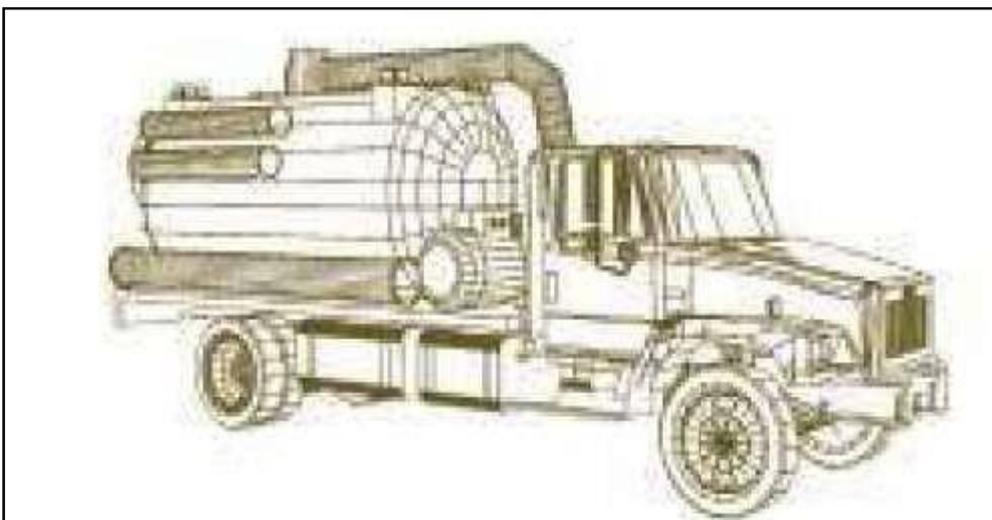


Figure 5.5 Truck-mounted vacuum tankers

2. Tractor-mounted tankers: These vehicles are locally made across India, but their capacity is similar to that of vacuum trucks. The motor, the tank and the tractor are assembled according to the complimenting capacity of each module.

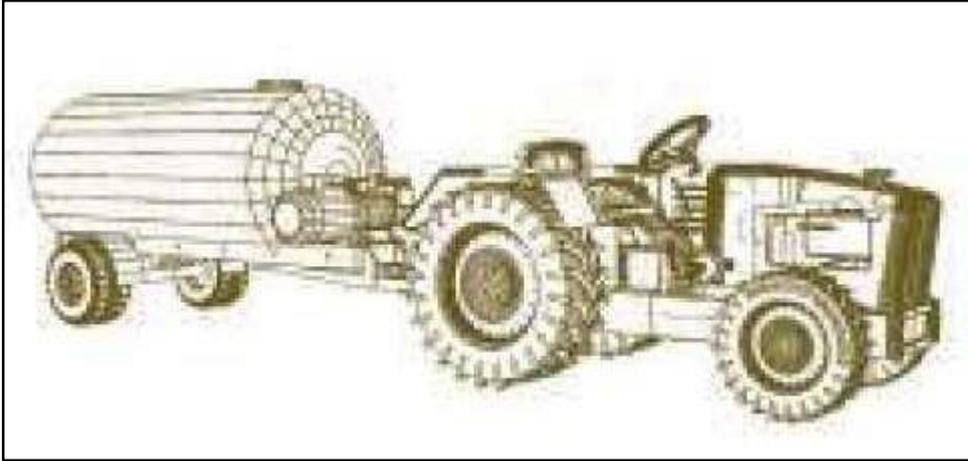


Figure 5.6 Tractor-mounted tankers

Septage transportation is one of the most important components of Septage management. There is need for evolving a standard method of collection, handling and transportation of Septage. Desludging trucks act as a “mobile sewer network” for onsite sanitation systems. They collect the Septage at the household level and transport it to treatment or disposal sites, thereby complimenting the functions of underground sewer network. It may be assumed that one vehicle having a capacity of 2,000 liters shall clean 3 to 10 septic tanks per day. This is based on the frequency of cleaning of septic tanks (once in 2 – 3 years) and also the distance from the location of septic tanks to the Septage treatment facility. The vehicles are available in different capacities from 2,000 up to 12,000 liters. It is to be noted that the requirement of machines also varies depending upon the capacity of vehicles, road width etc. In case of bigger cities having sufficient width of roads, vehicles having larger capacities may be adopted. Adequate provision for standby machines for cleaning of septic tanks may also be made. Small scale vacuum trucks called Vacutug (from 200 up to 2,000 Liters capacity) also are recommended for use in areas inaccessible to large desludging vehicles. The Vacutug is mounted on wheels and can be attached to a small vehicle. It can be manufactured locally to offer flexibility and mobility without losing the capacity to collect a substantial volume of fecal sludge within one operation.

For the purpose of planning sewerage/septage management systems for this proposal the project area is broadly categorized into two: areas with higher population density and areas with lower population density. Networked sewerage system with STPs is proposed for the first category where the density is generally more than 1500 per square kilometre. Furthermore, septage treatment is proposed in densely populated areas where there is no road network. Septage load from this zone of Kanhangad Municipality is proposed to be transported to the 7 MLD STP with MBBR technology at Nilankara Vayal in Kanhangad Municipality where Co-treatment facility will be provided.

5.15 SEPTAGE CO-TREATMENT PROPOSED

Septage collected from the septage Zone is proposed to be treated in the Sewage Treatment Plant. Capacity of septage load is considered while designing the Sewage

Treatment Plant. A septage collecting tank of size 6mX4mX3m is proposed to collect the septage received by trucks. The septage is diluted with effluent from secondary clarifier and proposed to pump to receiving chamber of Sewage Treatment Plant.

5.16 LAND REQUIRED FOR STP AND WELLS

The details of land required for Sewage Treatment Plant, pumping stations and lifting stations are detailed below. Procurement of land is the sole responsibility of Municipal Authority.

Table 5.4 Land details

Sl No	Components	Area required in cents	Remarks
1	Sewage Treatment Plant	400	Survey No:SR no.100,101,102,103 Kanhagad Village, 12.29793570, 75.10560752
2	STP Link road	0	SR No. 102 Nilankara Vayal
3	LS-1	1	12.32271350, 75.08625608
4	LS-2	1	12.31195963, 75.09393077
5	LS-3	1.5	12.31473433, 75.08736160
6	LS-4	1.5	12.31014627, 75.08992765
7	LS-5	1.5	12.31143780, 75.09005078
8	LS-6	1	12.30835997, 75.09277674
9	LS-7	1	12.29007973, 75.10147860
10	LS-8	1.5	12.29482542, 75.09941467
11	LS-9	5	12.30084804, 75.09542914
12	LS-10	5	12.30675178, 75.09321063
13	LS-11	1	12.31578941, 75.09005931
14	LS-12	1	12.32248906, 75.08741277
15	LS-13	1	12.32419402, 75.08964460
16	LS-14	1.5	12.32798717, 75.08699007

17	LS-15	1	12.32936090, 75.10421842
18	LS-16	1	12.32465228, 75.10585378
19	LS-17	1.5	12.32211411, 75.10765492
20	LS-18	1.5	12.32029561, 75.10715546
21	LS-19	1.5	12.31798341, 75.10236344
22	LS-20	1	12.31979776, 75.10043544
23	LS-21	2	12.31864166, 75.09824572
24	LS-22	1.5	12.32152044, 75.10063960
25	LS-23	1	12.30770639, 75.10526744
26	LS-24	1	12.30494515, 75.10563204
27	LS-25	1	12.31034104, 75.09504216
28	LS-26	1.5	12.30054181, 75.10030165
29	CW-1	10	12.32550788, 75.09711301

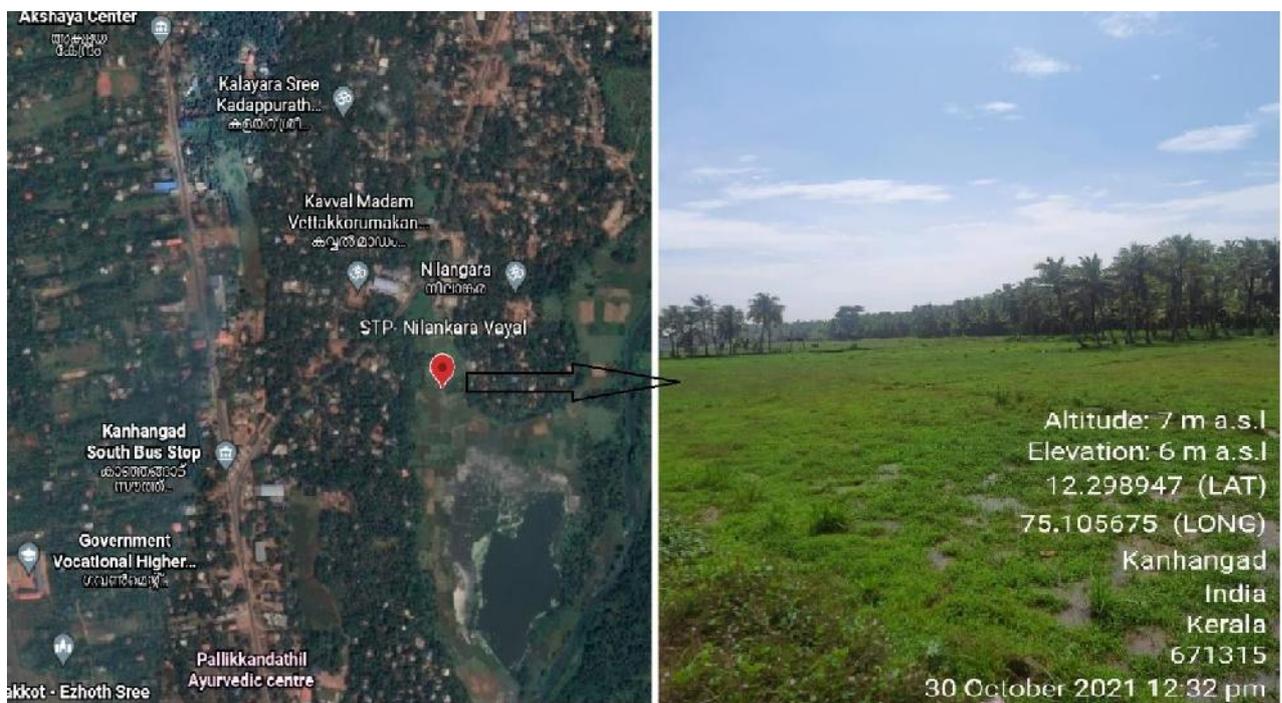


Figure 5.7 STP- Location

5.17 SMART MANAGEMENT AND ON-LINE MONITORING USING INTERNET OF THINGS (Io T)

Advancement in the field of digital technology has enabled the wastewater treatment system operator and managers to control and enhance the performance of various components of the system. Internet of things (Io T) consists of a network of physical objects using various sensors as end points to enable monitoring from a remote station.

For the sewerage treatment plant, a network of various sensors can capture the variations of values of parameters like temperature, dissolved oxygen, chemical composition, TDS etc. at different control points of the system. The continuous data obtained through IoT is used by a customized algorithm for synthesis to impart a decision-making procedure. A centralised information processing system (CIPS) can be formed for this task. In addition to this smart water flow meters can also be coupled to this digital environment. IoT in wastewater management can also be used to calculate residual chemicals after the treatment. This data can be further used to calculate the efficiency of the treatment process and ensure that water quality standards are met before it is discharged in a water body.

By using real-time data gathered through different embedded sensors, performance characteristics of machines can be monitored that further increase the productivity of equipment and boost maintenance tasks. In the present study for the hospital, provision for implementing a IoT based control of the unit have been suggested.

5.18 ODOUR CONTROL METHODS

Odours are a complex combination of a wide variety of compounds; however, there are certain compounds and groups of compounds that contribute specifically to sewage odours, and significantly determine the selection of the control technology. These include the following: Hydrogen sulphide, and Ammonia. Odour control is a complex and time-consuming challenge, often requiring a combination of methods for treating odorous gases and for removing or reducing the potential causes of the odours. If an odour problem is severe enough to affect the community, an emergency response and solution to the problem must be carried out quickly. The approach for selecting an odour control method or technology includes the following steps:

- A. Identify the odour source and characteristics through sampling and analysis.
- B. List and assign priorities to controlling a specific odour problem, recognizing considerations such as cost, plant location, future upgrading of various sewage processes, severity of the odour problem, and the nature of the affected area.
- C. Select one or more odour control method or technology for implementation to meet the objectives of steps “a” and “b”, taking in to consideration the advantages and disadvantages of each.
- D. Monitor odour missions from the treated air for process adjustments and for feedback to evaluate the solution’s effectiveness.

Hydrogen sulphide ($H_2 S$) is the most common odorous gas found in sewage collection and treatment systems and results from the reduction of sulphate by bacteria under

an aerobic condition. Its characteristic rotten-egg odour is well known. The gas is corrosive, toxic and soluble in sewage. Hydrogen sulphide is considered a broad-spectrum poison, meaning it can poison several different systems in the body.

5.19 PREVENTION OF ODOUR

Hydrogen sulphide production can be controlled by maintaining conditions that prevent the build-up of sulphides in the sewage. The presence of oxygen at concentrations of more than 1.0 mg/L in the sewage prevents sulphide build-up because sulphide produced by anaerobic bacteria is aerobically oxidized. Maintaining anaerobic environment inhibits the anaerobic degradation process, which contributes to the generation of hydrogen sulphide. A checklist is given below:

Prevent corrosion in the collection well of the facility by blowing air through the facility

- Avoid storing screenings and grit generated in the grit chamber for a long time. Dispose of screening sand grit at appropriate Intervals
- Retention time of sludge in the sludge treatment facilities should be appropriate (Do not retain sludge for a long time)
- Maintain sewage at neutral pH range because most of the sulphide is present at a pH value of less than 7.

Following is a short checklist of operational considerations for controlling odours of primary treatment facilities: (May also apply in other facilities)

- Remove scum routinely, with increased frequency during warm weather.
- Remove sludge before it can bubble or float.
- Wash weirs and other points where floatable and slime collect. Some facilities use submerged pipes with holes rather than effluent troughs. The submerged pipes do not splash the primary effluent, thereby reducing their lease of hydrogen sulphide.
- Wash down all spills and grease coatings.
- When draining a tank, immediately flush it completely. If sludge does not drain quickly, spray lime, calcium hypochlorite, or potassium permanganate on the sludge surface to reduce odours. Because even a clean tank can produce odours, flushing the tank with a chlorine solution or keeping the tank floor covered with allow concentration of chlorine solution will reduce odours.
- If the sewage is septic, add chemicals in the collection system or at the plant, as appropriate, to reduce sulphides.
- If tanks are covered for odour control, keep plates and access hatches in place.
- Routinely check any odour scrubbers or deodorizers for plugging, adequate supply of chemicals, proper pressures for demisting, and/or effectiveness of carbon.

- The splashing of primary sewage into weir troughs and effluent channels can result in the release of hydrogen sulphide. If possible, try to minimize the splashing of primary sewage in to the channel or weirs. If it cannot be accomplished operationally, then installing submerged sewer pipes may be necessary. This will require tank modifications to verify the plant hydraulics and provide proper control to avoid fluctuations in the tank levels.
- Minimize the stripping of hydrogen sulphide from the sewage when using channel air diffuser systems. Adoption of the following regular practices will not only increase removal efficiency but will provide better working conditions for the operator:
- Regularly remove accumulations from the inlet baffles and outlet weirs with a hose or a broom with stiff bristles. Only experience will determine the necessary frequency.
- Clean cum removal equipment regularly; otherwise, obnoxious odours and a runn slightly appearance will result.
- Keep cover plates in place except when operations or maintenance require the removal.
- Immediately flush and remove all sewage and sludge spills. Avoid hosing down motors and enclosed control devices.
- Establish a house keeping schedule for the primary treatment area, including galleries, stairwells, control rooms, and related buildings, and assign responsibility for each item to a specific employee.
- Re paint surfaces as necessary for surface protection and appearance.

5.20 CONTROL OF ODOUR BY CHEMICAL ADDITION

Chemical addition can control odours in STP by preventing anaerobic conditions or controlling the release of odorous substances.

Table 5.5 Control of odour by chemical addition

Chemical	Effective against Oxidizers
Ozone	Atmospheric hydrogen sulphide only
Hydrogen peroxide	Hydrogen sulphide, also acts as oxygen source
Chlorine	Hydrogen sulphide and other reduced sulphur compounds
Sodium and calcium hypochlorite	Hydrogen sulphide and other reduced sulphur compounds
Potassium permanganate	Hydrogen sulphide and other reduced sulphur compounds

Chapter 6 COST ESTIMATE, OPERATION AND MAINTENANCE CHARGES

6.1 DETAILED ESTIMATE

6.1.1 GENERAL

The detailed estimate for the STP components and Network components is prepared in accordance with the Delhi Schedule of Rates (DSR) 2018 provisions after applying District Cost Index. For certain items, market rates are adopted. The estimate prepared in Kerala Water Authority Price software.

6.1.2 DETAILED ESTIMATE OF COMPONENTS

The detailed estimates have been divided into components as Raw sewage well ,Receiving Chamber, Screen Chamber, Grit chamber, Equalization Tank, Aeration/MBBR Tank, Secondary Settling Tank, Filter Feed Tank, Treated Water tank, Sludge sump, Sludge Thickener, Thickened sludge Centrifuge Structure, Centrate sump, Chlorinator room, Air blower room, Administrative Building, Well and pump house, Sewer network, Control room, etc, Mechanical works, Electrical installations and instrumentation, Operation and maintenance. The total estimate amount comes to Rs. 200.60 Crores including O&M for 10 years. Detailed estimate is enclosed as annexure.

6.2 PROPOSED SEWERAGE SYSTEM O&M

On completion of the construction, the system should be commissioned in phases. Trial commissioning and operation of all the components of the project shall be carried out in phases and any defects found during the period shall be attended immediately. The following components require regular supervision, operation and maintenance.

1. Sewerage Network.
2. Pumping Stations.
3. Sewage Treatment Plants.

For the efficient operation and maintenance of sewerage system, proper planning, staff/labour, tools & equipment and spares are required. For estimating the O&M cost for the Sewerage system, the cost is broadly categorized into

1. Establishment Charges
2. O&M for Network maintenance cost
3. O&M for STP

6.3 SEWER NETWORK MAINTENANCE

For the purpose of maintenance, the jet rodding machine will be used along with other components for maintenance of the collection system. It can either be procured or can be hired. The staff shall be properly trained to operate the jet rodding machine.

All the new connections shall be given under the supervision of O&M staff. No unauthorized connection shall be given to the sewerage system.

Sewer inspections and maintenance should be planned. The whole sewerage system should

be marked on a plan and divided into sections and areas.

Quality maintenance shall be the most important step in smooth functioning of the proposed sewers. This includes the optimum use of labour, equipment and material to keep the system in good condition.

6.4 TYPES OF MAINTENANCE

There are two types of maintenance of an underground sewerage system - preventive and emergency. It is necessary that preventive or routine maintenance are carried out to prevent any breakdown of the system and to avoid emergency operations to deal with clogged sewer lines or over flowing manholes or backing up of sewage into a house or structural failure of the system. Preventive maintenance is more economical and provides for reliability in operations of the sewer facilities. Emergency repairs, which would be very rare if proper maintenance is carried out will also have to be provided for proper inspection and preventive maintenance is a necessity.

The organization required for the maintenance of the sewerage system will vary with the size and type of the sewerage system and the relative age of the system. The larger the municipality, the larger and more complex will be its maintenance organization. The size of the organization will vary from a couple of employees to several hundred regular employees. The primary effort of the staff is to maintain sewers free flowing and unobstructed.

6.4.1 STEPS TO BE TAKEN FOR OPERATION AND MAINTENANCE OF THE SEWERAGE NETWORK DETAILED IN THIS SECTION ARE AIMED AT

- Regular maintenance of the system for proper functioning
- Preventing any breakdown of the system
- Emergency operations to deal with clogged sewer lines or overflowing manholes
- Preventing back flow of sewage into residence sand
- Preventing structural failure of the system.

6.4.2 INSTITUTIONAL STRUCTURE

Operation and maintenance of the proposed scheme shall be carried out through the maintenance wing of KWA.

The following list gives the duties that are to be performed for proper sewer maintenance:

- Inspection of sewers, sewer appurtenance sand Sewage Treatment Plant.
- Cleaning of sewers and sewer appurtenances.
- Checking manhole conditions for deposition of silt etc.
- Replacing broken manhole covers.
- Raising the manhole cover for the construction of culverts, resurfacing etc.
- Approval of sewer connection applications and executing connections
- Maintaining records of sewers and STP including:
- Daily operation and maintenance report Complaints register
- Stock of equipment

- Disposal of silt, garbage removed after cleanings sewer, manholes and treatment plants.
- Removal of debris, brick bats etc. After any repair work.
- Identifying locations where regular maintenance is needed (problem areas) in sewers and STP.
- Ensuring work is carried out correctly and safely with due regards to health and safety regulations.
- Adopting preventive maintenance within the sub division as a whole, conducting periodic staff meeting and record of the proceedings.

6.4.3 PREVENTIVE MAINTENANCE

In order to maintain the sewer system in satisfactory manner, desilting of manholes and sewers is to be done by any of the following methods suitable for the purpose.

- a) By manually by ball passing method
- b) By drag bucket machine
- c) By jet rodding machine

6.4.4 BREAK DOWN MAINTENANCE

The work of each sewer maintenance gang would consist of the following:

- 1) The house sewer obstruction and main sewer obstruction or any other related complaints to be attended with high priority.
- 2) There were line leaks/complaints are to be attended with high priority.
- 3) Any silt or mud removed during sewer cleaning operation shall be removed from the roads within 24 hours to approved location.

It shall be the responsibility of the O&M division to arrange for traffic control and to obtain permission from concerned agencies for traffic diversion etc for purpose of maintenance. All necessary precautions shall be taken. After the maintenance works are completed roads, cables, utilities etc shall be restored to the original condition.

6.4.5 PERFORMANCE LEVEL TO BE ACHIEVED

- a) Collection system shall be maintained without over flows from manholes/sewers on to streets or into storm water drains.
- b) Silt and trash removed from sewers during removal of block ages/routine cleaning of sewers shall be disposed off hygienically within 24hours.
- c) Preventive maintenance shall be carried out as per approved schedule.
- d) Duration of break down maintenance shall not exceed the specified norms.
- e) All safety precautions shall be taken in sewer maintenance

6.4.6 PROPOSED SEWERAGE SYSTEM O&M

On completion of the construction, the system should be commissioned in phases. Trial commissioning and operation of all the components of the project shall be carried out in

phases and any defects found during the period shall be attended immediately. The following components require regular supervision, operation and maintenance.

- Sewerage Network.
- Pumping Stations.
- Sewage Treatment Plants.

6.5 SAFTEY PRACTICES

Sewer cleaning is an occupation that has an overall accident frequency rate that is relatively higher than any other industry. The employer has the responsibility of providing the worker with a safe place to work. Never the less, the worker has the overall responsibility and must ensure that it is a safe place to work. This can only be done by constantly thinking of safety and working safely. The worker has the responsibility of protecting not only himself, but also all other plant personnel or visitors by establishing safety procedures for the plant and then ensuring they are followed. He must train himself to analyse jobs, work areas and procedures from a safety stand point and learn to recognize potentiality hazardous actions or conditions. When he recognizes a hazard, he must take immediate steps to eliminate it through corrective action. If correction is not possible, guard against the hazard by proper use of warning signs and devices / by establishing and maintaining safety procedures. As an individual, the supervisor can be held liable for injuries or property damage, which results from an accident caused by his negligence.

6.6 O &M CHARGES

O&M charges for 10 years (STP + Network) excluding centage and GST	Rs. 545201418.81
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Chapter 7 IMPLIMENTATION OF THE PROJECT

7.1 IMPLEMENTING AGENCY

Kerala Water Authority is the responsible agency in Government sector in the water supply sector and sewerage Sector for implementation of Major Projects under various funding agencies AMRUTH, NABARD, Rebuild Kerala, ADB assistance, and also STATE PLAN Works. Being high value projects Implementation of sewerage projects also requires an agency with expertise and having sufficient human resources. Implementation can be done through concerned Project Divisions of KWA.

7.2 STEPS TO TAKEN WHILE TENDERING.

Conditions should be incorporated in the NIT that detailed field survey and design of network shall be carried out for ascertaining the levels due to road developments if any and in order to accommodate the fact that sewer network design based on gravity flow and accurate levels with Total Station equipment along both sides of road and centre of road is required. Due to limitation of fund and time DGPS survey along one side of the road is only taken in the present proposal. Additional changes required for satisfactory completion of work additional sewer lines required with additional manholes, lifting stations required due to future developments in the scheme area shall also be included in the scope of work while implementing the project. Better and advanced technology for treatment to be considered for STP while implementing the project. Soil investigation of STP site, well sites not carried out as the land proposed are private lands. Hence detailed soil investigation is to be carried out and type of foundation of the structures to be changed accordingly.

7.3 INTEGRATION WITH OTHERPROJECTS

Planning and design of sewerage schemes can be combined with other water projects. This is since most of these projects are inter-related and environment sensitive. Hence the location of an STP, collection wells and coverage of sewerage networks in an area depends upon the water supply system existing in that area, proximity of irrigation canals, water bodies and flood routing structures if any. Planning shall also be done for integrating with road development projects in the scheme area so as to execute all road reformation works after laying sewerage system.

7.4 SUPPORT ACTIVITIES

It has been observed that in many cases of the implementation of the sewerage projects, public protests are experienced by the implementing agencies and authorities. This is because of the unawareness of the local people about the treatment process, disposal of sludge and re-use of treated sewage etc. In this regard, it is essential to educate the consumers to make them aware of the waste management process thereby encouraging them to come up with sewerage connections. The state government is promoting the waste management concept in all the possible ways. More support is needed from the Local Self Government Departments, Suchitwa Mission Kerala, Haritha Keralam Mission Kerala and all the other departments by organizing programmers for motivation public through seminars and awareness classes.

7.5 IMPLIMENTATION SCHEDULE

Table 7.1 Implementation Schedule

Year	Month	2022						2023					
		1	3	5	7	9	11	1	3	5	7	9	11
1	Appraisal of the report	█											
2	Sanction of the project		█										
3	Tendering, and awarding work			█									
4	Civil works				█								
5	Mechanical works						█	█	█	█	█	█	
6	Electrical and instrumentation works						█	█	█	█	█	█	
7	Sewer network and allied works				█	█	█	█	█	█	█	█	
8	Trial and commissioning												█

Proposed implementation Schedule is provided above. The project is proposed to complete within a period of two years.

7.6 ENVIRONMENTAL IMPACT MANAGEMENT

The project area is not falling under environmental sensitive zones. There are no natural reserve forests or parks or the presence of coastal belt. During the construction phase, the emissions from movement of vehicles used for project activity may affect the air quality due to the particulate matter generated during loading, transporting, unloading of materials during construction. Movement of heavy vehicles and concrete mixer would generate considerable noise in the surrounding environment. Hence a proper traffic management plan is recommended during the construction activities.

Sludge generated in the STP must be properly disposed off by transforming it into fertilizer products or bricks for low impact construction activities. Recycled water generated from the STP is to be used as per the guide lines already given regarding the positive impacts, it is to be noted that water quality of the rivers and streams will be greatly improved along with the general environment The large quantity of recycled water will be useful for multiple purposes including agriculture.

Chapter 8 CONCLUSION AND RECOMMENDATION

- The responsibility of providing sewerage systems rest with local bodies which can be facilitated by Kerala Water Authority. KWA has recently set up a Sewerage Vertical with four sewerage circles towards this. The idea and vision behind it are to visualize and materialize complete sewerage schemes for the State as it is vital for a safe environment. Moreover, there are directions from the Honourable National Green Tribunal (NGT) for ensuring the installation of Effluent Treatment Plants (ETPs), Common Effluent Treatment Plants (CETPs), Sewage Treatment Plants (STPs) and other pollution control measures. Hon. NGT has also directed to take necessary action to abate discharge of pollution into rivers (OA No. 673 of 2018).
- This proposal includes 7 MLD STP with MBBR technology at Nilankara Vayal in Kanhangad Municipality, a sewer network of 56.014 km, 2057 manholes, 1 pumping station and 26 lifting stations. Manholes at 30 m intervals and at all intersections are proposed to facilitate maintenance operations. Septage load from entire Kanhangad Municipality is proposed to be transported to the 7 MLD STP where Co-treatment facility will be provided.
- The cost estimate of the project is excluding land cost. The fund for land has to be provided by the local bodies /Government, according to the source of funding for the scheme.
- If sufficient funds and lands are made available, the projects can be taken up by KWA and can be completed in 2 years. For efficient control of operation and maintenance a monitoring cell at institutional level is to be formed.
- For better performance of the system testing of influent samples, effluent samples after treatment from each unit is to be tested at regular intervals and modifications if any shall be made at the initial stage itself so as to ensure efficiency of individual units and effluent standards as per design.
- Better and advanced technology for treatment to be considered for STP while implementing the project.

APPENDIX - I

DESIGN OF STP WITH MOVING BED BIOFILM-REACTOR (MBBR)

Average flow	7	MLD				
Design flow	7.304	MLD	7304348	LPD	7304	m ³ /day
Working hours	23		7304	KLD	304.35	m ³ /hour
Assumed peak factor	2.25					
Peak design flow	16.43	MLD	16434783	LPD	16435	m ³ /day
					684.78	m ³ /hour
Raw Sewage Characteristics						
Average sewage flow entering the STP	304.35	m ³ /hour				
Peak flow entering the STP	684.78	m ³ /hour				
COD	400	mg/l				
Primary ST/ET effluent BOD	250	mg/l				
Thickener overflow return as fraction of plant flow	0.15					
Thickener overflow return	1.096	MLD				
Thickener overflow return BOD	500	mg/l				
Centrate from sludge dewatering as fraction of plant flow	0.006					
Centrate from sludge dewatering return	0.04383	MLD				
Centrate from sludge dewatering return BOD	380	mg/l				
Influent BOD to aeration tank	283.1	mg/l				
TSS	400	mg/l				
Total Nitrogen (As N)	40	mg/l				
Total Phosphorous (As P)	7	mg/l				
Faecal Coliform	30000000	mpn/100 ml				
E Coliform	40000000	mpn/100 ml				
Chlorides as Cl	125	mg/l				
pH	6					
Treated Sewage Characteristics (after filtration)						
COD	50	mg/l				
BOD	10	mg/l				
TSS	10	mg/l				
Total Nitrogen (As N)	9	mg/l				
Total Phosphorous (As P)	1	mg/l				
E Coliform	1000	mpn/100 ml				
pH	7					
Receiving Chamber						
Average quantity of flow	304.35	m ³ /hour				
Peak flow	684.78	m ³ /hour				
	0.190	m ³ /sec				
Average Retention Time for peak flow	30	sec	offset to wall	0.3	m	
Volume of the inlet chamber	5.71	m ³	free board	0.5	m	
Assumed depth of flow	1.5	m	total height	2	m	
Area required for inlet chamber	3.80	m ²	wall thickness	0.25	m	
Length of the tank	2.25	m	slab thickness	0.3	m	
Breadth of the tank	1.69	fix	1.7	m	area in m ²	9.38
Mechanical Coarse Screen Channel						
Peak design flow	0.190	m ³ /sec				
Number of screen	1					
Peak flow rate per screen	0.190	m ³ /sec				
Velocity at peak flow	0.8	m/sec	assumed			
Velocity through clean bar screen	0.86	m/sec				
Length of channel U/S	1	m				
Width of channel provided	0.8	m				
Depth of flow	0.30	m				
Area required for screen	0.238	sqm				
Headloss through bar screen	0.01	m	assuming head loss coefficient = 0.7			
Assumed depth of flow after inserting bar screen	0.3	m	0.30	(control value)		
Width of channel required	0.79	m	fix	1	m	
Clear bar spacing	20	mm	(20 to 50 mm)			
Bar thickness	10	mm	(5 to 15 mm)			
Number of bars	20					
Clear bar spacing obtained	42	mm	OK			
Inside width of screen (openings)	0.8	m				

Full height of channel	1	m	fb	0.5		
Angle of inclination	60	degree	1.05	rad		
Actual velocity at peak flow	0.78	(between 0.60 m/sec and 0.90 m/sec)				
Length of channel required D/S	1.73	m	fix	1.75	m	2.75
Manual Coarse Screen Channel						
Peak design flow	0.1902	m ³ /sec				
Number of screen	1					
Peak flow rate per screen	0.190	m ³ /sec				
Velocity at peak flow	0.8	m/sec	assumed			
Velocity through clean bar screen	0.90	m/sec				
Length of channel U/S	1	m	wall thickness	0.25	m	
Width of channel provided	0.8	m	offset to wall	0.25	m	
Depth of flow	0.30	m	slab thickness	0.30	m	
Area required for screen	0.238	sqm				
Headloss through bar screen	0.01	m	assuming head loss coefficient = 0.7			
Assumed depth of flow after inserting bar screen	0.32	m	0.31	(control value)		
Width of channel required	0.74	m	fix	1	m	
Clear bar spacing	20	mm	(20 to 50 mm)			
Bar thickness	10	mm	(5 to 15 mm)			
Number of bars	25					
Clear bar spacing obtained	31	mm	OK			
Inside width of screen (openings)	0.75	m			area in m ²	5.5
Full height of channel	1	m	fb	0.3		
Angle of inclination	60	degree	1.05	rad		
Actual velocity at peak flow	0.82	(between 0.60 m/sec and 0.90 m/sec)				
Length of channel required D/S	1.73	m	fix	1.75	m	
Mechanical Fine Screen Channel						
Peak design flow	0.190	m ³ /sec				
Number of screen	1					
Peak flow rate per screen	0.190	m ³ /sec				
Velocity at peak flow	0.8	m/sec	assumed			
Velocity through clean bar screen	1.10	m/sec				
Length of channel U/S	1.75	m	wall thickness	0.25	m	
Width of channel provided	0.6	m	offset to wall	0.25	m	
Depth of flow	0.40	m	slab thickness	0.30	m	
Area required for screen	0.24	sqm				
Headloss through bar screen	0.04	m	assuming head loss coefficient = 0.7			
Assumed depth of flow after inserting bar screen	0.5	m	0.44	(control value)		
Width of channel required	0.48	m	fix	1	m	
Clear bar spacing	6	mm	(up to 6 mm)			
Bar thickness	10	mm	(5 to 15 mm)			
Number of bars	63					
Clear bar spacing obtained	6.0	mm				
Inside width of screen (openings)	0.37	m				
Full height of channel	1	m	fb	0.5		
Angle of inclination	45	degree	0.79	rad		
Actual velocity at peak flow	1.17	(between 0.60 m/sec and 1.20 m/sec)				
Length of channel required D/S	1.00	m	fix	1	m	2.75
Daily screening quantity						
Daily sewage quantity	7304	m ³ /day				
Rate of screening quantity	0.015	m ³ /1000 m ³				
Daily screening quantity	0.1096	m ³ /day				
Grit Separator Chamber						
Number of grit units	1	SB	1			
Peak flow	0.1902	m ³ /sec				
Flow in one unit	0.1902	m ³ /sec				
Grit particle size	0.2	mm				
HRT	90	sec	(45 to 90 sec, typical 60)			
Volume of grit chamber	17.12	m ³				
SOR	900	m ³ /m ² /day	(empirical, from observations)			
	0.010	m ³ /m ² /sec				
Area required	18.26	m ²	wall thickness	0.25	m	
SWD	3.00	m	slab thickness	0.30	m	

Side of square channel	4.27	m	offset to wall	0.3	m	
Fix length	4.3	m	freeboard	0.5	m	
Fix width	4.3	m	area given	18.49	m ²	OK
Shape factor	0.85		volume given	55.47	m ³	OK
Specific gravity of liquid	2.65					
Kinematic viscosity	1.003E-06	m ² /sec				
V _p in m/sec	0.036		let $N_r < 1$, apply Stoke's law to get terminal velocity v_p			
N _r	6		apply Newton's equation			
assumed velocity in m/sec	0.0146					
N _r	2				area in m ²	29.16
drag coefficient Cd	11.95					
v _p in m/sec	0.019					
Critical displacement velocity, V _c	0.0190	m/sec		R _t	1.43	
Horizontal velocity of flow, V _h	0.0147	m/sec	OK	R _v	1.29	
Equalisation Tank						
Number of units	2					
Average design flow	152.17	m ³ /hour				
Volume of tank required	829.00	m ³	from detailed analysis			
HRT	5.45	hours	free board	0.50	m	
SWD	4.5	m	offset to wall	0.45	m	
Area required for each tank	184.22	m ²	wall thickness	0.3	m	
Diameter of circular tank	15.32	m	fix	15.4	m	
Side if square tank	13.57	m	fix length	13.6	m	
Thickness of foundation slab	0.45	m	fix breadth	13.6	m	
Actual capacity provided	838.2	m ³	circular	OK		
	832.32	m ³	rectangular	OK	area in m ²	456.02
Moving Bed Bio-Reactor (MBBR)-Single Stage						
Number of tanks proposed	2					
Average design flow/tank	3652.17	m ³ /day				
Number of streams	2					
BOD of incoming sewage	283.11	mg/l				
TSS of incoming sewage	400	mg/l				
BOD expected after treatment	10	mg/l				
BOD to be removed	273.11	mg/l				
BOD removal % expected	96.47					
BOD loading rate/volume	4	kg/m ³ /day	4-7 kg/m ³ /day as per M&E			
Actual BOD loading rate	1033.98	kg/day				
Quantity of BOD to be removed per day	997.46	kg/day				
Volume of reactor required	258.50	m ³				
Surface area loading rate (SALR) for BOD removal	7.50	g/m ² /day				
Required carrier surface area	137864.30	m ²				
Specific surface area of carrier	450.00	m ² /m ³				
Required carrier volume	306.37	m ³				
Volume of media required	40%					
	103.40	m ³	depth of base	0.9	m	
Volume of tank required-BOD loading rate/volume method	361.89	m ³	slab thickness	0.35	m	
Volume of tank required- SALR method	765.91	m ³	offset to wall	0.45	m	
Volume of each tank	765.91	m ³	total height	5.00	m	
SWD	4.5	m	wall thickness	0.30	m	
Area of each tank	170.20	m ²	fix dia	15.1	m	
Diameter of circular tank	14.72	m	length	13.4	m	
Side of square tank	13.05	m	breadth	13.4	m	
Actual capacity provided-circular	805.86	m ³	OK			
Actual capacity provided-rectangular	808.02	m ³	OK			
Fix capacity	805.86	m ³				
Actual volume of media obtained	322.34	m ³				
Actual carrier surface area	145054.80	m ²				
Volume of liquid in the tank	676.92	m ³				
Hydraulic Retention Time at design average flow	2.22	hours	133.5	minutes		
Hydraulic Retention Time at peak flow	0.99	hours	59.3	minutes		

SARR for the given SALR	6.94	g/m ² /day			area in m ²	444.02
Estimated BOD removal rate	1006.32	kg/day				
Actual BOD removal rate %	97.32	BOD of effluent	7.57	mg/l		ok
Moving Bed Bio-Reactor (MBBR)-Single Stage Nitrification						
Number of tanks proposed	2					
Average design flow/tank	3652.17	m ³ /day				
Number of streams	2					
BOD of incoming sewage	10.00	mg/l				
NH ₄ -N of incoming sewage	40.00	mg/l				
Alkalinity as CaCO ₃	140.00	mg/l				
Target effluent NH ₃ -N	3.30	mg/l	% removal	91.75		
DL level to be maintained in tank	2.00	mg/l				
Design minimum waste water temperature	20.00	°C				
SARR _{max}	0.61		SARR temp coefft. Θ	1.058		
Minimum NH ₃ -N at SARR _{max}	0.50		SARR _T	0.81	g/m ² /day	
Design value of SALR	0.88	g/m ² /day				
NH ₃ -N loading rate	146.09	kg/day				
Required carrier surface area	165752.22	m ² /day				
Specific surface area of carrier	600.00	m ² /m ³				
Required carrier volume	276.25	m ³ /day	depth of base	0.65	m	
Volume of media required	40%		slab thickness	0.35	m	
Volume of tank required- SALR method	690.63	m ³	offset to wall	0.45	m	
Volume of each tank	690.63	m ³	total height	5.00	m	
SWD	4.5	m	wall thickness	0.30	m	
Area of each tank	153.47	m ²	fix dia	14	m	
Diameter of circular tank	13.98	m	fix length	12.4	m	
Side of square tank	12.39	m	fix breadth	12.4	m	
Actual capacity provided-circular	692.72	m ³	OK			
Actual capacity provided-rectangular	691.92	m ²	OK			
Fix capacity	692.72	m ³				
Actual volume of media obtained	277.09	m ³				
Actual carrier surface area	166252.80	m ²			area in m ²	386.42
Volume of liquid in the tank	581.89	m ³				
Hydraulic Retention Time at design average flow	1.91	hours	114.71	minutes		
Hydraulic Retention Time at peak flow	0.85	hours	50.98	minutes		
Estimated NH ₃ -N removal rate	134.44	kg/day				
NH ₃ -N of effluent	3.19	mg/l				
BOD SALR	0.22	g/m ² /day	<i>should be < 0.5 to achieve good nitrification</i>			
Using the equivalent weight of CaCO ₃ as 50, the equivalent weight of NaHCO ₃ as 84, the alkalinity use for nitrification as 7.14 g CaCO ₃ /g NH ₃ -N and the target effluent alkalinity as 80 mg/L as CaCO ₃ , give the calculated alkalinity requirement as 118.5 mg/L as CaCO ₃ .						
Influent alkalinity	140.00	mg/l				
Target effluent alkalinity	80.00	mg/l				
Alkalinity used for Nitrification	7.14	g CaCO ₃ /g NH ₃ -N				
Alkalinity to be added	202.04	mg/l				
Rate of alkalinity addition needed as CaCO ₃	737.88	kg/day				
Equiv wt. of CaCO ₃	50.00	g/equivalent				
Equiv wt. of NaHCO ₃	84.00	g/equivalent				
Daily NaHCO ₃ requirement	1239.63	kg/day NaHCO ₃				
Blower air requirement						
BOD loading/tank	1033.98	kg/day				
NH ₃ -N loading rate/tank	146.09	kg/day				
Oxygen uptake ratio-BOD	1.50	kg of O ₂ /kg of BOD				
Oxygen uptake ratio-NH ₃ -N	4.35	kg of O ₂ /kg of NH ₃ -N				
Oxygen required for BOD loading	1550.97	kg/day				
Oxygen required for NH ₃ -N loading	635.48	kg/day				
Percentage of O ₂ in air	21.00					
Weight of air required-BOD loading	7385.59	kg/day				

Weight of air required-NH ₃ -N loading	3026.09	kg/day			
Density of air	1.225	kg/m ³			
Volume of air-BOD loading	6029.05	m ³ /day			
Volume of air-NH ₃ -N loading	2470.28	m ³ /day			
Air transfer efficiency of diffuser	0.100				
Quantity of air required-BOD loading	60290.51	m ³ /day			
Quantity of air required-NH ₃ -N loading	24702.75	m ³ /day			
Factor of safety	1.10				
Volume of air required-BOD loading	2763.32	m ³ /hour			
Volume of air required-NH ₃ -N loading	1132.21	m ³ /hour			
Volume of equalisation tank	829.00	m ³			
Normal inflow	0.085	m ³ /sec			
Air requirement for equalisation tank	1.25	m ³ /m ³ /hour			
Air requirement for sludge tank	3.00	m ³ /m ³ /hour			
Volume of ET	829.00	m ³			
Volume of air required for ET	1036.25	m ³ /hour			
Volume of air required for ST	39.22	m ³			
Total air required	4971.00	m ³ /hour			
Capacity of blower	4971.00	m ³ /hour			
Number of blowers working	3.00	SB	1		
Air required per blower	1657.00	m ³ /hour			
Pressure given	0.60	kg/cm ²	5.89	m	
Volumetric efficiency	70%				
Power required for blower motor	51.96	HP		kw	
Fix power of blower motor	52.00	HP			
Energy/tank	2791.11	kwh			
Alum solution tank					
number of units	1				
dosage of alum	50	ppm			
requirement for 8 hours	121.740	kg			
volume of solution at 10% strength/unit	1.100	m ³			
length of tank	1.2	m			
breadth of tank	1.2	m			
liquid depth	0.76	m			
total depth	1	m			
solution flow rate	0.1375	m ³ /hour			
Lime solution tank					
number of units	1				
dosage of lime	35	ppm			
requirement for 8 hours	85.22	kg			
volume of solution at 10% strength/unit	0.79	m ³			
length of tank	1.1	m			
breadth of tank	1.1	m			
liquid depth	0.65	m			
total depth	1	m			
solution flow rate	0.09875	m ³ /hour			
Secondary Clarifier					
No. of Tanks	2				
Average Flow in each tank	3652.17	m ³ /day			
SOR	25.00	m ³ /m ² /day			
SWD	2.80	m			
Solid conc. In settled sludge -%	0.8 to 0.9	%			
Withdrawal frequency - continuous					
Area Required for the Tank	146.09	m ²			
Diametre Required for Secondary Settling Tank	13.64	m			
Assumed Detention Period	3.10	hrs			
Volume	471.74	m ³		FB	0.5
Depth of the Clarifier assumed	2.80	m			
Area of the Clarifier	168.48	m ²			
Provide Secondary Clarifier of Diametrer	14.70	m			
Surface Loading Rate	21.68	m ³ /m ² /day		OK	

Check for Peak flow	48.77	m ³ /m ² /day		OK		
Sludge Sump						
Number of units	1					
Average flow/tank	7304.35	m ³ /day				
TSS	400	mg/l				
BOD	283.11	mg/l				
Assumed TSS Sludge	30%					
Assumed BOD Sludge	35%					
Sludge generated-TSS	876.5	kg/day				
Sludge generated-BOD	723.8	kg/day				
Total sludge	1600.31	kg/day				
% sludge with 1.02 specific gravity	10%					
Sludge volume per day/tank	156.89	m ³ /day				
	6.54	m ³ /hour				
Assumed HRT	2	hours	freeboard	0.35	m	
Volume of tank	13.07	m ³	slab thickness	0.3	m	
Assumed SWD	2	m	offset to wall	0.3	m	
Area of the tank	6.54	m ²	wall thickness	0.25	m	
Diameter of circular tank	2.89	m	fix	3	m	
Actual capacity provided	14.14	m ³			area in m ²	4.10
Pump for Sludge transfer to Thickner						
Number of pumps	1.00	W		1	SB	
Specific gravity of liquid	1.03					
Type of pump set	fugal sewage transfer-non clog					
Working hours	5.00	hours				
Discharge required	31.38	m ³ /hour	0.008716	m ³ /sec		
Required head	15.00	m				
Velocity in sludge transfer pipe adopted	0.70	m/sec				
Pipe diameter required	125.91	mm	fix	150	mm	
Efficiency	50%					
Power required	3.49	HP	fix	4.00	HP	
Energy	13.00	kwh				
Sludge Thickener						
Number of units	1					
Total sludge	1600.31	kg/day				
Solids Loading Rate	40	kg/m ² /day				
Thickening area required	40.01	m ²				
Surface Loading Rate	12	m ³ /m ² /day				
Thickening area required	13.07	m ²	freeboard	0.35	m	
Maximum area	40.01	m ²	slab thickness	0.35	m	
Area of distribution chamber	20%		offset to wall	0.35	m	
Total area required	48.01	m ²	wall thickness	0.3	m	
Diameter of circular tank	7.82	m	fix	8	m	
Thickening area available	50.27	m ²				
SWD	2.5	m				
Actual volume provided	125.66	m ³				
Thickened sludge consistency	3%	of total sludge volume				
Thickened sludge volume	48.01	m ³ /day			area in m ²	9.30
Pump for Sludge transfer to Centrifuge						
Type of pump set	Screw pump					
Number of pumps	1.00	W		1	SB	
Volume of thickened sludge to be pumped	48.01	m ³ /day				
Working hours of centrifuge	5.00	hours				
Discharge required	9.60	m ³ /hour	2.7E-03	m ³ /sec		
Head required	15.00	m				
Efficiency	50%					
Power required	1.07	fix	1.50	HP		
Energy	3.979	kwh				
Sludge Centrifuge and Dosing Tanks						
Number of centrifuges	1	SB		1		
Capacity of centrifuge	0.25	m ³ /hour				
Poly electrolyte dosing for centrifuge & thickener	10%					

Sludge volume	1600.31	kg/day				
Dose	2	kg/1000 kg				
Quantity of Poly Electrolyte	3.20	kg/day				
Concentration	0.1					
Volume of tanks @ 24 hour	3.20	m ³				
	3200.62	litres				
Volume	133.36	litres/hour				
Volume required for 8 hours	1.07	m ³				
Liquid depth of tank	1	m				
Area required	1.07	m ²				
side of square tank	1.03	m	fix	1.2	area in m ²	2.88
Chlorine contact tank						
HRT	30	minutes	offset to wall	0.3	m	
Average flow	304.35	m ³ /hour	wall thickness	0.25	m	
Volume of tank	152.17	m ³	slab thickness	0.35	m	
Assumed liquid depth	3.5	m	freeboard	0.35	m	
Area of the tank	43.48	m ²			area in m ²	59.29
side of square tank	6.59	m	fix	6.6	m	
Filter feed tank						
HRT	20	minutes	offset to wall	0.3	m	
Average flow	304.35	m ³ /hour	wall thickness	0.25	m	
Volume of tank	101.45	m ³	slab thickness	0.3	m	
Assumed liquid depth	3.5	m	freeboard	0.35	m	
Area of the tank	28.99	m ²				
side of square tank	5.38	m	fix length	5.4	m	
			fix breadth	5.4	m	
Volume provided	102.06	OK			area in m ²	42.25
Pressure Sand Filter						
Number of units	7					
Average flow/filter	1043.48	m ³ /day				
Filter operating hours	20	hours				
Operating flow/filter	52.17	m ³ /hour				
Filter Loading Rate	12	m ³ /m ² /hour				
Area of the filter required	4.35	m ²				
Area of each filter	4.35	sqm				
Diameter of filter required	2.35	m	fix	2.4	m	
Height of the filter	2.5	m	offset to wall	0.5	m	
Operating pressure	3.5	Bar				
Filter media	Sand				area in m ²	80.92
Activated Carbon Filter						
Number of units	7					
Average flow/filter	1043.48	m ³ /day				
Filter operating hours	20	hours				
Operating flow/filter	52.17	m ³ /hour				
Filter Loading Rate	10	m ³ /m ² /hour				
Area of the filter required	5.22	m ²				
Area of each filter	5.22	sqm				
Diameter of filter required	2.58	m	fix	2.6	m	
Height of the filter	2.5	m	offset to wall	0.5	m	
Operating pressure	3.5	Bar				
Filter media	Activated Carbon				area in m ²	90.72
Pump for clarified water to PSF and ACF						
Type of pump set	CF					
Number of pumps	7.00	W	1	SB		
Discharge of clarified water required/pump set	43.48	m ³ /hour				
Working hours of pumps	20.00	hours				
Discharge required/pump set	52.17	m ³ /hour	1.4E-02	m ³ /sec		
Head required	40.00	m				
Efficiency	60%					
Power required	12.88	fix	13.00	HP		
Energy	192.21	kwh				

Treated Water Tank					
HRT	60	minutes	offset to wall	0.3	m
Average flow	304.35	m ³ /hour	wall thickness	0.3	m
Volume of the tank	304.3	m ³	slab thickness	0.35	m
Assumed liquid depth	3.5	m	freeboard	0.35	m
Area of the tank	86.96	m ²			
Number of tanks	1		fix length	9.4	m
Area of one tank	86.96	m ²	fix breadth	9.4	m
Side of square tank	9.33	m			
Volume provided	309.26	m ³	OK		

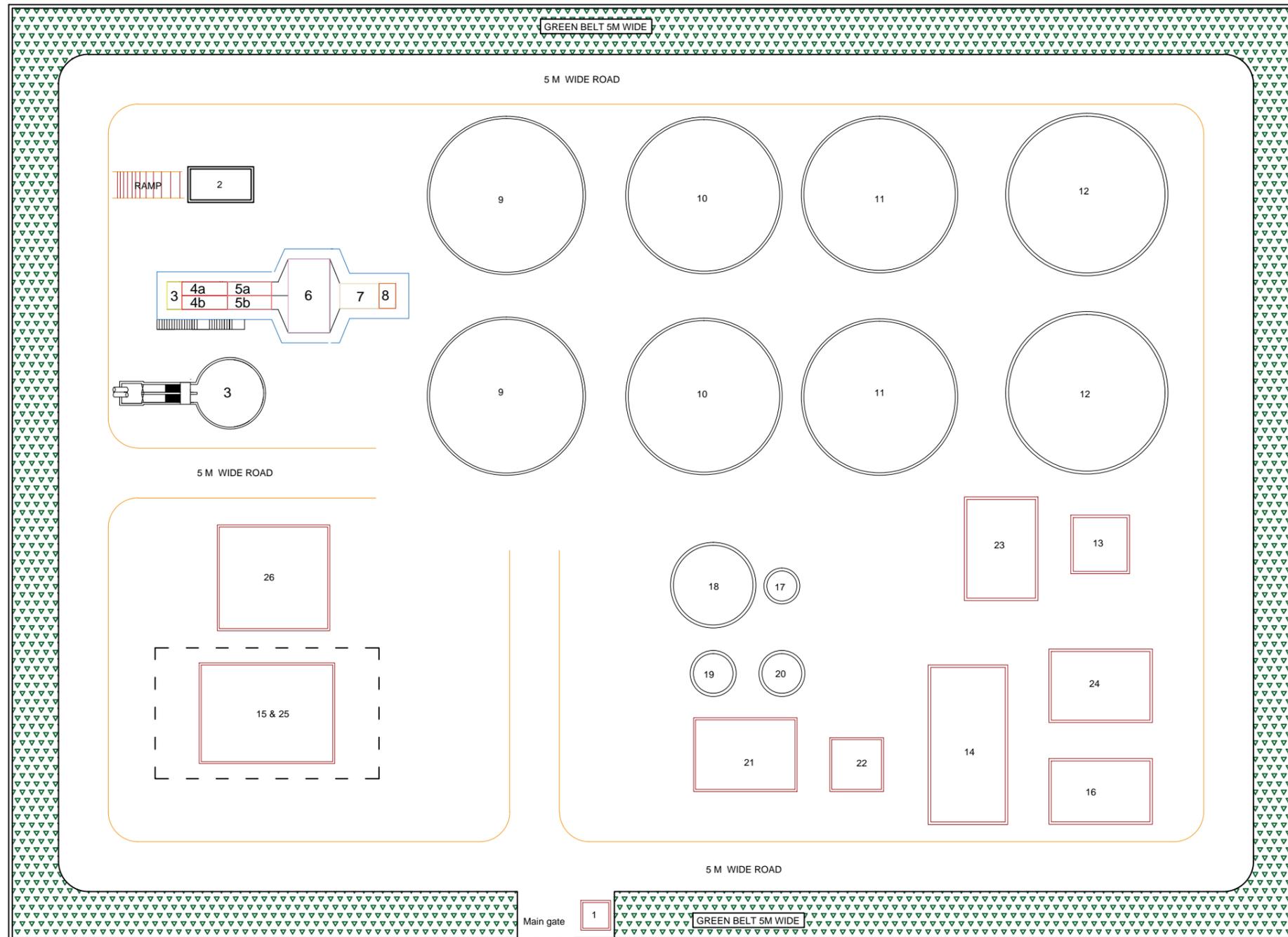
NO	DESCRIPTION	Size
1	SECURITY ROOM	
2	SEPTAGE TANK	6.00x4.00x3.00
3	RECIVING CHAMBER & COLLECTION WELL	5.70 x 1.25 & 6.00 dia
4 a	COARSE SCREEN CHANNEL-MECHANICAL	2.75 x 1
4 b	COARSE SCREEN CHANNEL-MANUAL	2.75 x 1
5 a	FINE SCREEN CHANNEL-MECHANICAL	2.75 x 1
5 b	FINESCREEN CHANNEL-MANUAL	2.75 x 1
6	GRIT CHAMBER	4.30x4.30x3.00
7	PARSHALL FLUME	3.00x2.00
8	DISTRIBUTION CHAMBER	2.25x1.00
9	EQUALISATION TANK	15.40 dia 4.50m D

10	MBBR 1	15.10 Dia
11	MBBR 2	14.00 Dia
12	SECONDARY SETTING TANK	14.70 Dia 3.5 D
13	FILTER FEED TANK	5.4x5.4x3.85
14	PSF/ACF	
15	DG ROOM	
16	TREATED WATER TANK	9.4x9.4x3.85
17	SLUDGE SUMP	3.0 Dia, 2.35 D
18	SLUDGE THICKNER	8.0 dia 3.0 D
19	CENTRATE SUMP	4.0 dia 2.5 D

20	THICKNED SLUDGE SUMP
21	CENTRIFUGE BUILDING
22	SLUDGE SHED
23	AIR BLOWER ROOM
24	CHLORINATION ROOM
25	TRANSFORMER YARD
26	ADMINISTRATIVE BUILDING

GENERAL NOTES

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- DIMENSIONS NOT IN SCALE
- FOR ESTIMATION PURPOSE ONLY



No.	Revision/ Issue	Date



PPD & SEWERAGE CIRCLE,
KERALA WATER AUTHORITY,
KOZHIKODE

PROJECT NAME

SEWERAGE SCHEME TO KANHANGAD MUNICIPALITY - CONSTRUCTION OF 7 MLD CAPACITY SEWAGE TREATMENT PLANT AT NILANKARAVAYAL AND LAYING SEWERAGE NET WORK

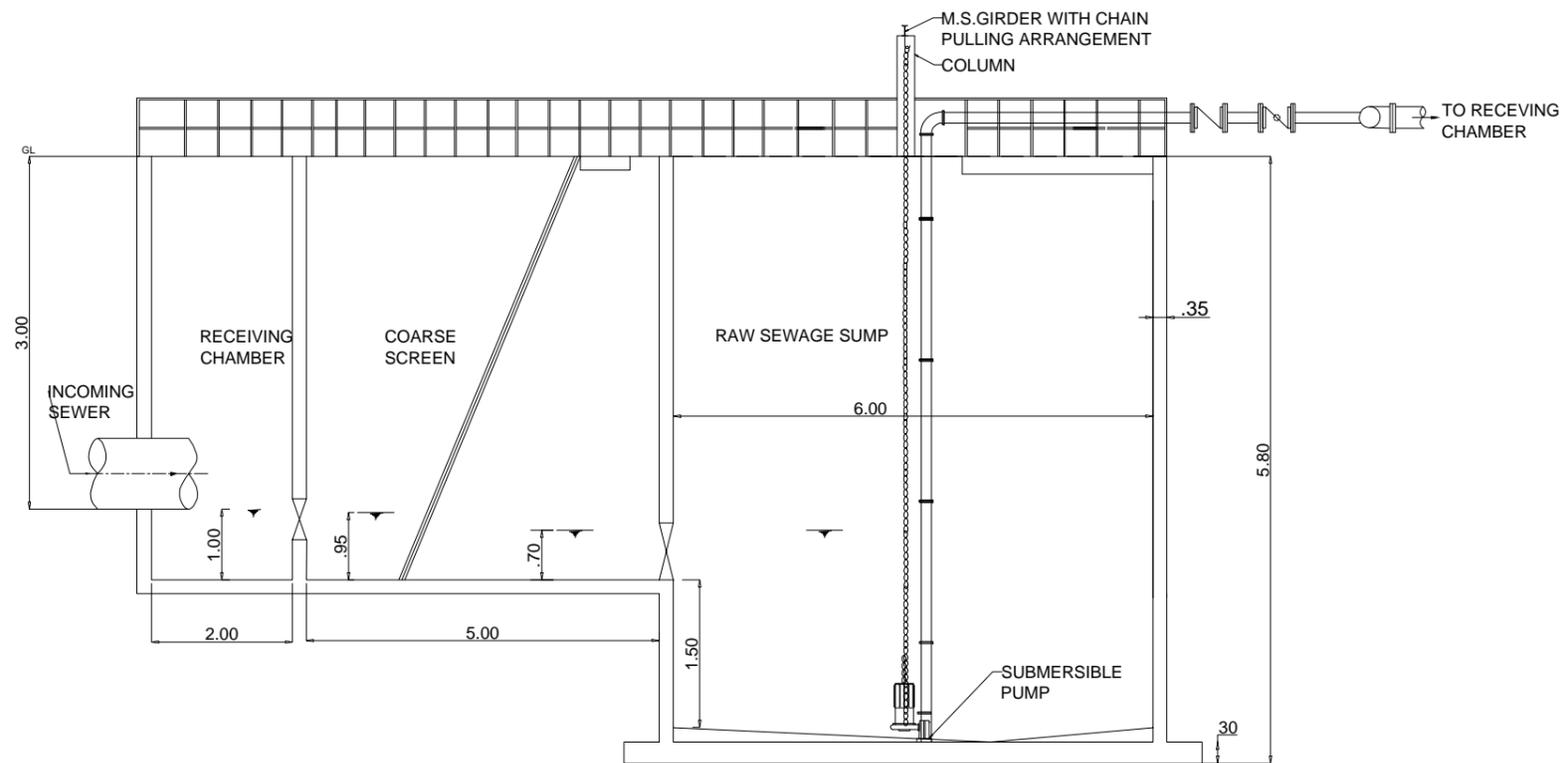
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STP LAYOUT
(Land Area 130m x 94m)

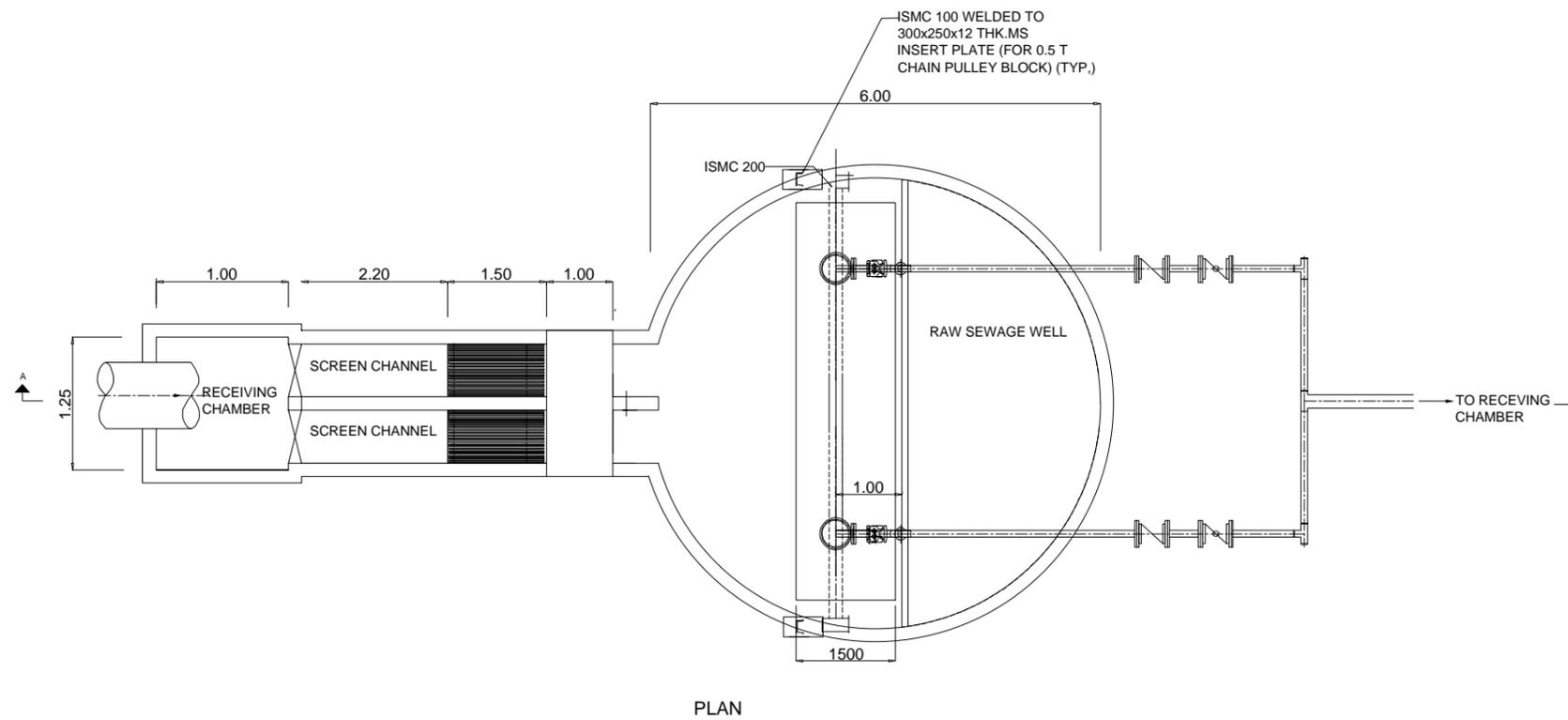
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Not in scale

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SECTION : A-A



PLAN

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KANHANGAD MUNICIPALITY -
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CAPACITY SEWAGE TREATMENT
PLANT AT NILANKARAVAYAL AND
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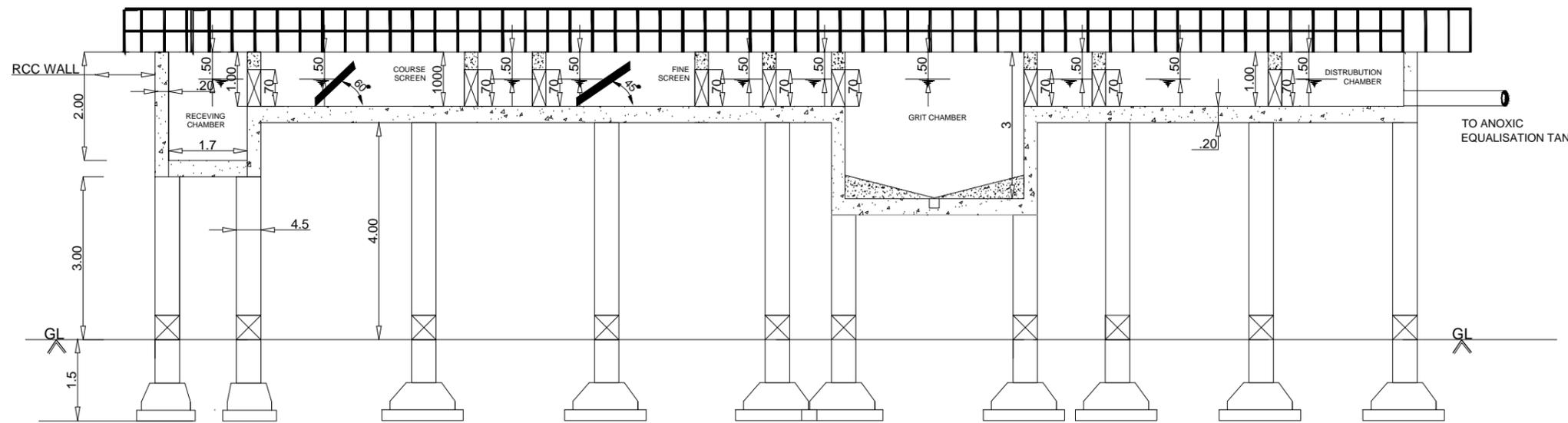
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RAW SEWAGE RECEIVING CHAMBER
CUM WELL

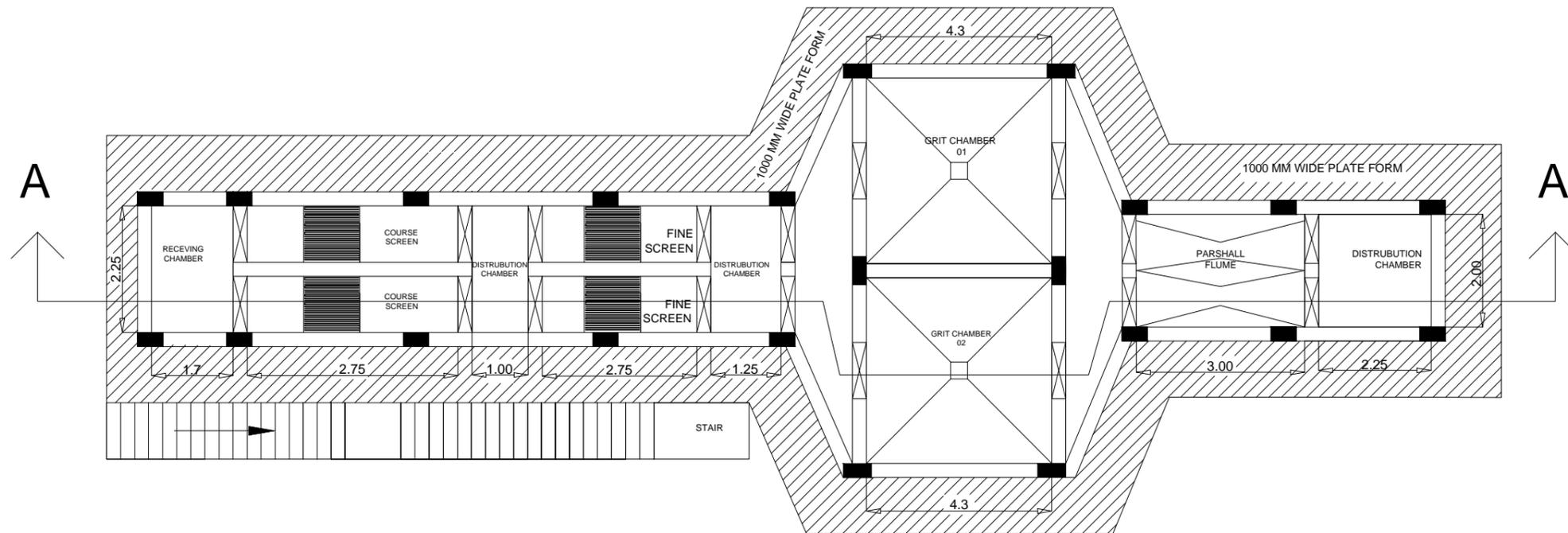
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SECTION: A-A



PLAN

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CAPACITY SEWAGE TREATMENT
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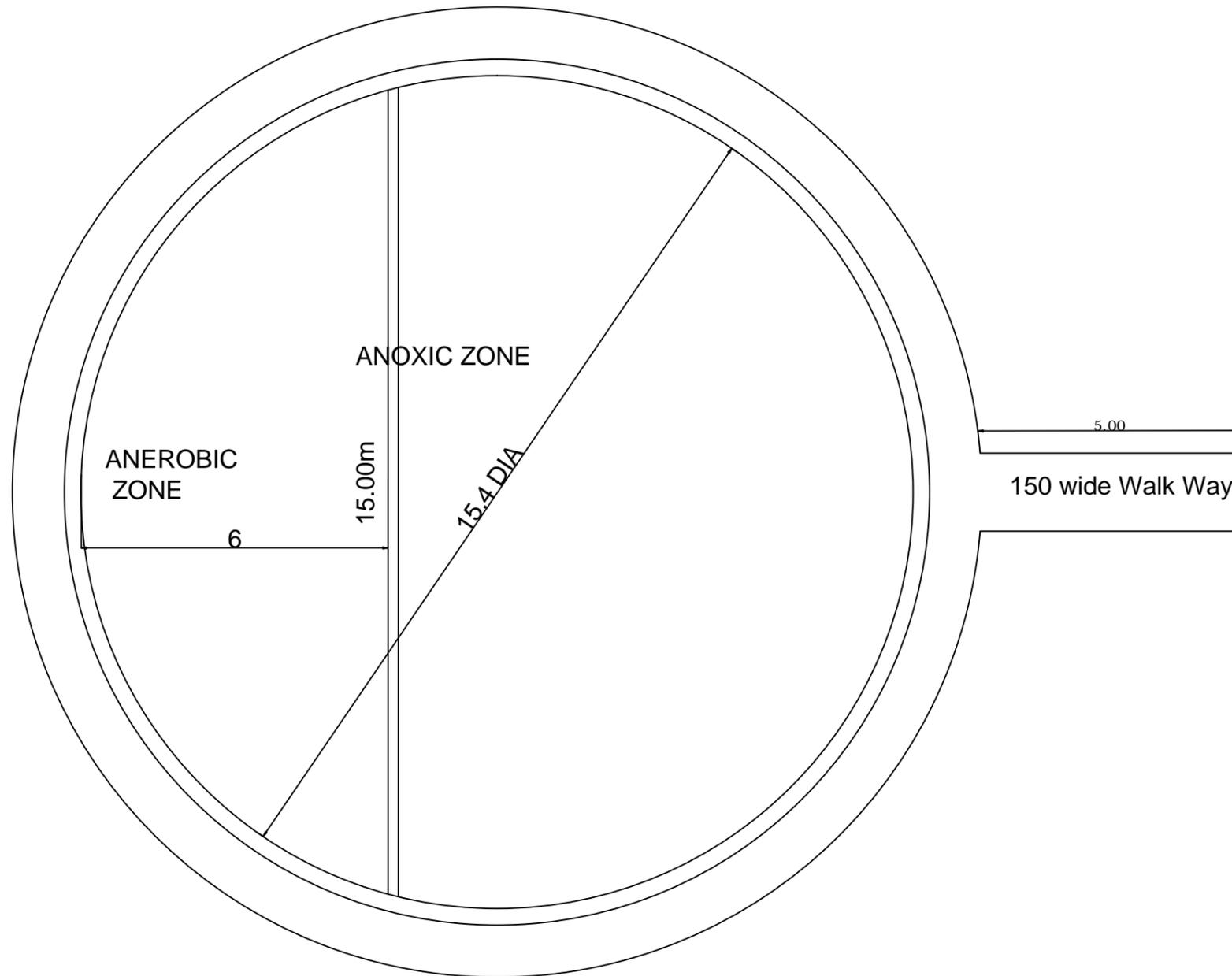
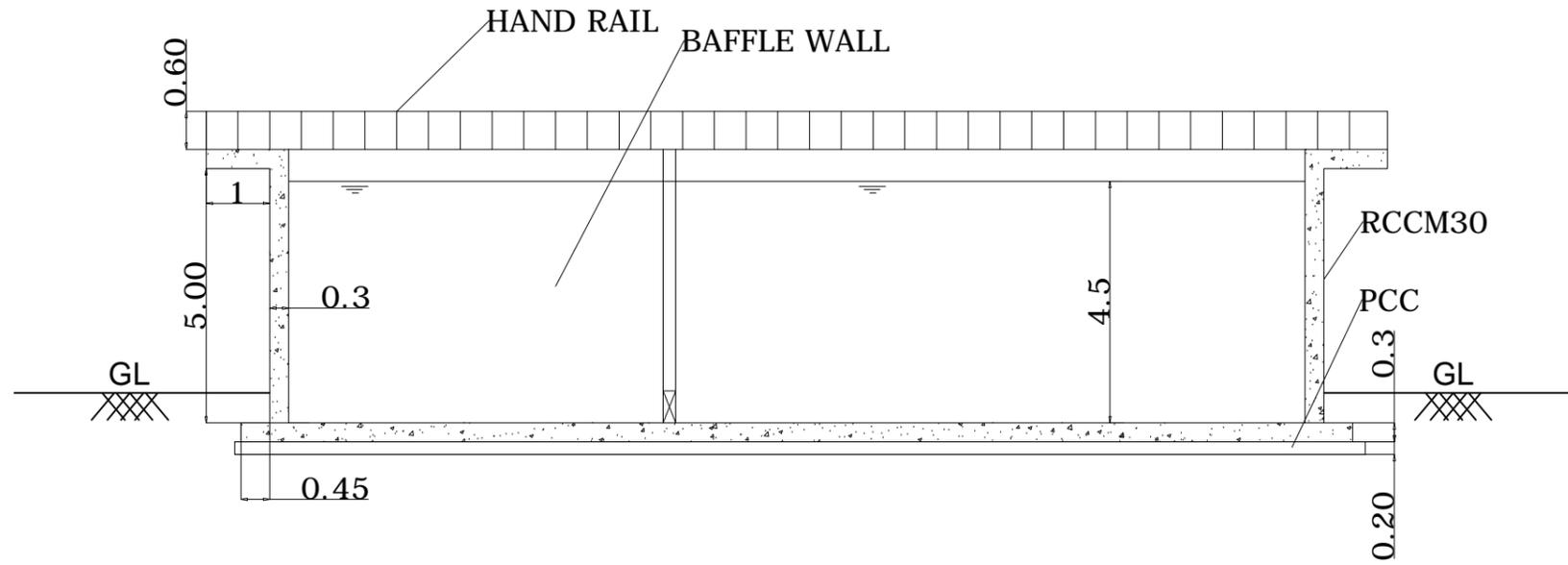
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DETAILS COURS & FINE SCREEN, GRIT
CHAMBER & DISTRIBUTION CHAMBER

DWG No :- KNGD /STP/ 4

Not in scale

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CAPACITY SEWAGE TREATMENT
PLANT AT NILANKARAVAYAL AND
LAYING SEWERAGE NET WORK

DRAWING TITLE

EQUALISATION TANK

DWG No :- KNGD /STP/ 5

Not in scale

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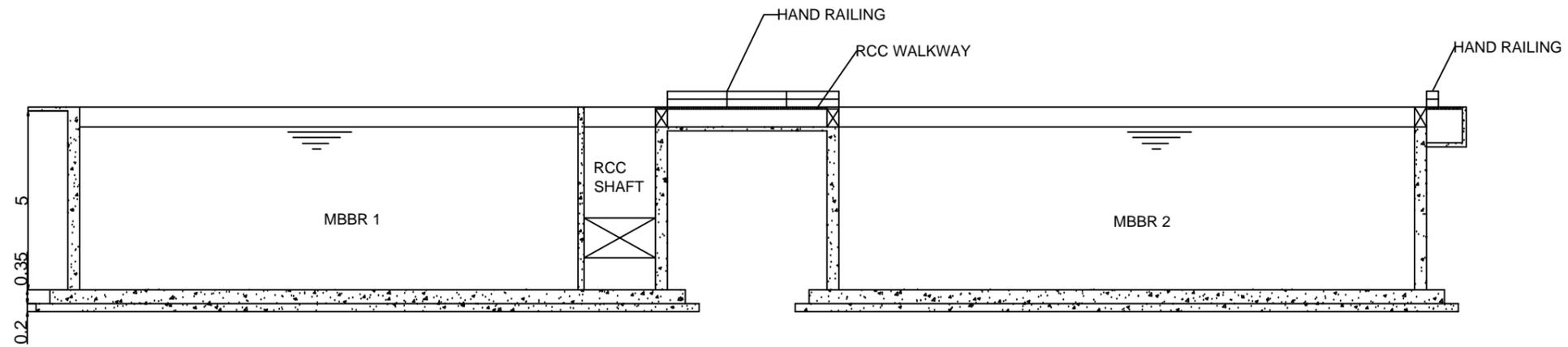
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MBBR TANK 1 & 2

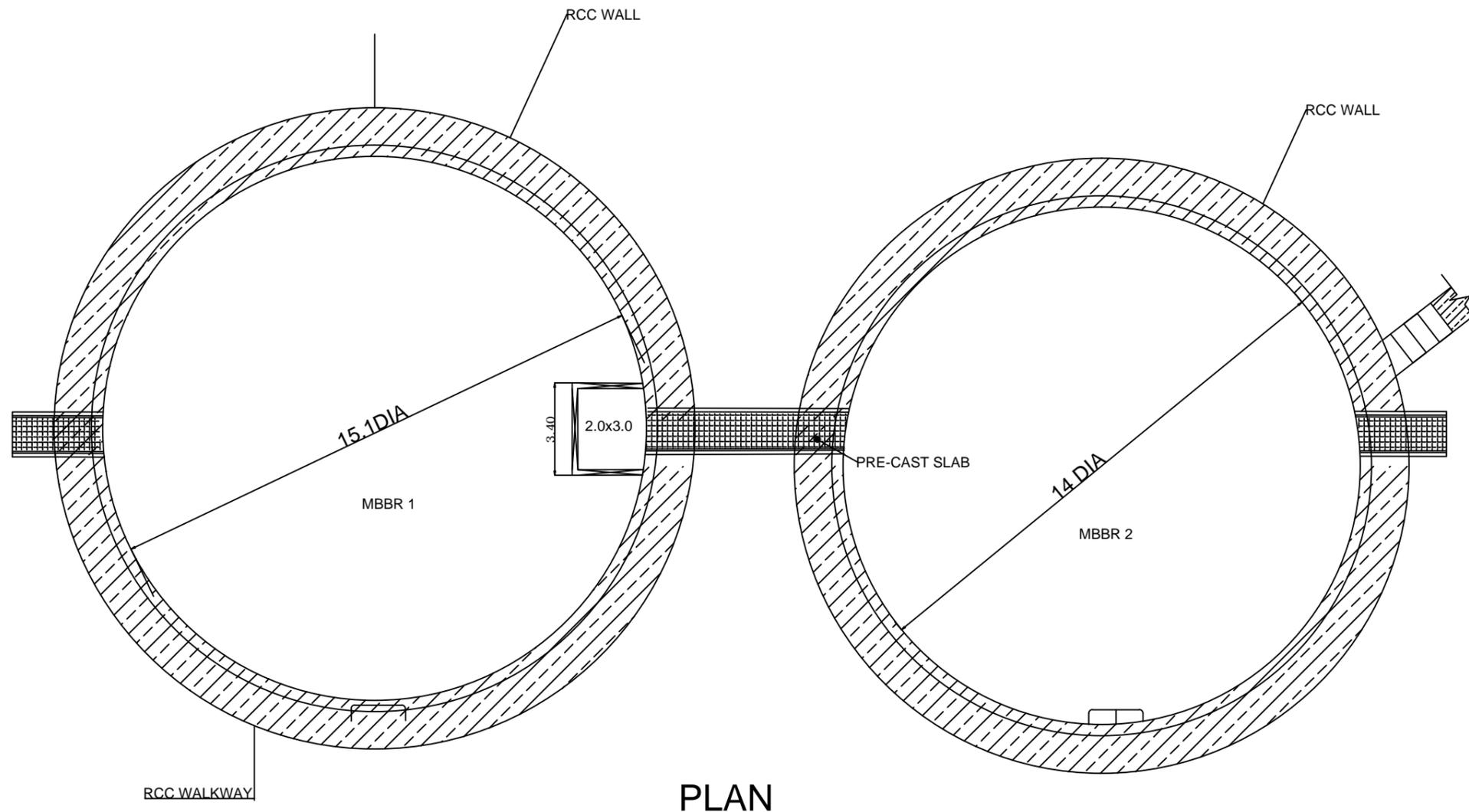
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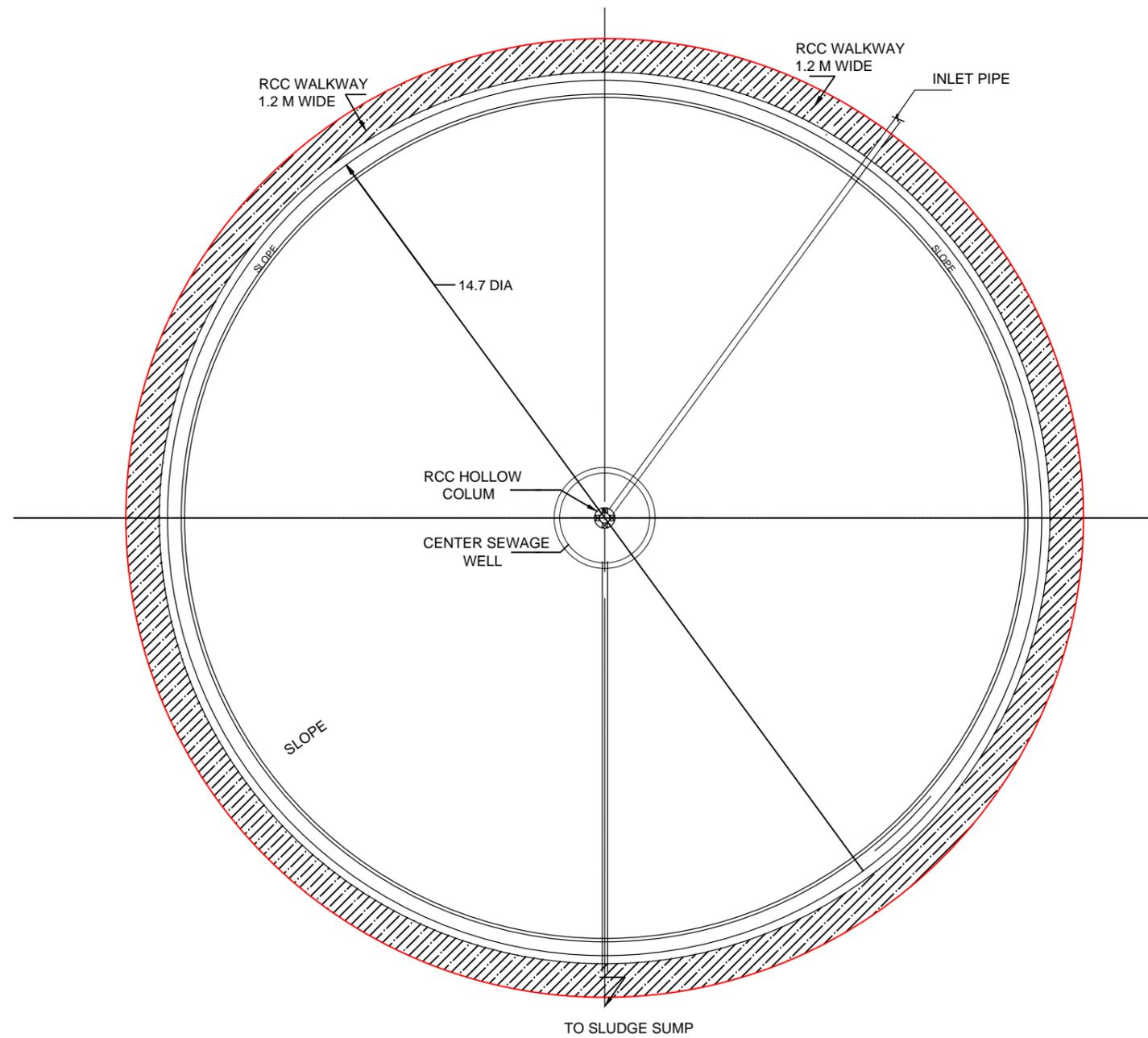
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SECTION AA

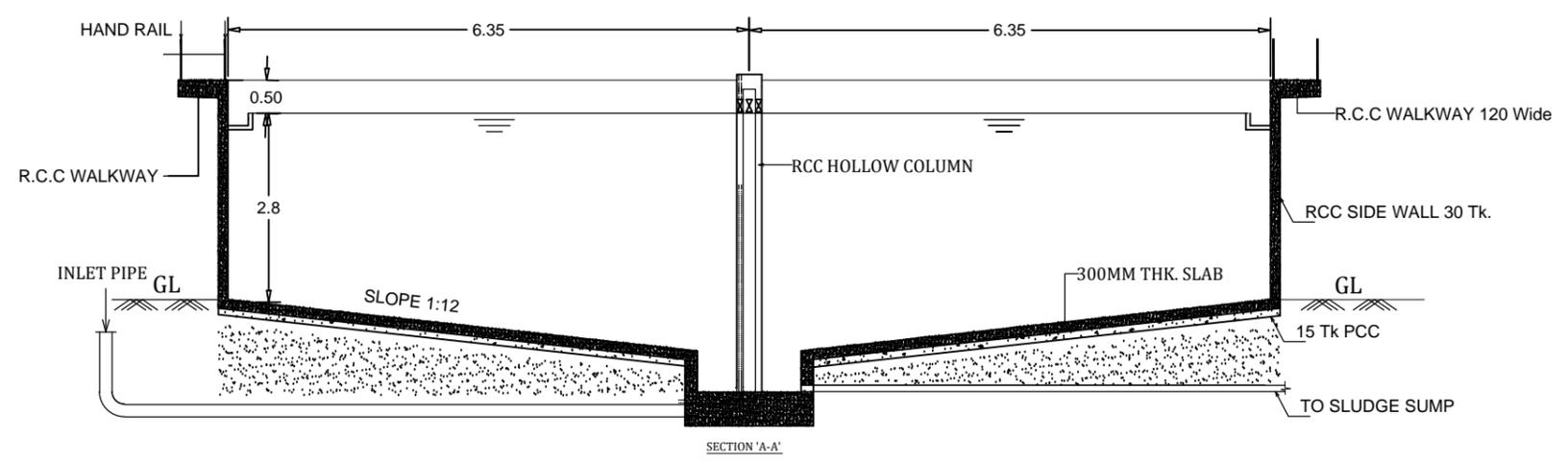


PLAN



TO SLUDGE SUMP

PLAN



SECTION 'A-A'

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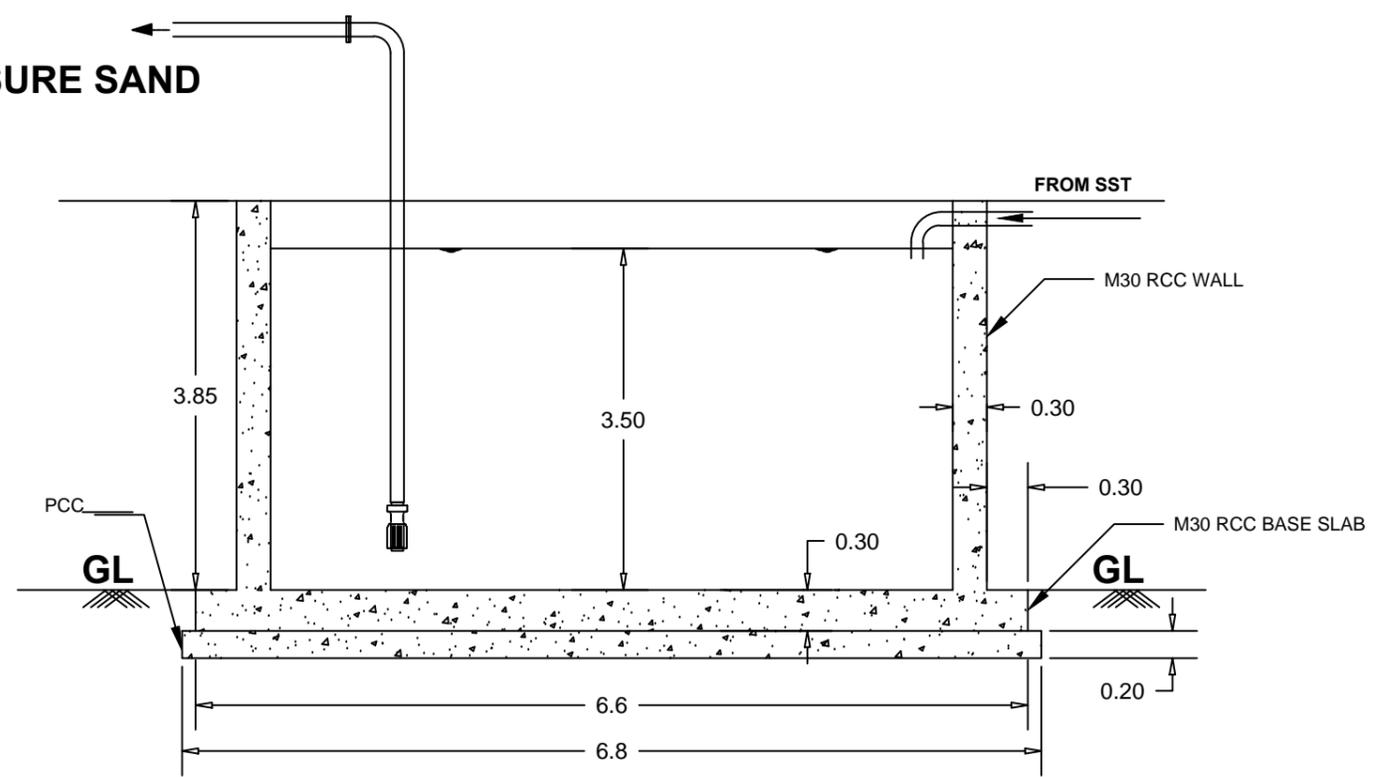
SECONDARY CLARIFIER TANK

DWG No :- KNGD /STP/ 7

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TO PRESSURE SAND FILTER



SECTION AA



**FILTER FEED TANK
5.4X5.4X3.85**

PLAN

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CAPACITY SEWAGE TREATMENT
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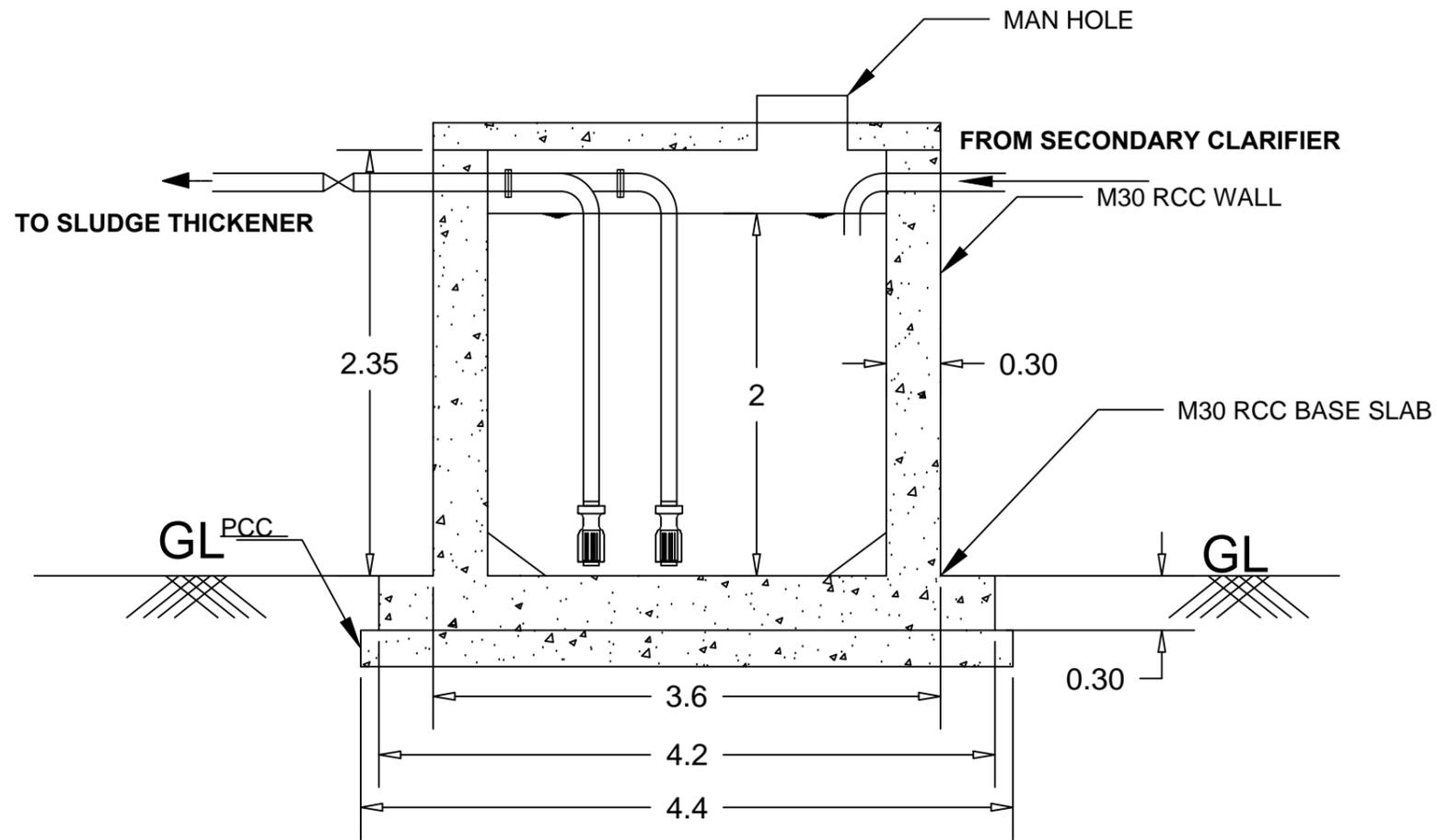
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FILTER FEED TANK

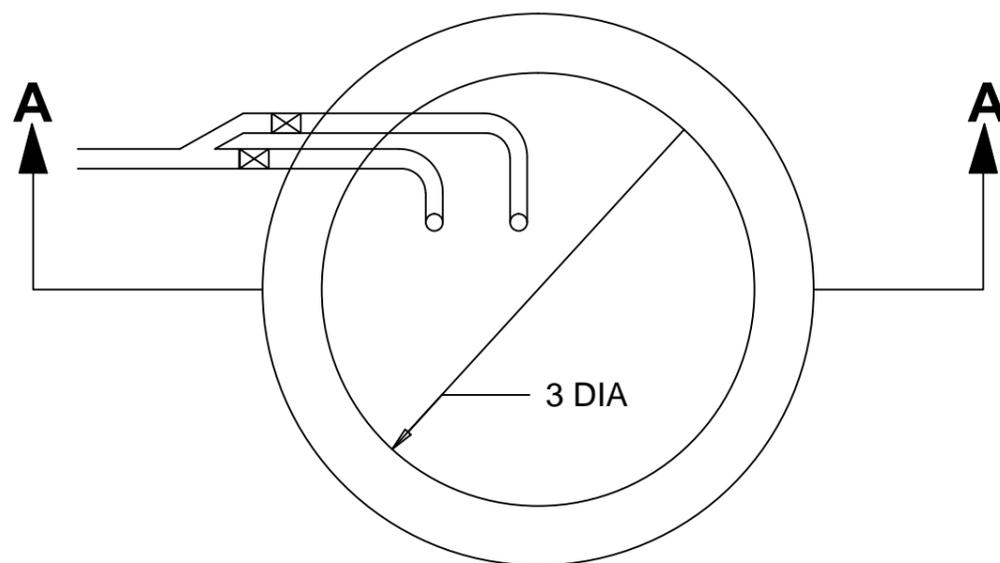
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SECTION AA



PLAN

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KANHANGAD MUNICIPALITY -
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CAPACITY SEWAGE TREATMENT
PLANT AT NILANKARAVAYAL AND
LAYING SEWERAGE NET WORK

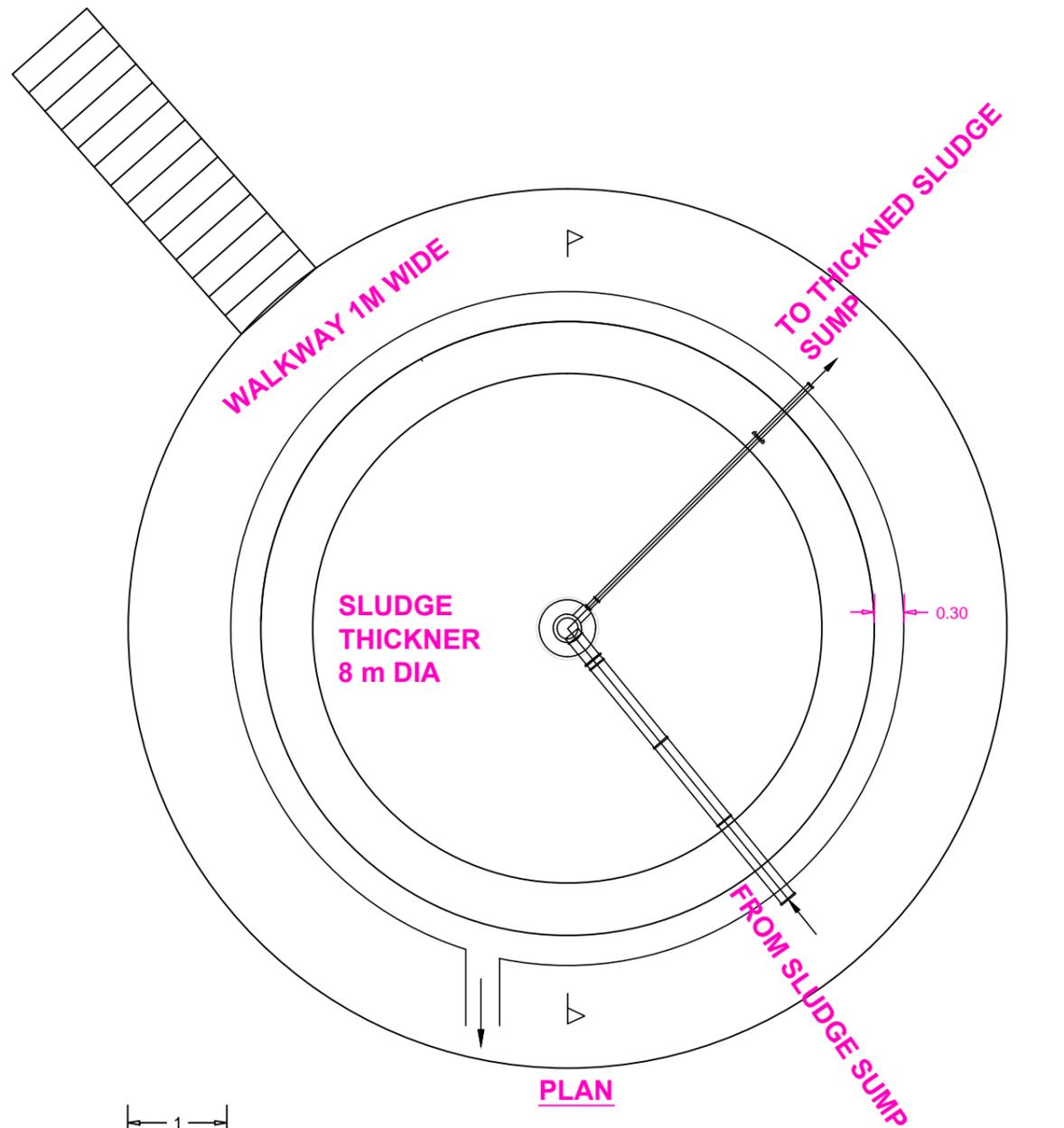
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SLUDGE SUMP

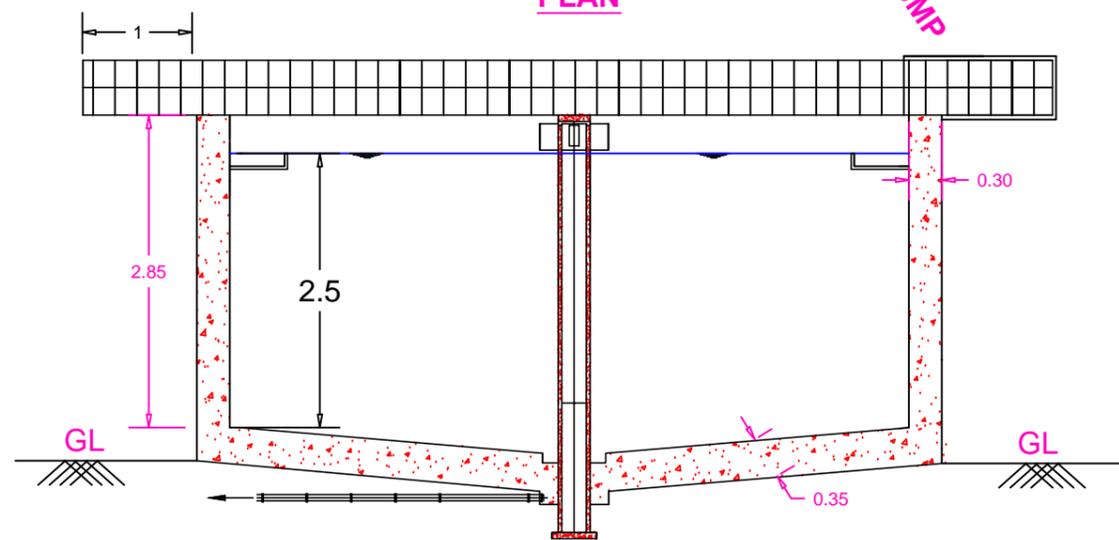
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PLAN



SECTION AA

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KOZHIKODE**

PROJECT NAME

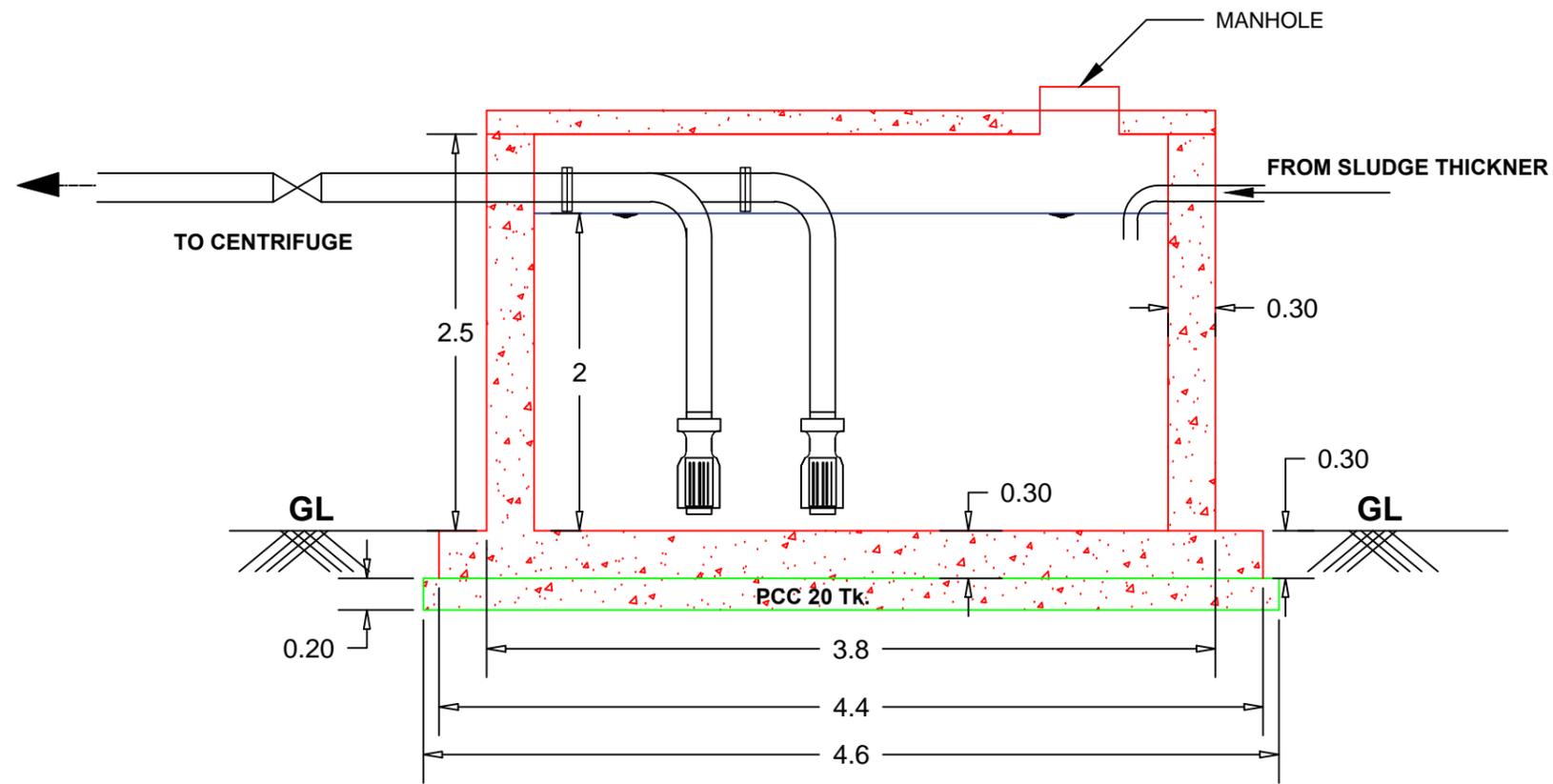
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KANHANGAD MUNICIPALITY -
CONSTRUCTION OF 7 MLD
CAPACITY SEWAGE TREATMENT
PLANT AT NILANKARAVAYAL AND
LAYING SEWERAGE NET WORK

DRAWING TITLE

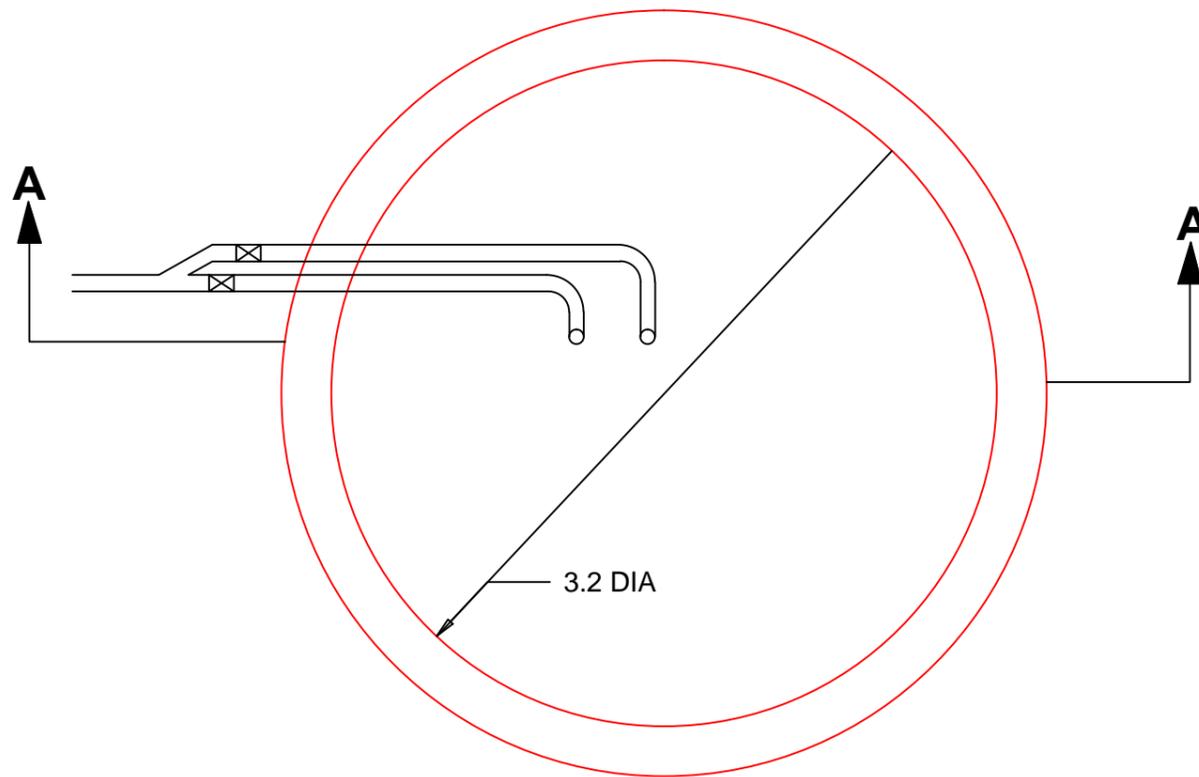
SLUDGE THICKENER

DWG No :- KNGD /STP/ 10

AE	AEE	EE	SE	CE
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SECTION AA



PLAN

GENERAL NOTES

- ALL DIMENSIONS ARE IN METERS
- DIMENSIONS NOT IN SCALE
- FOR ESTIMATION PURPOSE ONLY

No.	Revision/ Issue	Date



**PPD & SEWERAGE CIRCLE,
KERALA WATER AUTHORITY,
KOZHIKODE**

PROJECT NAME

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CAPACITY SEWAGE TREATMENT
PLANT AT NILANKARAVAYAL AND
LAYING SEWERAGE NET WORK

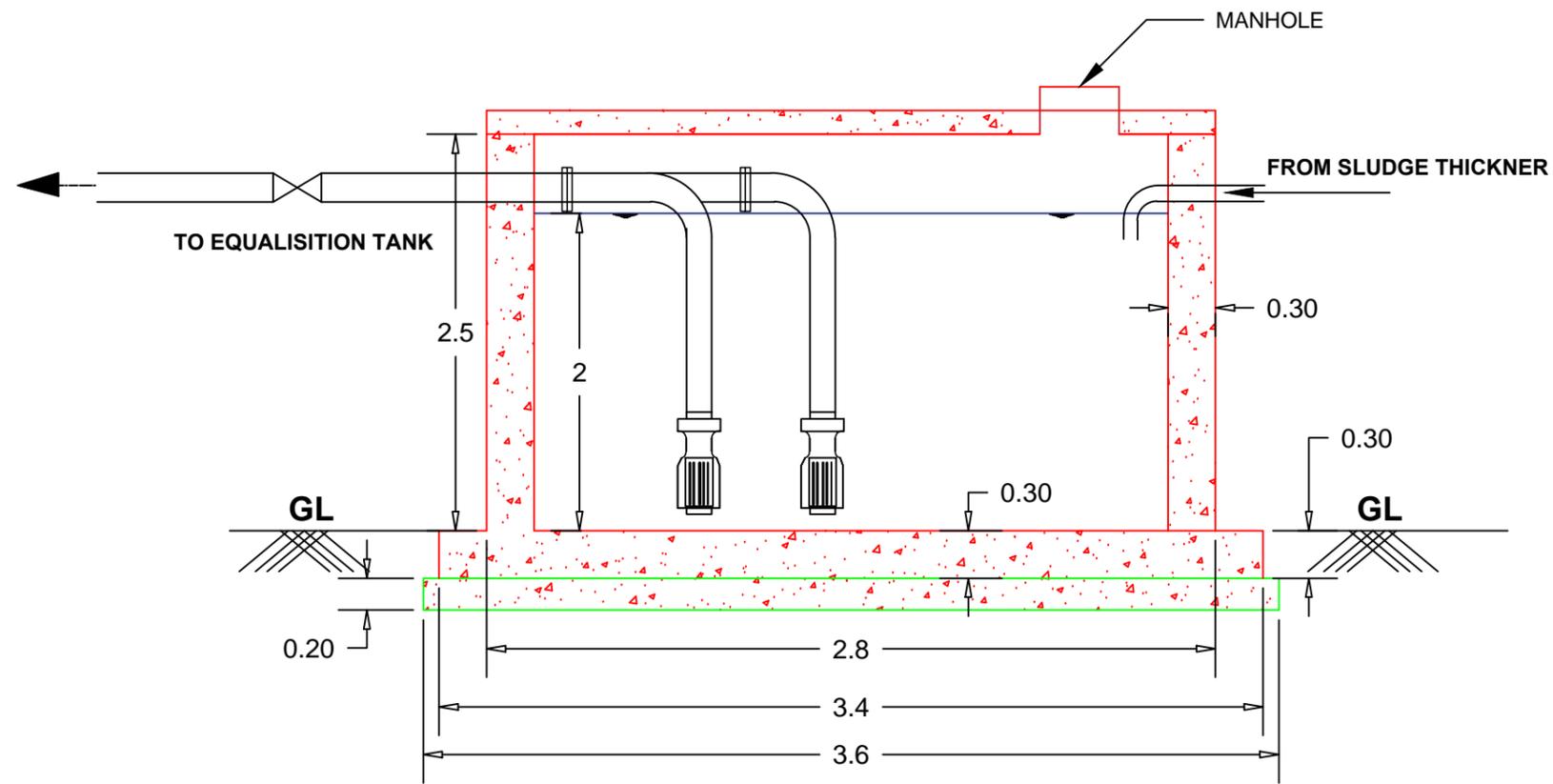
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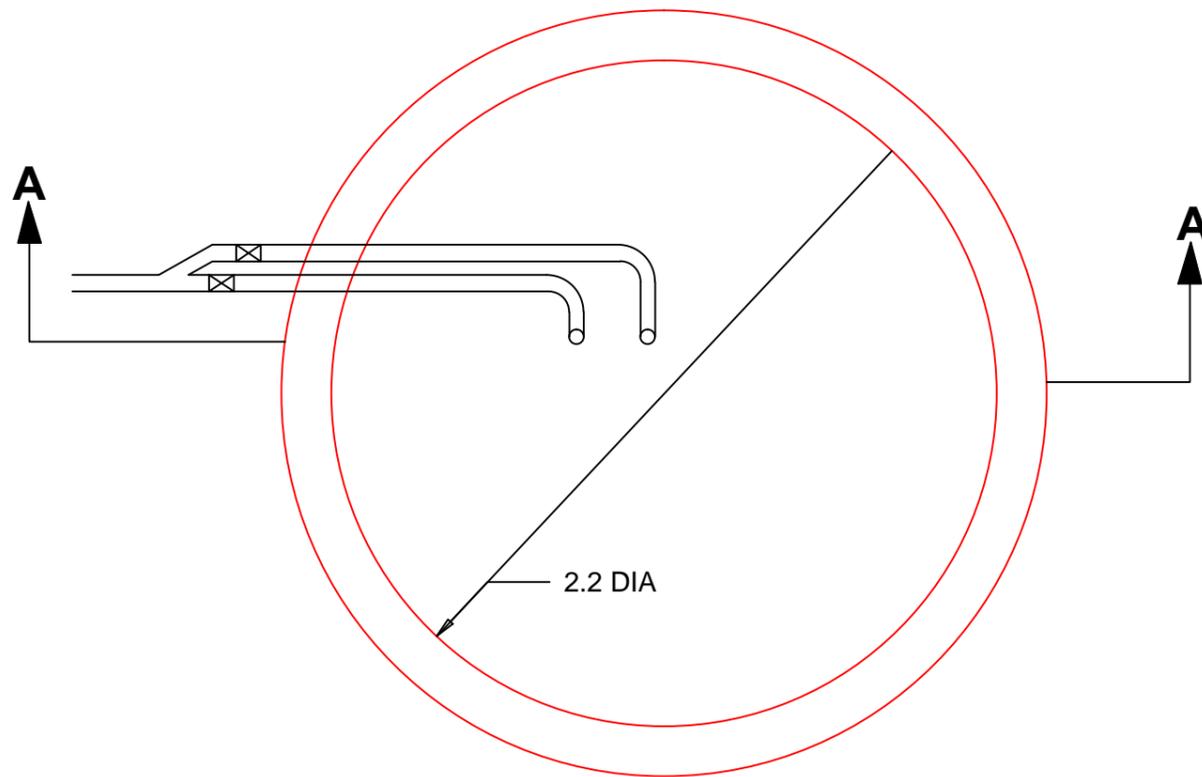
DWG No :- KNGD /STP/ 11

Not in scale

AE	AEE	EE	SE	CE
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SECTION AA



PLAN

GENERAL NOTES

- ALL DIMENSIONS ARE IN METERS
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No.	Revision/ Issue	Date



**PPD & SEWERAGE CIRCLE,
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LAYING SEWERAGE NET WORK

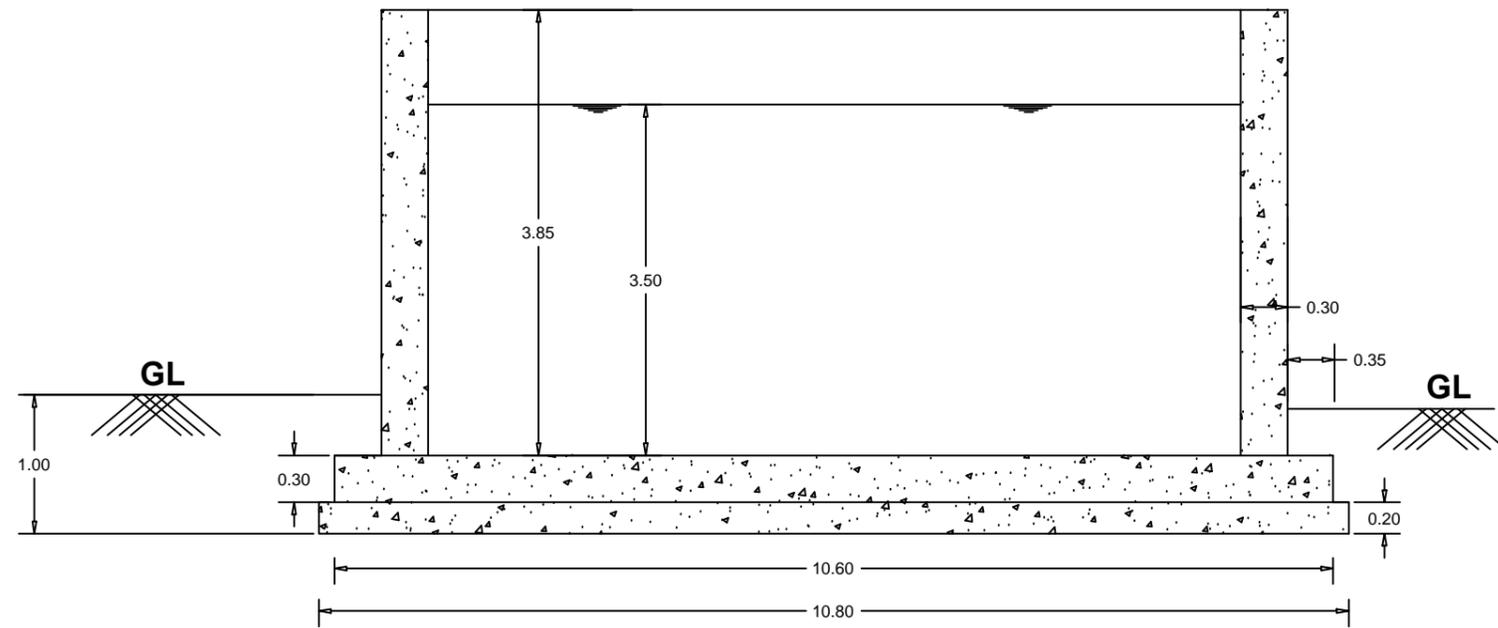
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CENTRATE SUMP

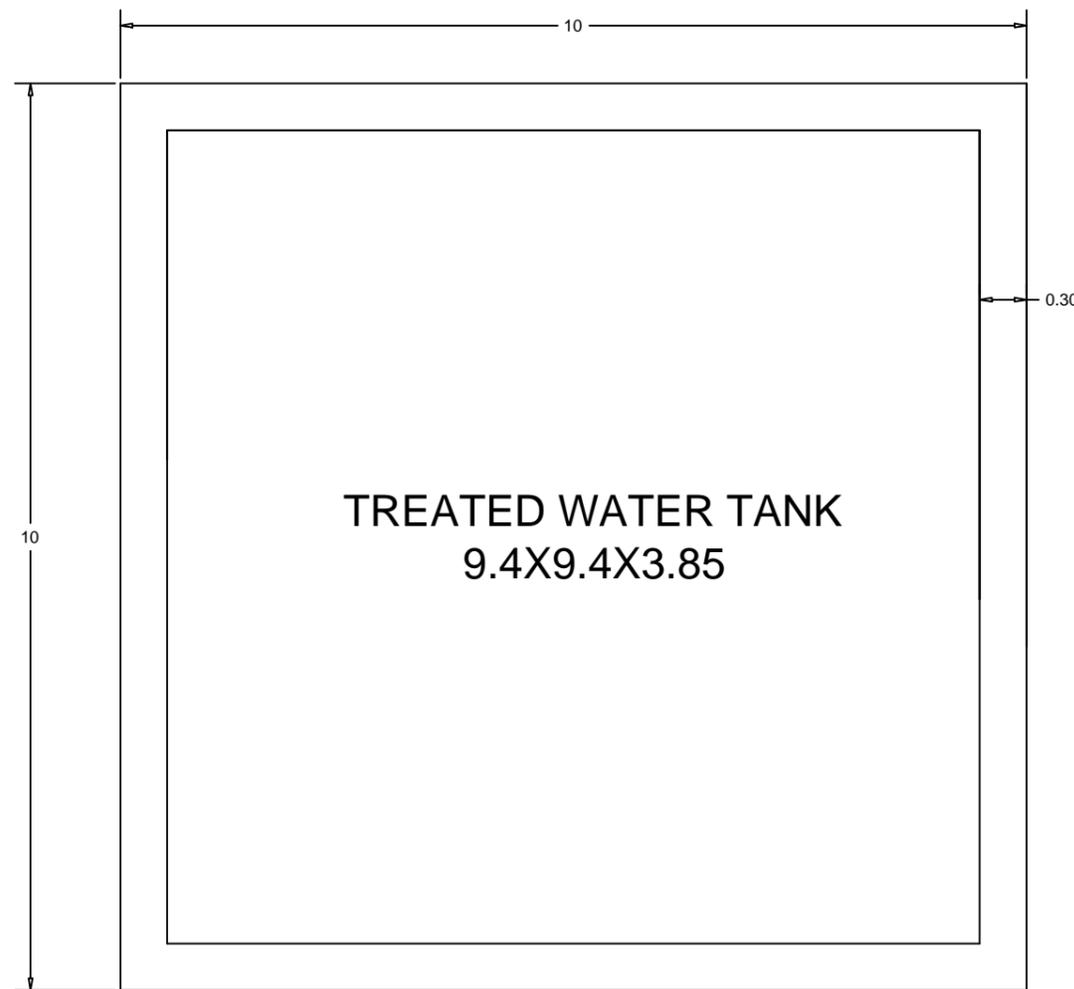
DWG No :- KNKD /STP/ 12

Not in scale

AE	AEE	EE	SE	CE
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SECTION



PLAN

GENERAL NOTES

- ALL DIMENSIONS ARE IN METERS
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No.	Revision/ Issue	Date



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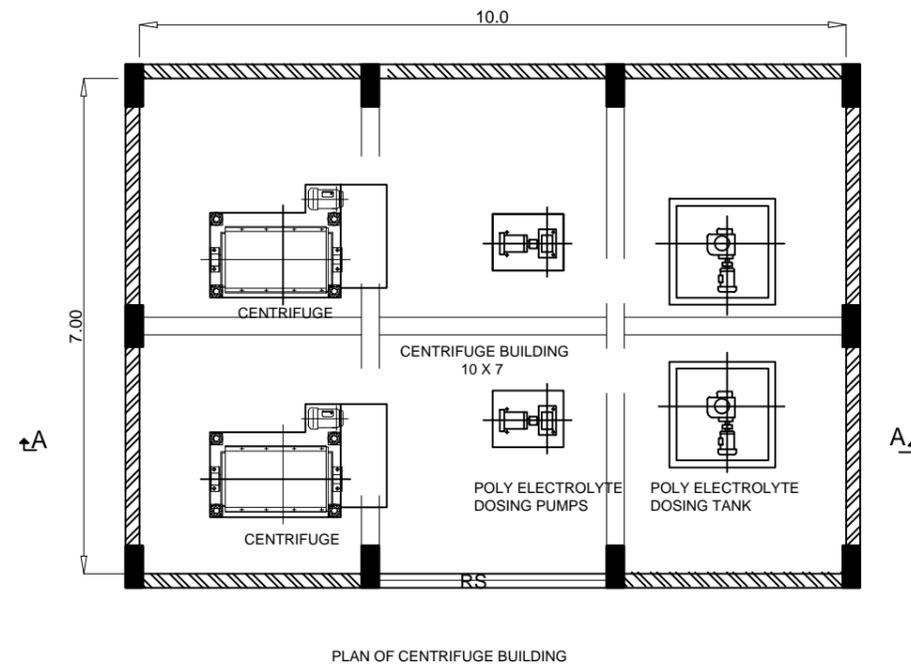
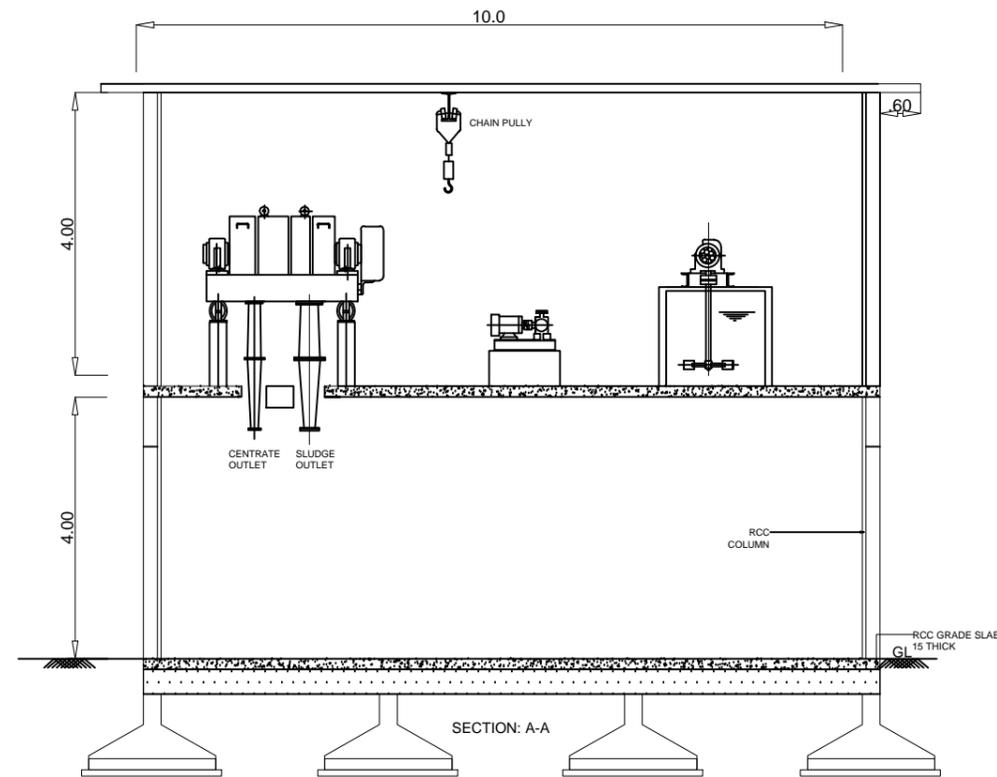
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TREATED WATER TANK

DWG No :- KNGD /STP/ 13

Not in scale

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GENERAL NOTES

- ALL DIMENSIONS ARE IN METERS
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No.	Revision/ Issue	Date



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LAYING SEWERAGE NET WORK

DRAWING TITLE

CENTRIFUGE BUILDING

DWG No :- KNKD /STP/ 14

Not in scale

AE	AEE	EE	SE	CE
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GENERAL NOTES

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No.	Revision/ Issue	Date



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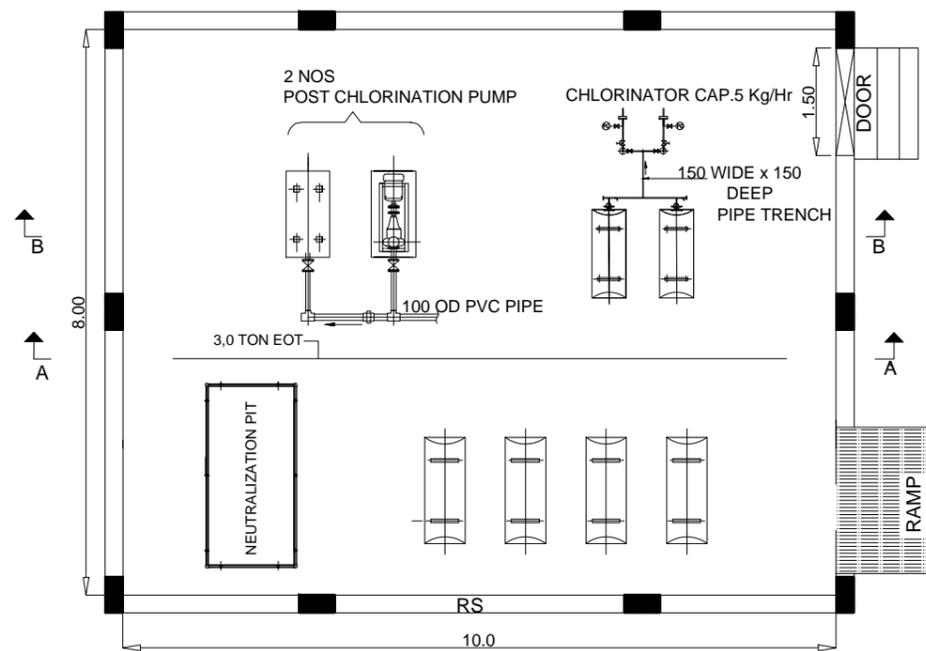
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CHLORINATION ROOM

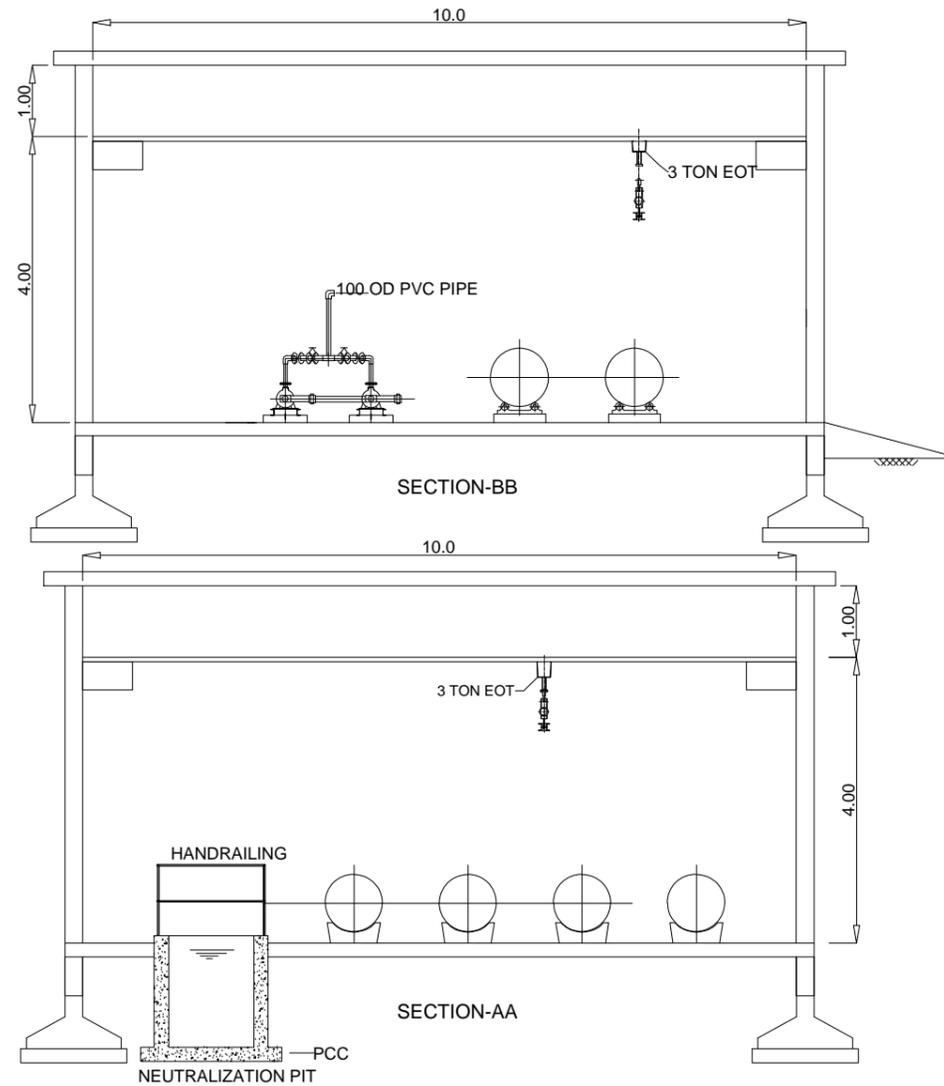
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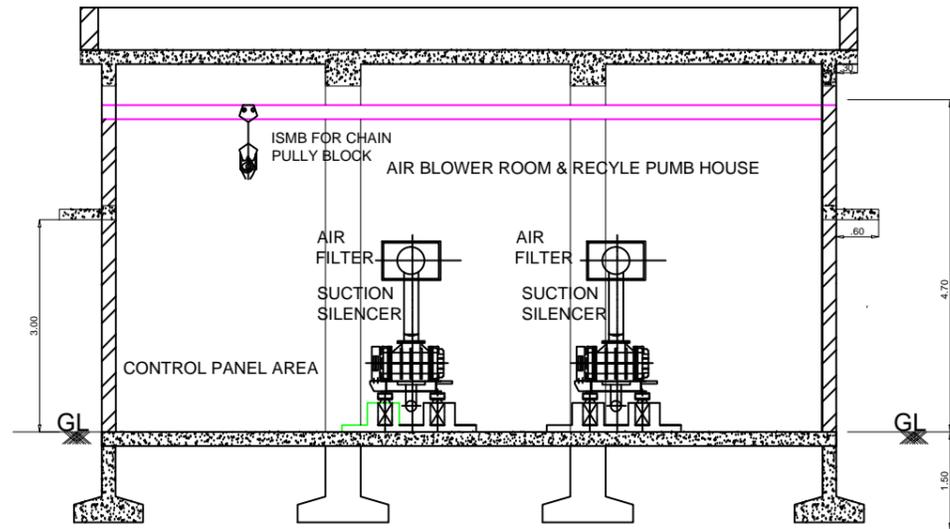


**CHLORINATION BUILDING
PLAN**

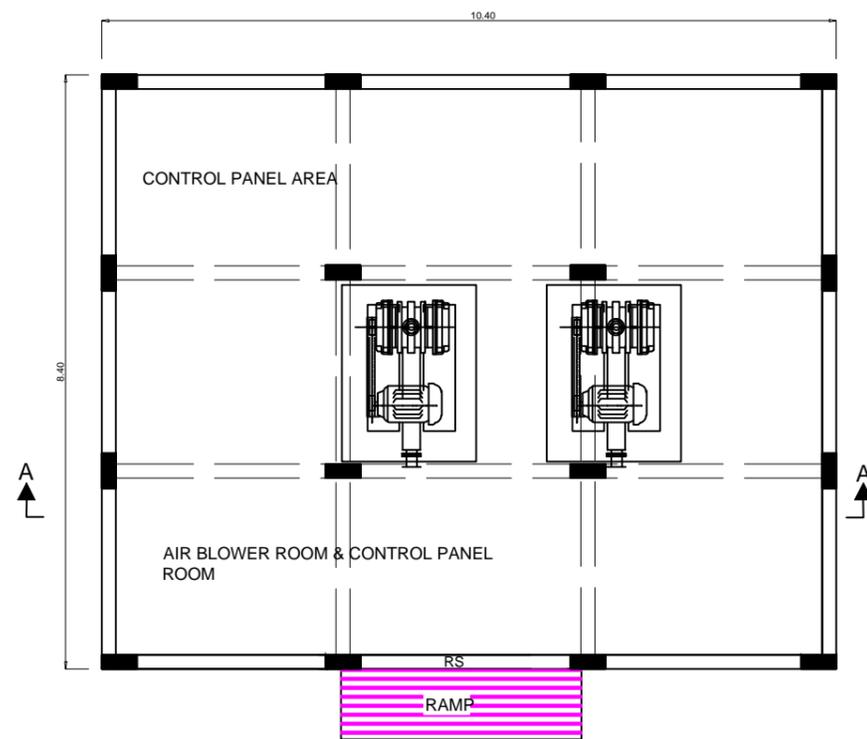


SECTION-AA

SECTION-BB



SECTION A-A



PLAN

GENERAL NOTES

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No.	Revision/ Issue	Date



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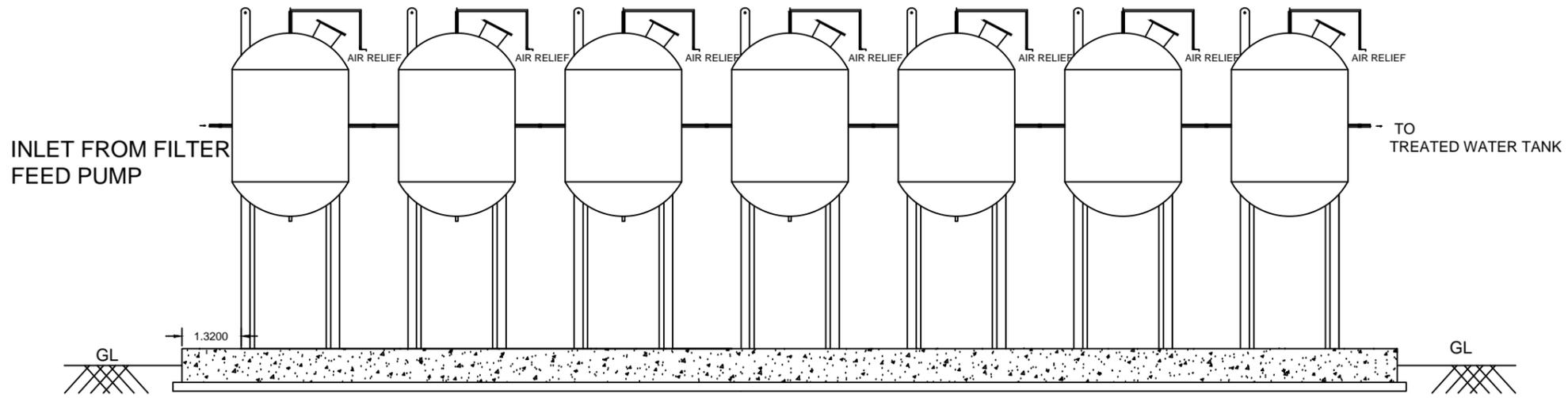
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AIR BLOWER ROOM
AND CONTROL PANEL ROOM

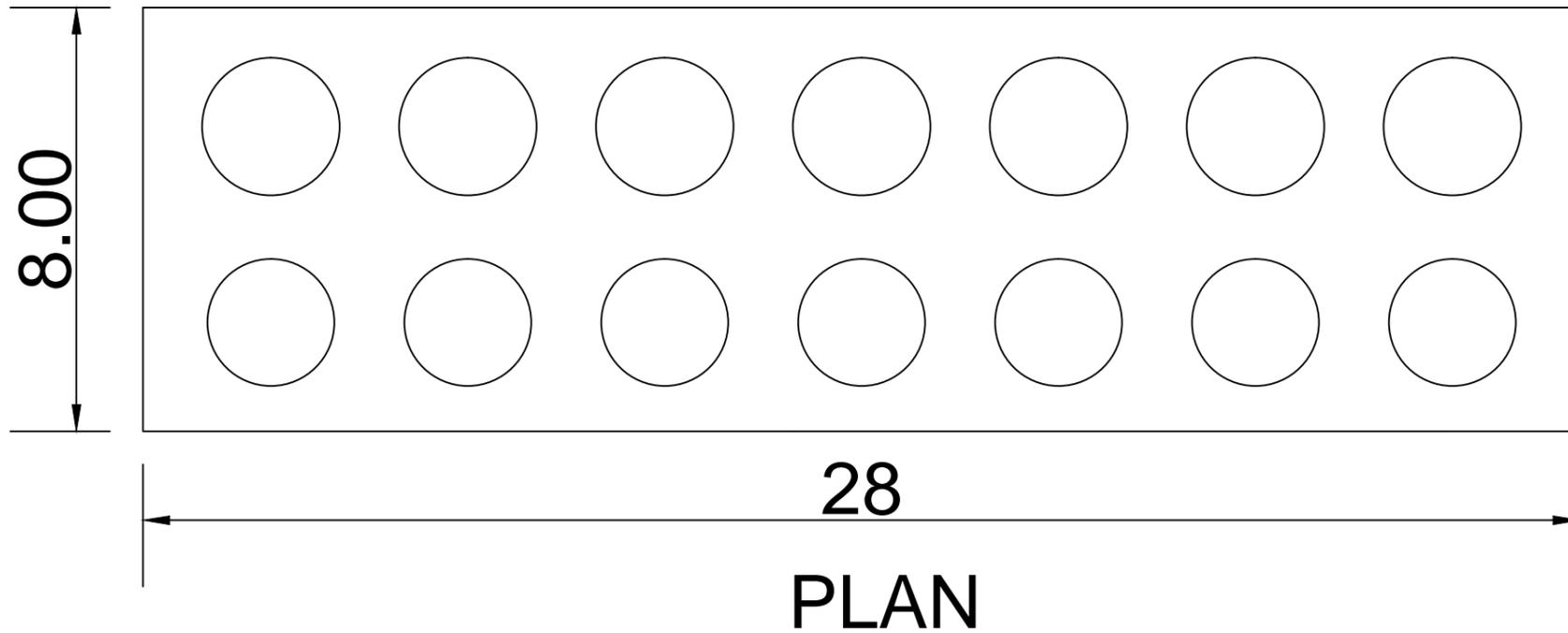
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Not in scale

AE	AEE	EE	SE	CE
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SECTION A A



PLAN

GENERAL NOTES

- ALL DIMENSIONS ARE IN METERS
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No.	Revision/ Issue	Date



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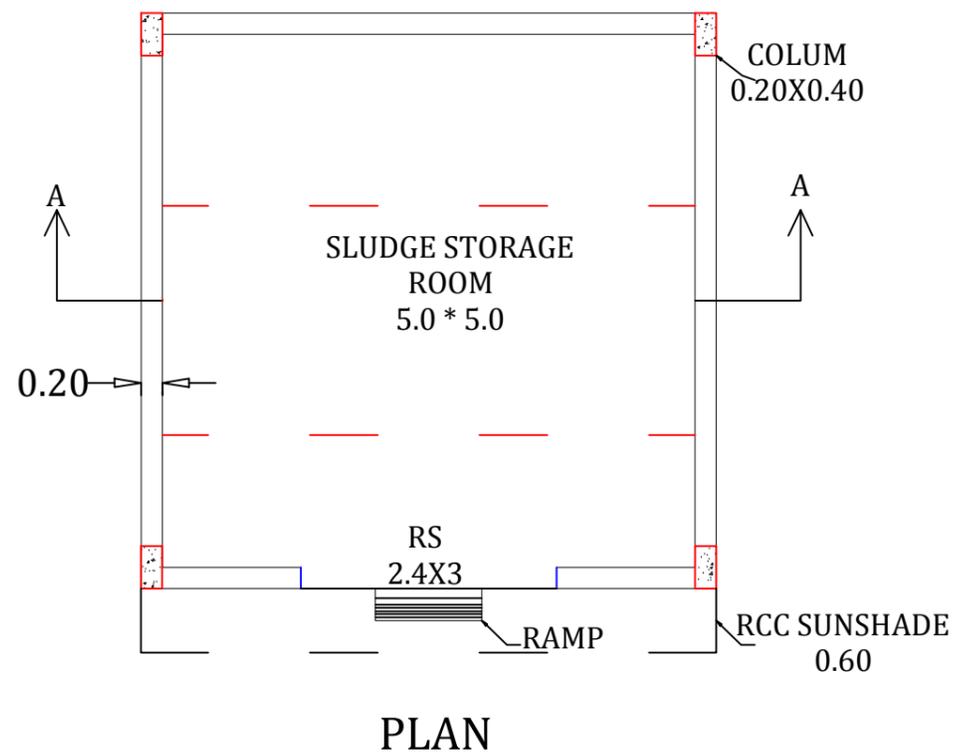
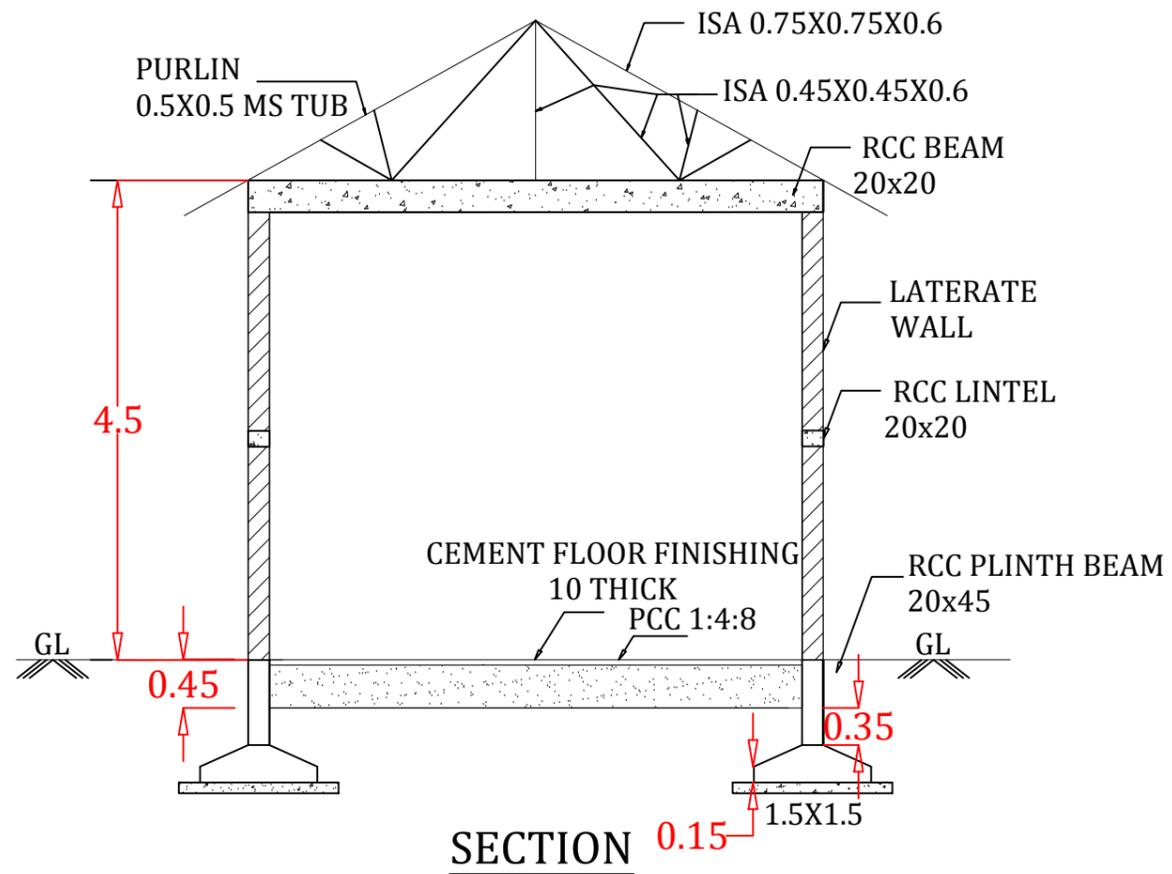
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PSF/ACF UNIT

DWG No :- KNGD /STP/ 17

Not in scale

AE	AEE	EE	SE	CE
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GENERAL NOTES

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No.	Revision/ Issue	Date



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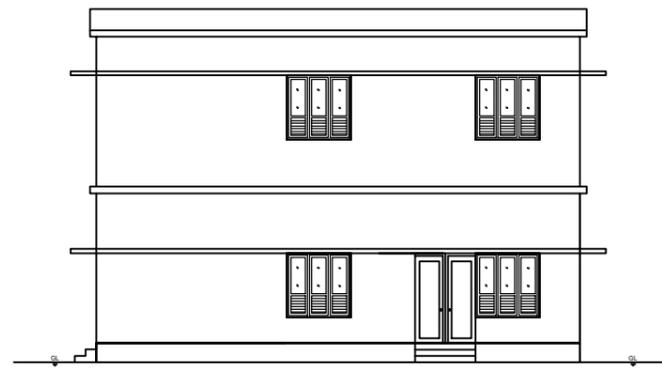
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SLUDGE STORAGE ROOM

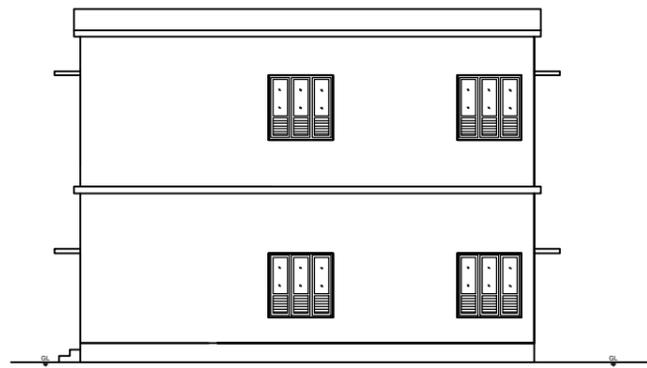
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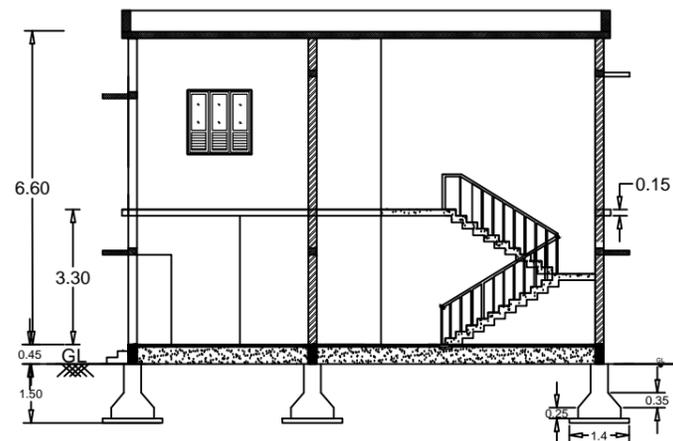
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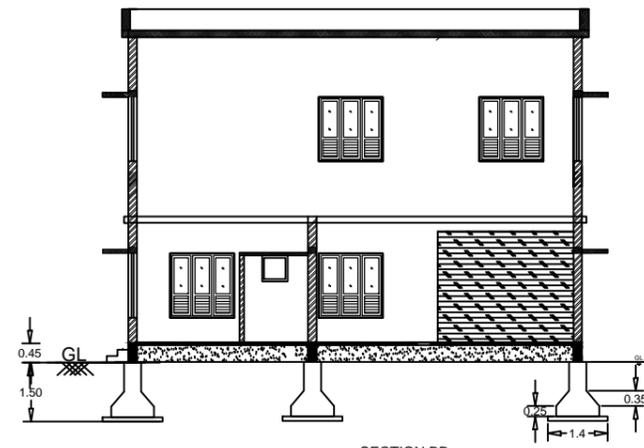
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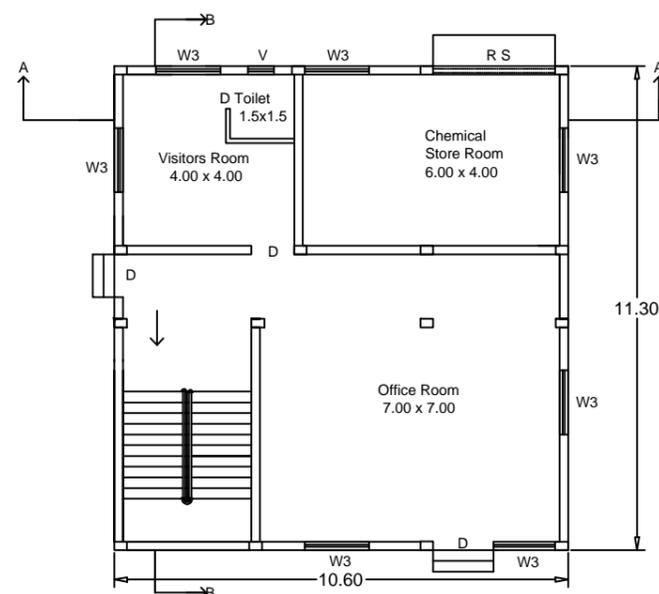
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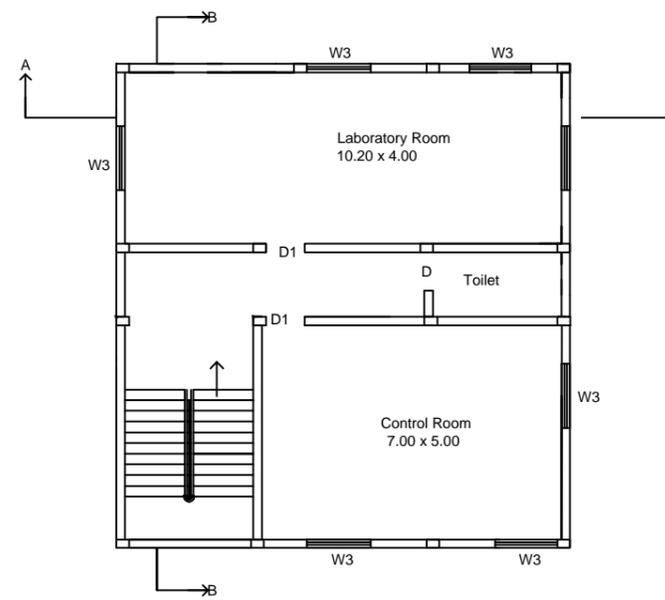
SECTION BB



SECTION BB



GROUND FLOOR PLAN



FIRST FLOOR PLAN

GENERAL NOTES

- ALL DIMENSIONS ARE IN METERS
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No.	Revision/ Issue	Date
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**PPD & SEWERAGE CIRCLE,
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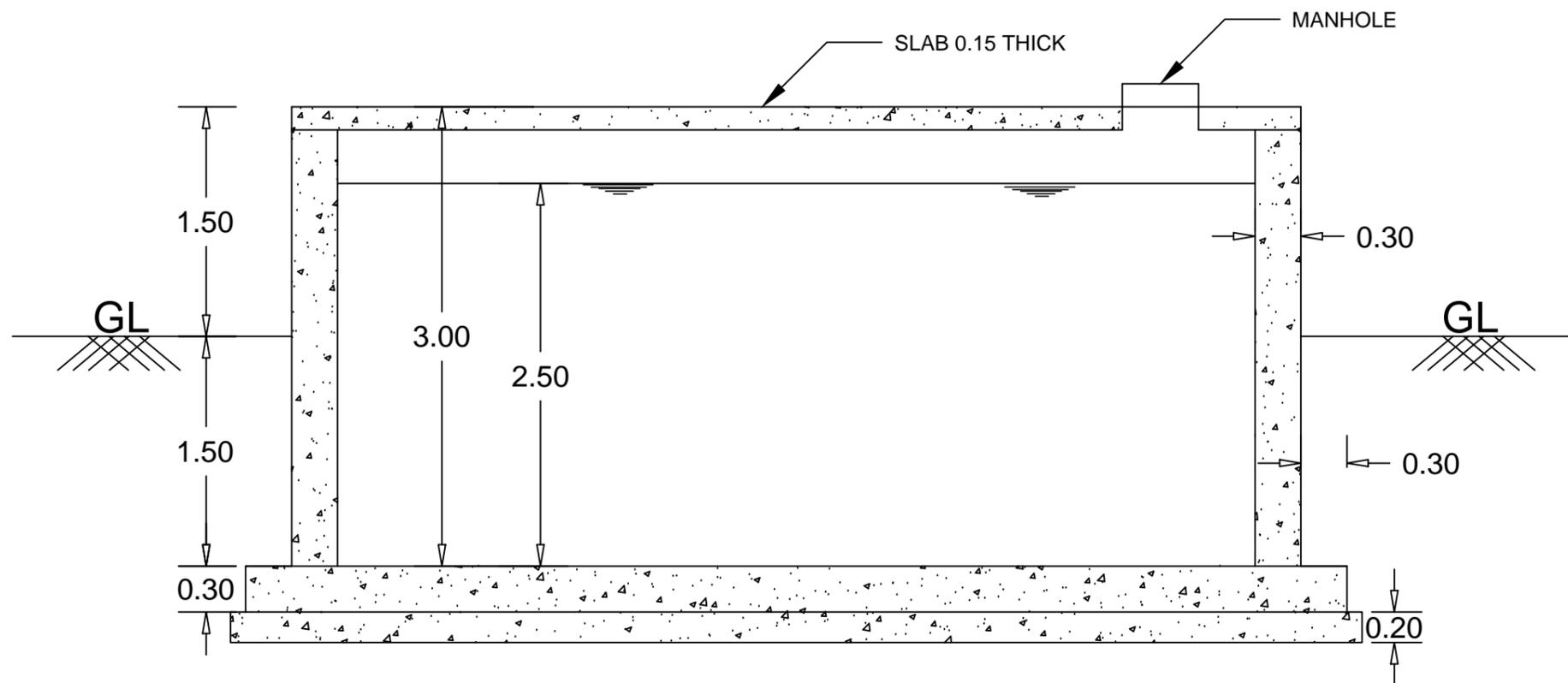
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ADMINISTRATIVE BUILDING
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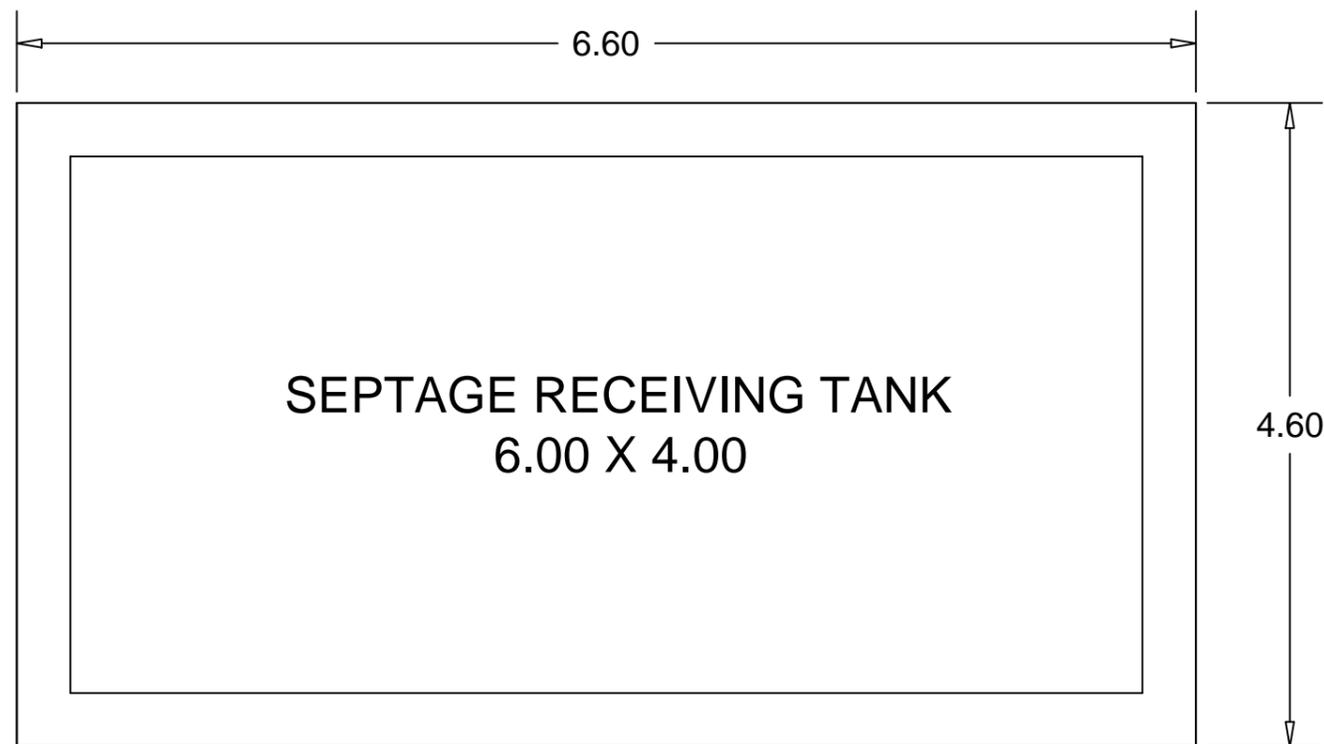
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Not in scale

AE	AEE	EE	SE	CE
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SECTION



PLAN

GENERAL NOTES

- ALL DIMENSIONS ARE IN METERS
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No.	Rivision/ Issue	Date



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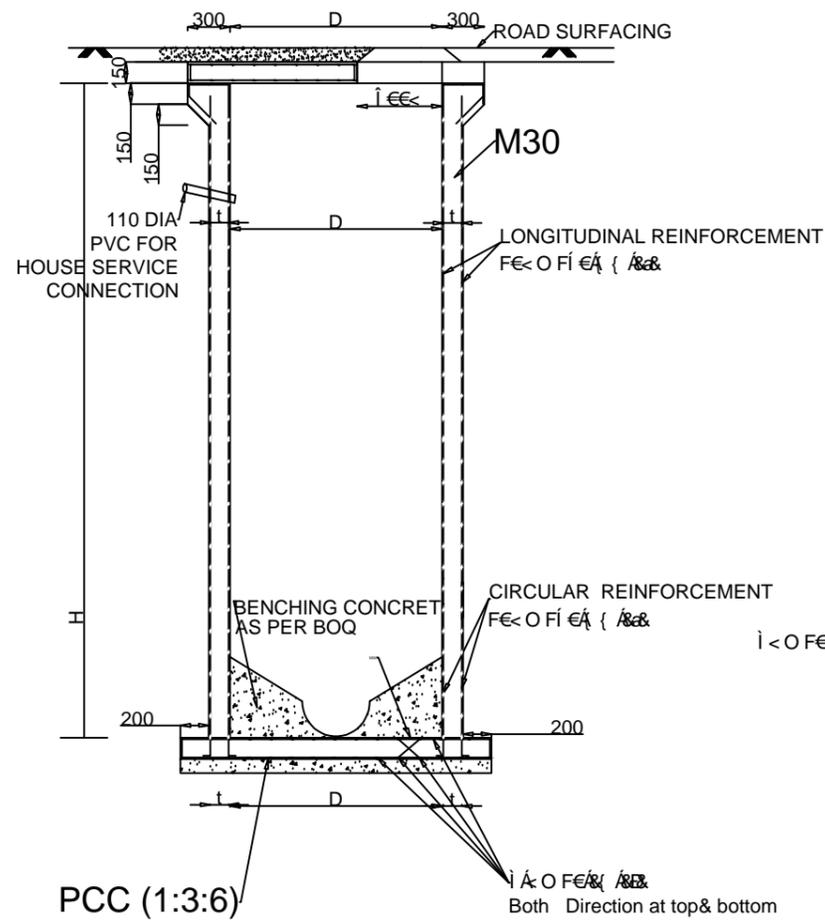
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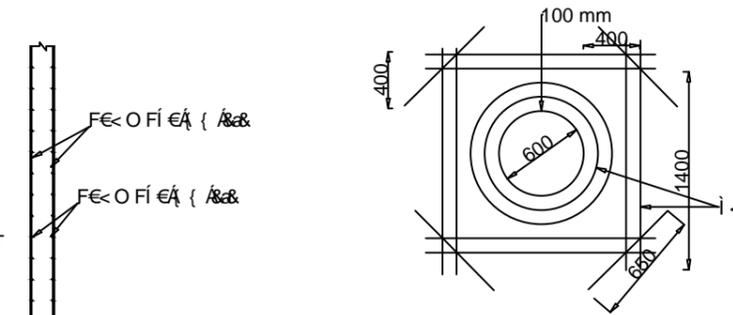
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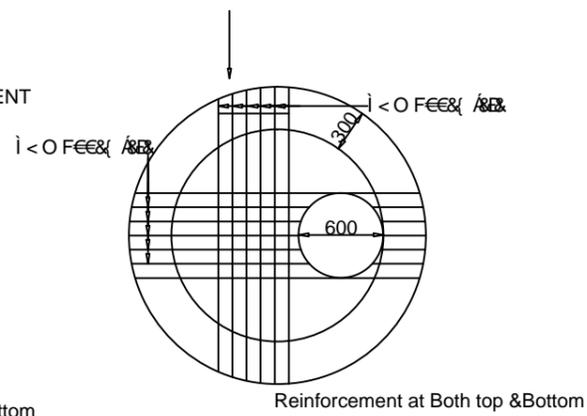
AE	AEE	EE	SE	CE
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SECTION



ADDITIONAL REINFORCEMENT AROUND
MANHOLE COVER OPENING ,INLET
OPENING AND OUTLET OPENING



COVER SLAB

GENERAL NOTES

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No.	Rivision/ Issue	Date



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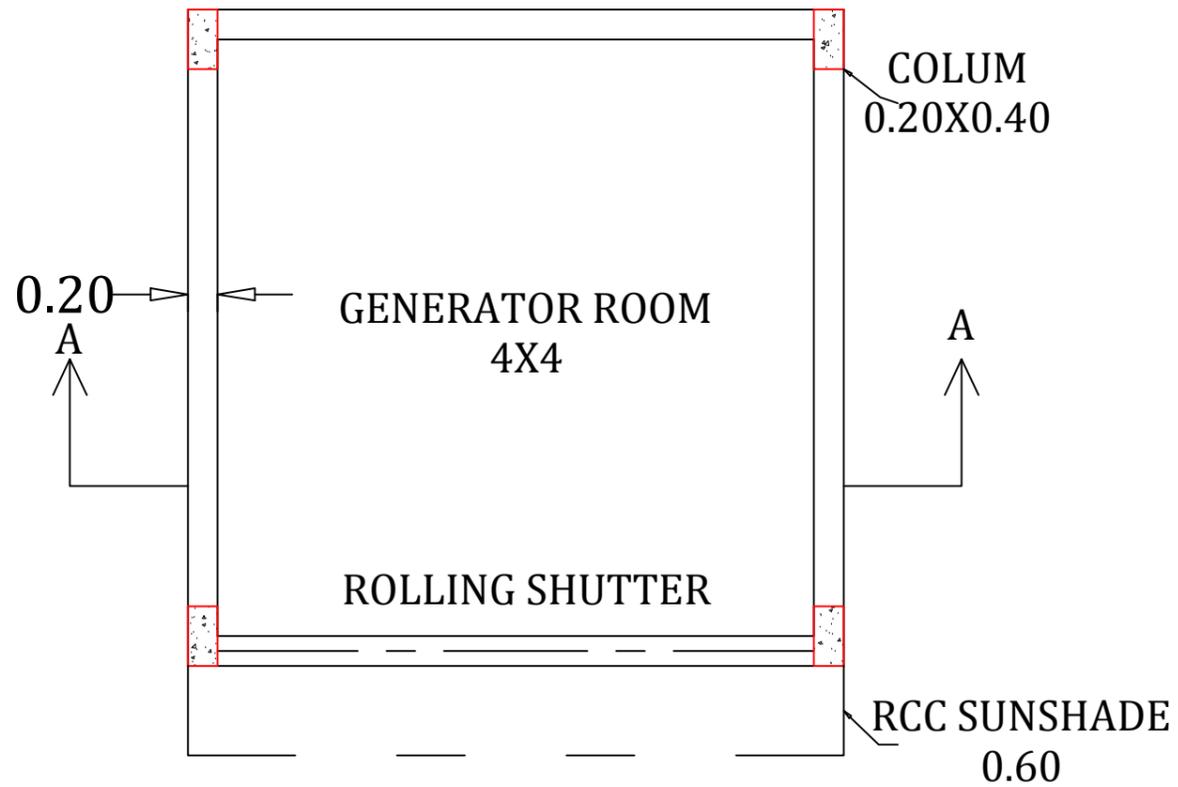
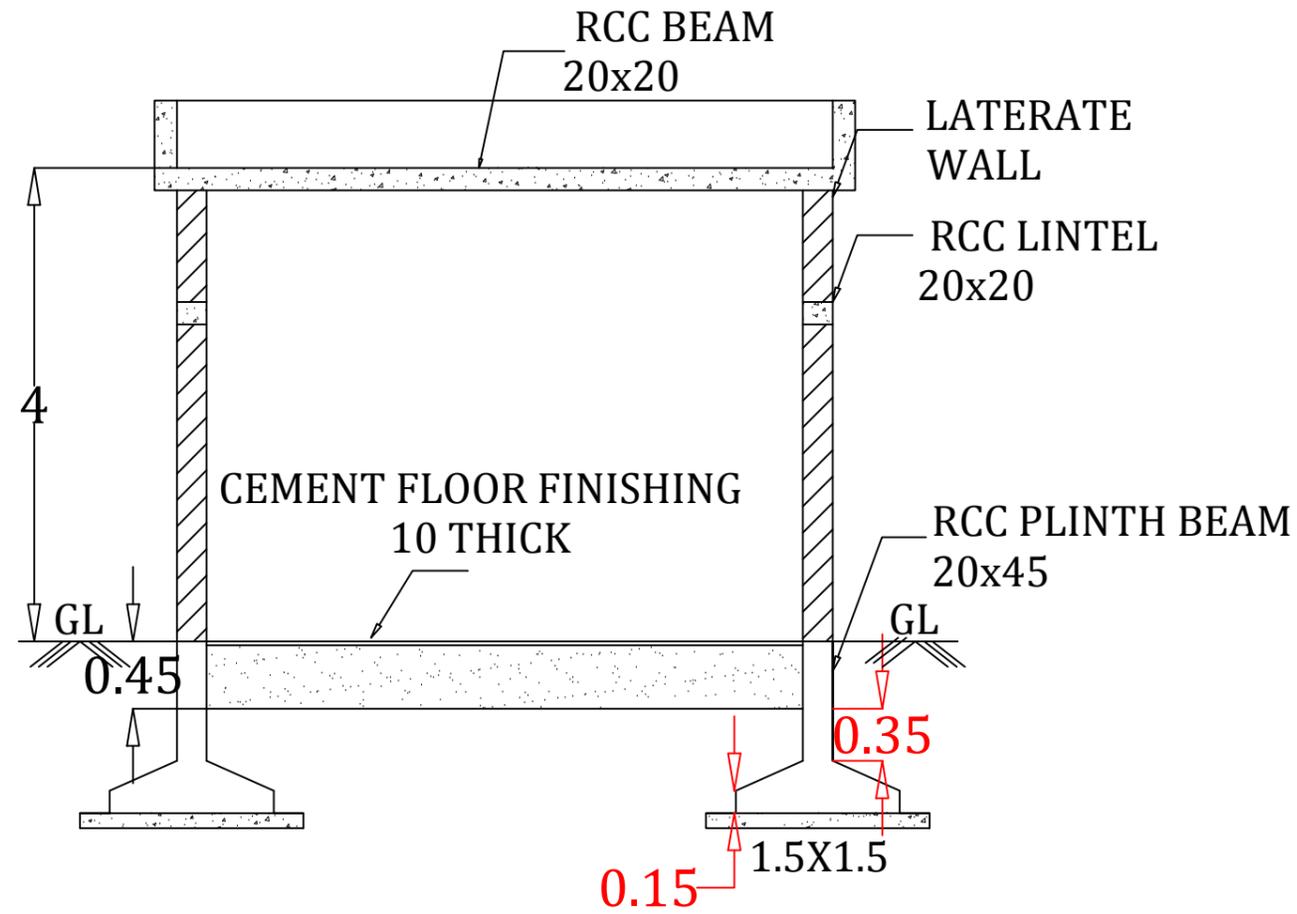
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TYPICAL MANHOLE DETAILS

DWG No :- KNGD /STP/ 21

Not in scale

AE	AEE	EE	SE	CE
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GENERAL NOTES

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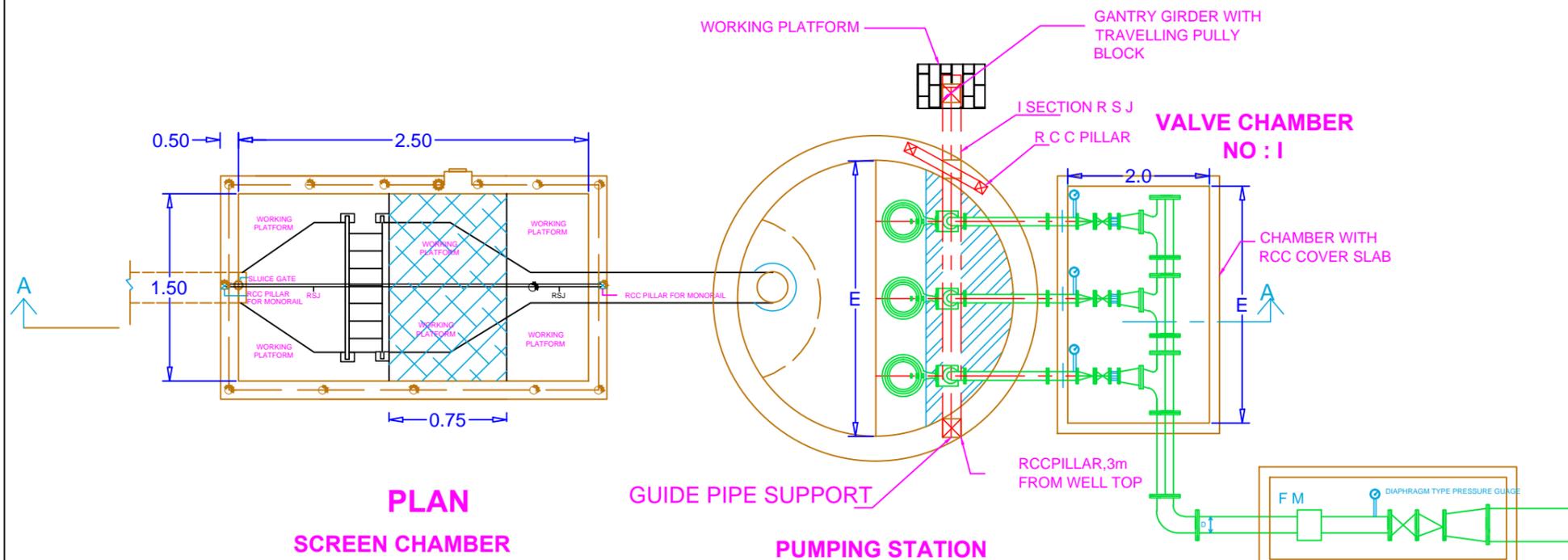
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DG ROOM

DWG No :- KNGD /STP/ 22

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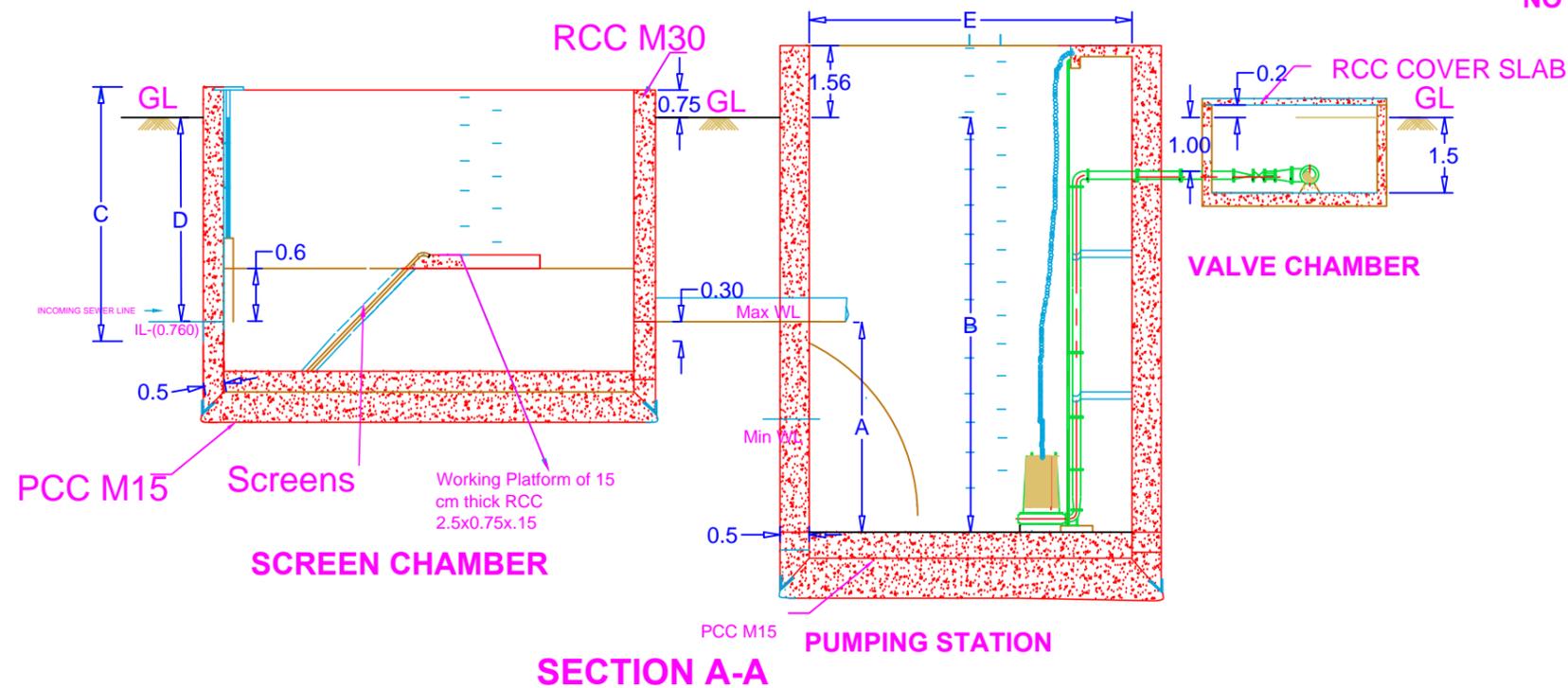
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PLAN
SCREEN CHAMBER

PUMPING STATION

VALVE CHAMBER NO : II



SCREEN CHAMBER

SECTION A-A

PUMPING STATION

VALVE CHAMBER

GENERAL NOTES

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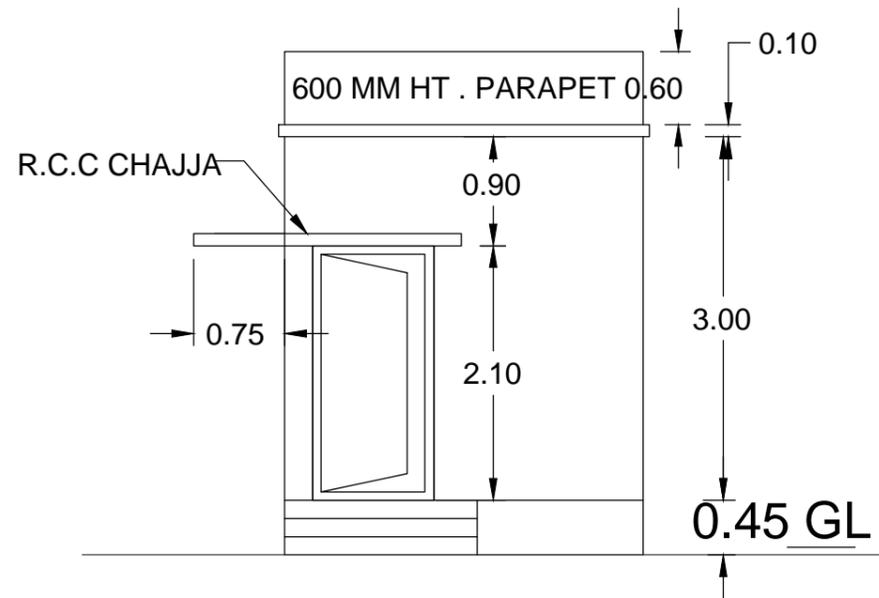
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GENERAL ARRANGEMENT OF
PUMPING STATION

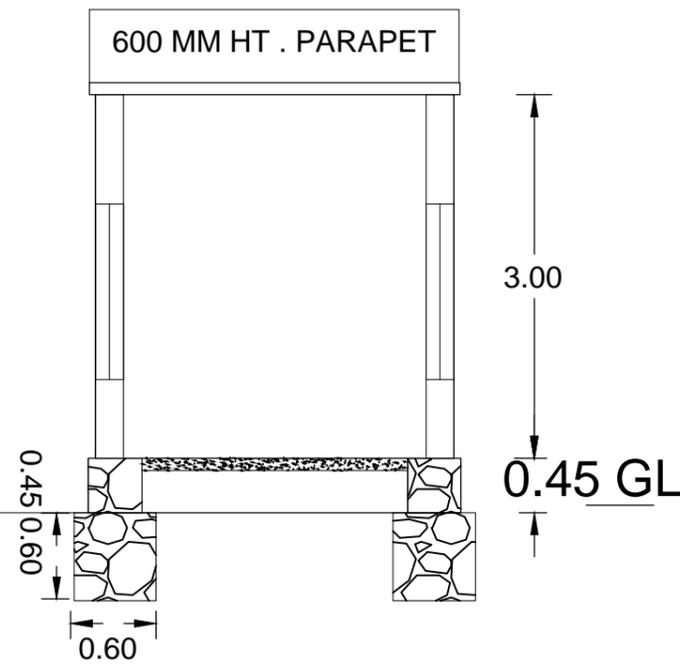
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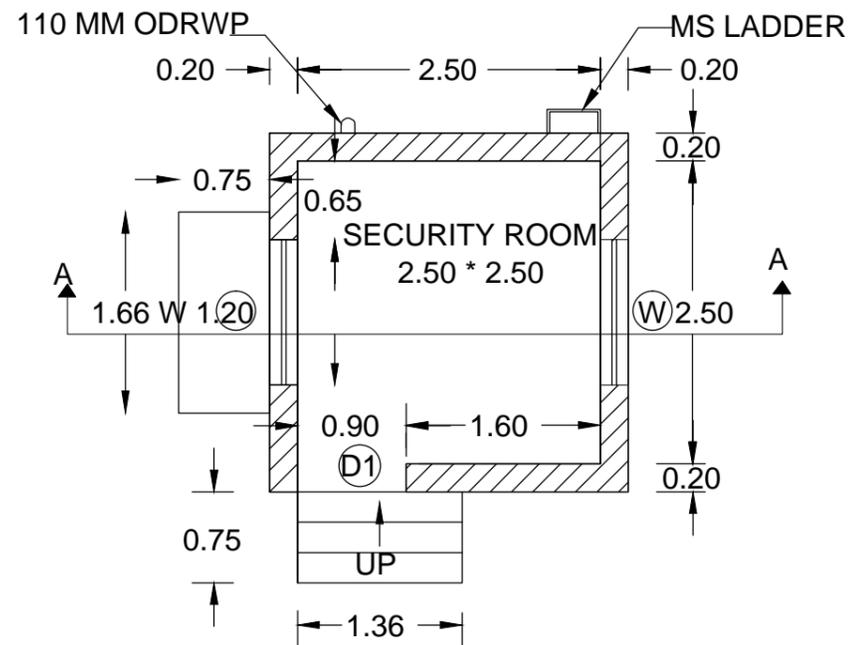
AE	AEE	EE	SE	CE
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ELEVATION



SECTION



PLAN

GENERAL NOTES

- ALL DIMENSIONS ARE IN METERS
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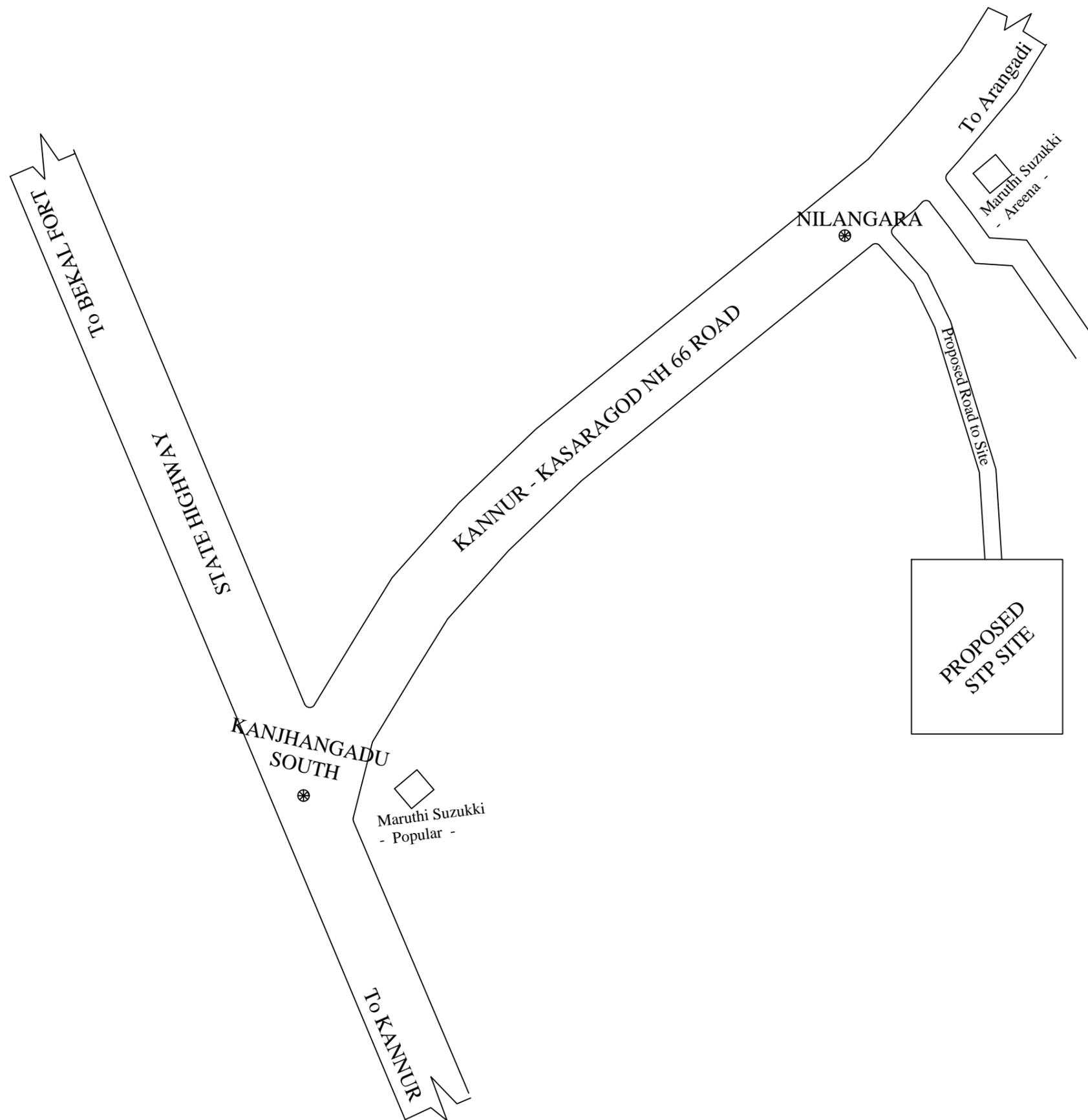
DRAWING TITLE

SECURITY ROOM

DWG No :- KNGD /STP/ 24

Not in scale

AE	AEE	EE	SE	CE
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GENERAL NOTES

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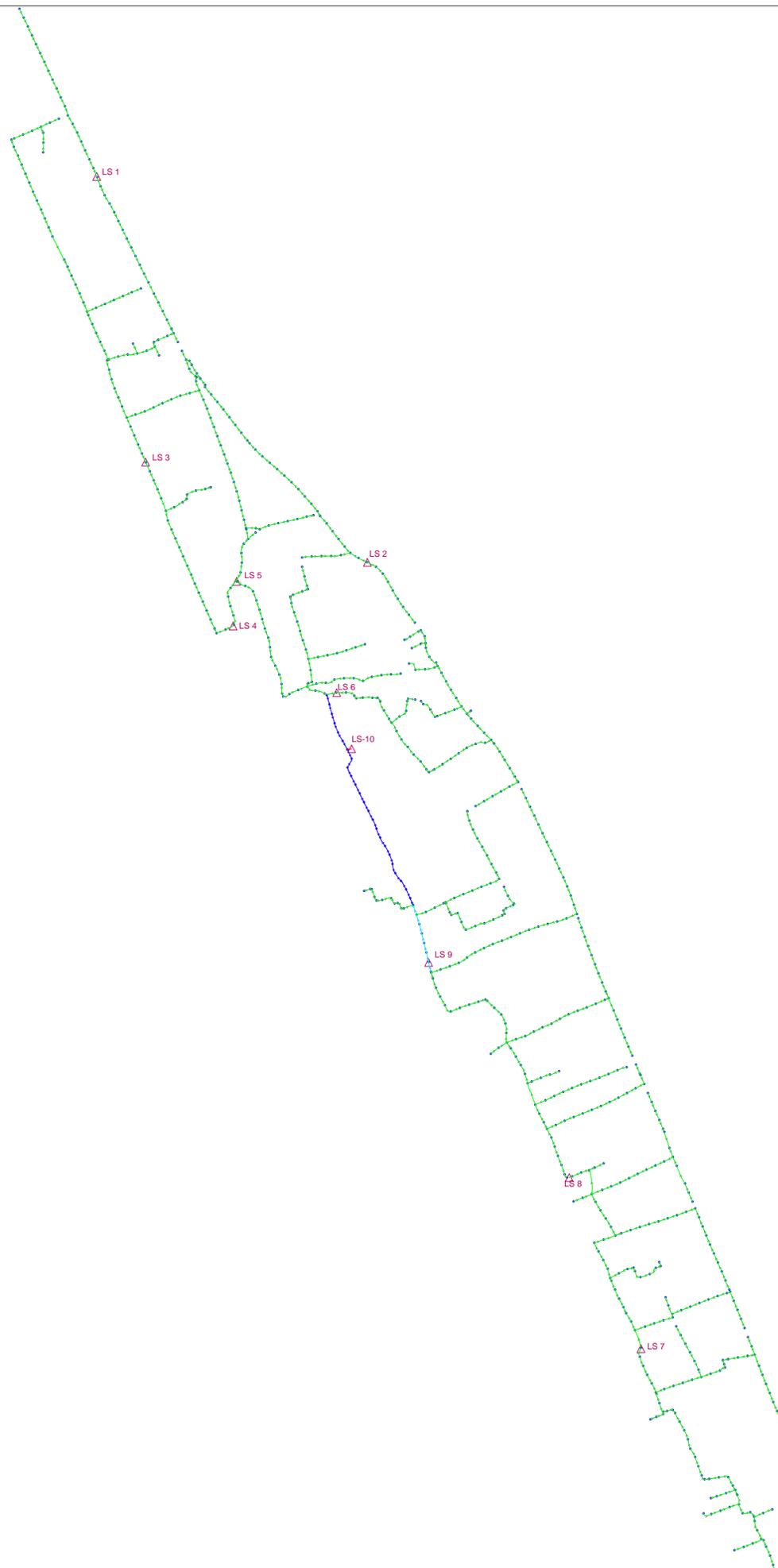
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LOCATION SKETCH

DWG No :- KNGD /STP/ 25

Not in scale

AE	AEE	EE	SE	CE
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GENERAL NOTES

ALL DIMENSIONS ARE IN METERS
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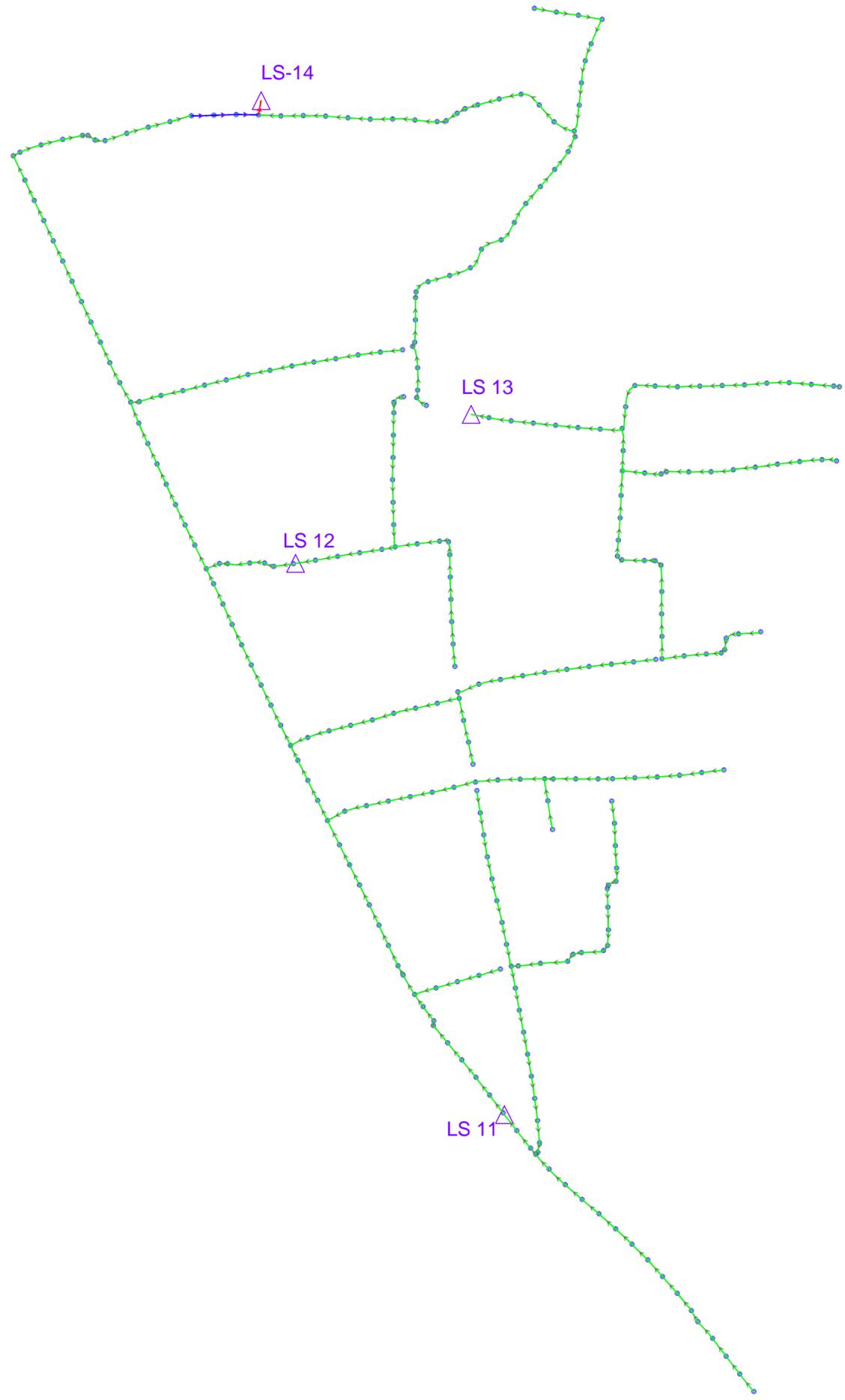
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NET WORK LAYOUT - ZONE -A

DWG No :- KNGD / Net Work/ Zn A

Not in scale

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GENERAL NOTES

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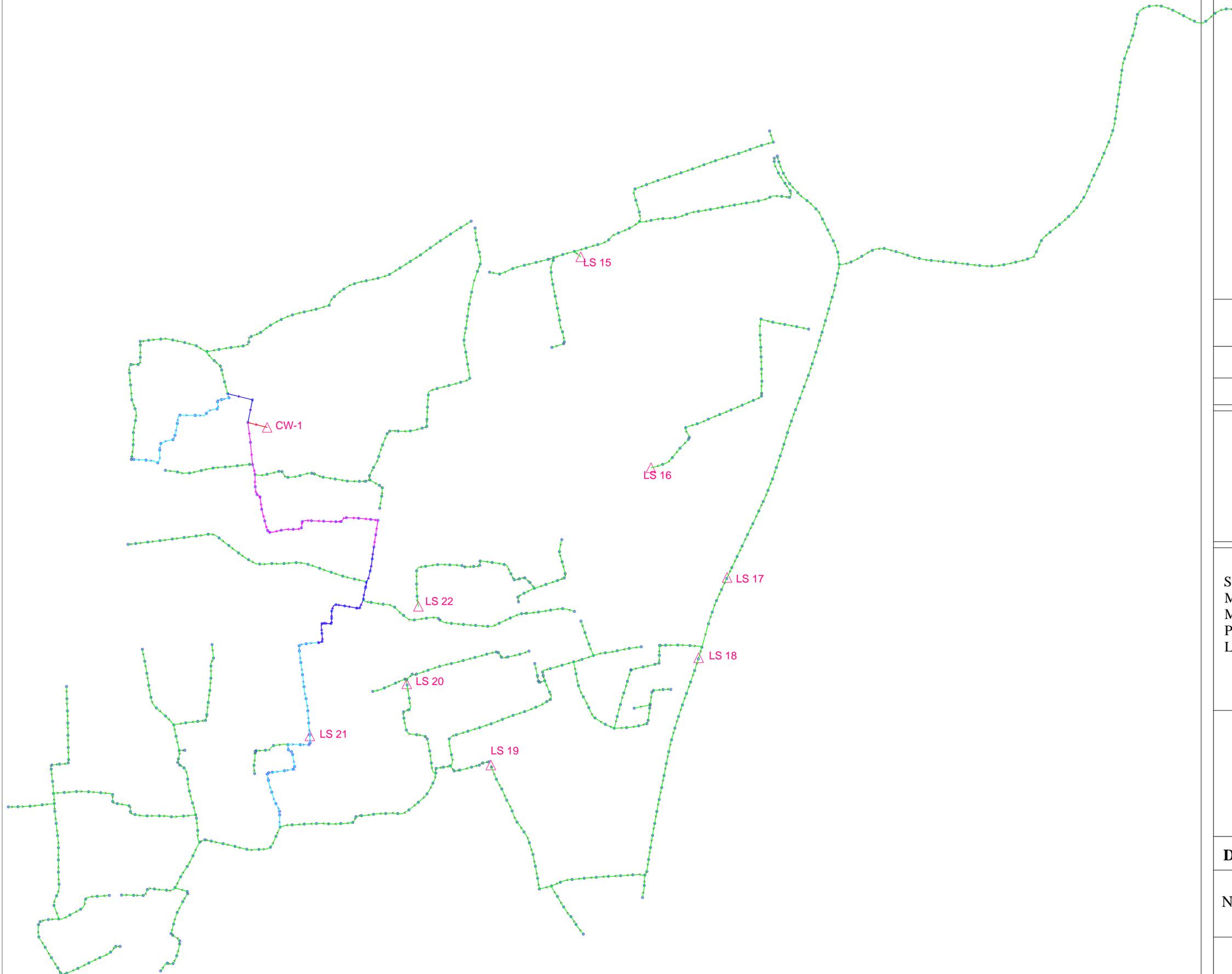
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NET WORK LAYOUT - ZONE -B

DWG No :- KNGD / Net Work/ Zn B

Not in scale

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GENERAL NOTES

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No.	Rivision/ Issue	Date



PPD & SEWERAGE CIRCLE
 KERALA WATER AUTHORITY
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PROJECT NAME

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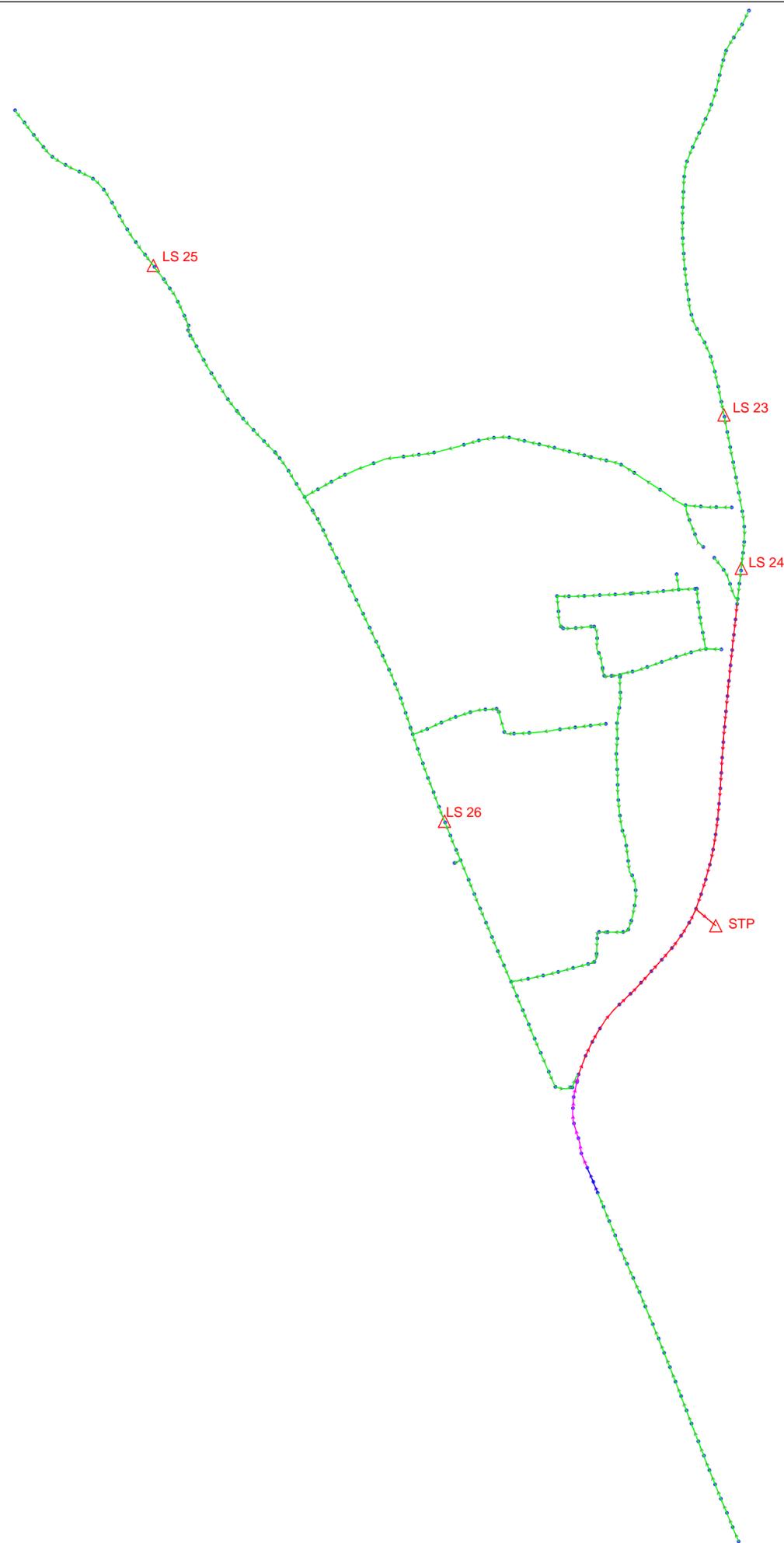
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NET WORK LAYOUT - ZONE -C

DWG No :- KNGD / Net Work/ Zn C

Not in scale

AE	AEE	EE	SE	CE
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GENERAL NOTES

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No.	Revision/ Issue	Date



PPD & SEWERAGE CIRCLE
 KERALA WATER AUTHORITY
 KOZHIKODE

PROJECT NAME

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DRAWING TITLE

NET WORK LAYOUT - ZONE -D

DWG No :- KNGD / Net Work/ Zn D

Not in scale

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APPENDIX-III

Design of Wet Wells & Lifting Stations

Sl no.	Name of wetwel	Peak flowLPS	Detention Period in min.	Storage capacity m ³	SWD (m)	Area m ²	Size	Depth up to invert of pipe (m)	Total Depth (m)
1	LS1	1.425	10.00	0.86	1.00	0.86	1.05	4.123	5.12
							say 2 m dia		
2	LS2	0.600	10.00	0.36	1.00	0.36	0.68	3.988	4.99
							say 2 m dia		
3	LS3	13.650	10.00	8.19	1.75	4.68	2.44	4.122	5.87
							say 3 m dia		
4	LS4	15.750	10.00	9.45	1.80	5.25	2.59	4.194	5.99
							say 3 m dia		
5	LS5	16.725	10.00	10.04	1.50	6.69	2.92	4.381	5.88
							say 3 m dia		
6	LS6	5.550	10.00	3.33	1.25	2.66	1.84	4.081	5.33
							say 2 m dia		
7	LS7	6.150	10.00	3.69	1.30	2.84	1.90	4.199	5.50
							say 2 m dia		
8	LS8	13.050	10.00	7.83	1.30	6.02	2.77	4.087	5.39
							say 3 m dia		
9	LS9	21.975	10.00	13.19	1.30	10.14	3.59	4.076	5.38
							say 5 m dia		
10	LS-10	54.075	10.00	32.45	2.00	16.22	4.55	3.593	5.59
							say 5 m dia		
11	LS11	3.900	10.00	2.34	1.00	2.34	1.73	4.649	5.65
							say 2 m dia		
12	LS12	1.650	10.00	0.99	0.75	1.32	1.30	4.172	4.92
							say 2 m dia		
13	LS13	3.825	10.00	2.30	0.75	3.06	1.97	5.014	5.76
							say 2 m dia		
14	LS 14	22.500	10.00	13.50	3.00	4.50	2.39	2.392	5.39
							say 3 m dia		
15	LS15	4.425	10.00	2.66	2.00	1.33	1.30	1.19	3.19
							say 2 m dia		
16	LS16	1.800	10.00	1.08	1.50	0.72	0.96	1.19	2.69
							say 2 m dia		
17	LS17	6.525	10.00	3.92	1.00	3.92	2.23	4.586	5.59
							say 3 m dia		
18	LS18	7.650	10.00	4.59	1.20	3.83	2.21	4.539	5.74
							say 3 m dia		
19	LS19	11.175	10.00	6.71	1.25	5.36	2.61	4.106	5.36
							say 3 m dia		

SI no.	Name of wetwel	Peak flowLPS	Detention Period in min.	Storage capacity m ³	SWD (m)	Area m ²	Size	Depth up to invert of pipe (m)	Total Depth (m)
20	LS20	1.425	10.00	0.86	0.75	1.14	1.21	4.536	5.29
		1.425					say 2 m dia		
21	LS21	30.825	10.00	18.50	1.50	12.33	3.96	3.919	5.42
		30.825					say 5 m dia		
22	LS22	3.975	10.00	2.39	0.75	3.18	2.01	5.051	5.80
		3.975					say 3 m dia		
23	CW-1	77.775	10.00	46.67	3.50	13.33	4.12	1.83	5.33
		77.775					say 5 m dia		
24	LS23	2.100	10.00	1.26	1.00	1.26	1.27	4.09	5.09
		2.100					say 2 m dia		
25	LS24	2.850	10.00	1.71	1.00	1.71	1.48	3.924	4.92
		2.850					say 2 m dia		
26	LS25	1.050	10.00	0.63	0.75	0.84	1.03	4.303	5.05
		1.050					say 2 m dia		
27	LS26	7.575	10.00	4.55	1.25	3.64	2.15	4.096	5.35
		7.575					say 3 m dia		

APPENDIX- IV

Design of Pumpsets & Pumping mains

Sl no.	Name of station		length (m)	Q Peak	Unit	Area (m ²)	Velocity (m/s)	Pipe dia (Pumping main)	Provided Dia.(mm)	Provided Dia.(m)	Actual velocity m/s	Hf For 1000m (4flv ² /2gd)	Total Hf	Static head(m)	Residual head(m)	Total Head (m)	Pump BHP
	From LS	To MH															
1	LS1	381	5	1.4250	Ltrs/sec	0.0011	1.25	0.0381	100	0.100	0.1815	0.34	0.002	4.119	2.00	6.12	0.17
				0.0014	m ³ /sec												
				0.3896	m ³ /mint												
				0.0000													
0.5HP																	
2	LS2	1524	5	0.6000	Ltrs/sec	0.0005	1.25	0.0247	100	0.100	0.0764	0.06	0.0003	4.039	2.00	6.04	0.07
				0.0006	m ³ /sec												
				0.9969	m ³ /mint												
				0.0000													
0.5HP																	
3	LS3	403	5	13.6500	Ltrs/sec	0.0109	1.25	0.1179	150	0.150	0.7728	4.06	0.020	4.123	2.00	6.14	1.60
				0.0137	m ³ /sec												
				0.8021	m ³ /mint												
				0.0000													
2HP																	
4	LS4	451	5	15.7500	Ltrs/sec	0.0126	1.25	0.1267	150	0.150	0.8917	5.40	0.027	4.222	2.00	6.25	1.87
				0.0158	m ³ /sec												
				0.5042	m ³ /mint												
				0.0000													
2HP																	
5	LS5	1552	5	16.7250	Ltrs/sec	0.0134	1.25	0.1306	150	0.150	0.9469	6.09	0.030	4.393	2.00	6.42	2.05
				0.0167	m ³ /sec												
				0.6188	m ³ /mint												
				0.0000													
3HP																	
6	LS6	538	5	5.5500	Ltrs/sec	0.0044	1.25	0.0752	100	0.100	0.7070	5.10	0.025	4.092	2.00	6.12	0.65
				0.0056	m ³ /sec												
				0.1375	m ³ /mint												
				0.0000													
1HP																	

Sl no.	Name of station		length (m)	Q Peak	Unit	Area (m ²)	Velocity (m/s)	Pipe dia (Pumping main)	Provided Dia.(mm)	Provided Dia.(m)	Actual velocity m/s	Hf For 1000m (4flv ² /2gd)	Total Hf	Static head(m)	Residual head(m)	Total Head (m)	Pump BHP
7	LS7	148	5	6.1500	Ltrs/sec	0.0049	1.25	0.0792	100	0.100	0.7834	6.26	0.031	4.209	2.00	6.24	0.73
				0.0062	m3/sec												
				0.0917	m3/mint												
				0.0000													
1HP																	
8	LS8	741	5	13.0500	Ltrs/sec	0.0104	1.25	0.1153	150	0.150	0.7389	3.71	0.019	4.070	2.00	6.09	1.51
				0.0131	m3/sec												
				0.2063	m3/mint												
				0.0000													
2HP																	
9	LS9	605	5	21.9750	Ltrs/sec	0.0176	1.25	0.1496	150	0.150	1.2442	10.52	0.053	4.086	2.00	6.14	2.57
				0.0220	m3/sec												
				0.0000	m3/mint												
				0.0000													
3HP																	
10	LS 10	132	2190	54.0750	Ltrs/sec	0.0433	1.25	0.2348	250	0.250	1.1022	4.95	10.847	5.403	2.00	18.25	18.80
				0.0541	m3/sec												
				0.1031	m3/mint												
				0.0000													
20HP																	
11	LS11	48	5	3.9000	Ltrs/sec	0.0031	1.25	0.0630	100	0.100	0.4968	2.52	0.013	4.664	2.00	6.68	0.50
				0.0039	m3/sec												
				10.7070	m3/mint												
				0.0000													
1HP																	
12	LS12	104	5	1.6500	Ltrs/sec	0.0013	1.25	0.0410	100	0.100	0.2102	0.45	0.002	4.195	2.00	6.20	0.19
				0.0017	m3/sec												
				0.0344	m3/mint												
				0.0000													
0.5HP																	
13	LS13	739	5	3.8250	Ltrs/sec	0.0031	1.25	0.0624	100	0.100	0.4873	2.42	0.012	9.341	2.00	11.35	0.83
				0.0038	m3/sec												
				0.0344	m3/mint												
				0.0000													
1HP																	

Sl no.	Name of station		length (m)	Q Peak	Unit	Area (m ²)	Velocity (m/s)	Pipe dia (Pumping main)	Provided Dia.(mm)	Provided Dia.(m)	Actual velocity m/s	Hf For 1000m (4flv ² /2gd)	Total Hf	Static head(m)	Residual head(m)	Total Head (m)	Pump BHP
14	LS 14	748	1550	22.5000	Ltrs/sec	0.0180	1.25	0.1514	200	0.200	0.7166	2.62	4.056	16.552	2.00	22.61	9.69
				0.0225	m3/sec												
				2.1543	m3/mint												
				0.0000													
10HP																	
15	LS15	524	390	4.4250	Ltrs/sec	0.0035	1.25	0.0672	100	0.100	0.5637	3.24	1.263	12.570	2.00	15.83	1.33
				0.0044	m3/sec												
				0.0944	m3/mint												
				0.0000													
2HP																	
16	LS16	376	245	1.8000	Ltrs/sec	0.0014	1.25	0.0428	100	0.100	0.2293	0.54	0.131	10.610	2.00	12.74	0.44
				0.0018	m3/sec												
				0.1949	m3/mint												
				0.0000													
0.5HP																	
17	LS17	317	5	6.5250	Ltrs/sec	0.0052	1.25	0.0815	100	0.100	0.8312	7.04	0.035	4.634	2.00	6.67	0.83
				0.0065	m3/sec												
				0.2637	m3/mint												
				0.0000													
1HP																	
18	LS18	193	5	7.6500	Ltrs/sec	0.0061	1.25	0.0883	100	0.100	0.9745	9.68	0.048	4.603	2.00	6.65	0.97
				0.0077	m3/sec												
				10.7070	m3/mint												
				0.0000													
1HP																	
19	LS19	210	5	11.1750	Ltrs/sec	0.0089	1.25	0.1067	150	0.150	0.6327	2.72	0.014	5.036	2.00	7.05	1.50
				0.0112	m3/sec												
				0.0344	m3/mint												
				0.0000													
2HP																	
20	LS20	1666	50	1.4250	Ltrs/sec	0.0011	1.25	0.0381	100	0.100	0.1815	0.34	0.017	4.740	2.00	6.76	0.18
				0.0014	m3/sec												
				0.0344	m3/mint												
				0.0000													
0.5HP																	

Sl no.	Name of station		length (m)	Q Peak	Unit	Area (m ²)	Velocity (m/s)	Pipe dia (Pumping main)	Provided Dia.(mm)	Provided Dia.(m)	Actual velocity m/s	Hf For 1000m (4flv ² /2gd)	Total Hf	Static head(m)	Residual head(m)	Total Head (m)	Pump BHP
21	LS21	615	657	30.8250	Ltrs/sec	0.0247	1.25	0.1772	200	0.200	0.9817	4.91	3.227	3.937	2.00	9.16	5.38
				0.0308	m3/sec												
				2.1543	m3/mint												
				0.0000													
6HP																	
22	LS22	583	330	3.9750	Ltrs/sec	0.0032	1.25	0.0636	100	0.100	0.5064	2.61	0.863	10.621	2.00	13.48	1.02
				0.0040	m3/sec												
				0.0944	m3/mint												
				0.0000													
2HP																	
23	CW-1	35	4570	77.7750	Ltrs/sec	0.0622	1.25	0.2815	300	0.300	1.1008	4.12	18.818	12.880	2.00	33.70	49.92
				0.0778	m3/sec												
				0.1949	m3/mint												
				0.0000													
50HP																	
24	LS23	220	5	2.1000	Ltrs/sec	0.0017	1.25	0.0463	100	0.100	0.2675	0.73	0.004	3.823	2.00	5.83	0.23
				0.0021	m3/sec												
				0.2637	m3/mint												
				0.0000													
0.5HP																	
25	LS24	639	5	2.8500	Ltrs/sec	0.0023	1.25	0.0539	100	0.100	0.3631	1.34	0.007	4.061	2.00	6.07	0.33
				0.0029	m3/sec												
				0.0944	m3/mint												
				0.0000													
0.5HP																	
26	LS25	301	5	1.0500	Ltrs/sec	0.0008	1.25	0.0327	100	0.100	0.1338	0.18	0.001	4.438	2.00	6.44	0.13
				0.0011	m3/sec												
				0.1949	m3/mint												
				0.0000													
0.5HP																	
27	LS26	646	5	7.5750	Ltrs/sec	0.0061	1.25	0.0879	100	0.100	0.9650	9.49	0.047	4.109	2.00	6.16	0.89
				0.0076	m3/sec												
				0.2637	m3/mint												
				0.0000													
1HP																	

APPENDIX - V
FLEX TABLE-CONDUITS

ID	Label	Start Node	Invert (Start) (m)	Stop Node	Invert (Stop) (m)	Length (Scaled) (m)	Slope (Calculated) (%)	Material	Elevation Ground (Start) (m)	Elevation Ground (Stop) (m)	Diameter (mm)
754	p852	n950	6.108	n951	6.006	30	0.34	HDPE	7.37	7.27	225
755	p853	n951	6.006	n952	5.74	30	0.887	HDPE	7.27	6.93	225
756	p854	n952	5.74	n953	5.58	30	0.533	HDPE	6.93	6.77	225
757	p855	n954	5.478	n955	5.376	30	0.34	HDPE	6.78	6.96	225
758	p856	n955	5.376	n956	5.274	30	0.34	HDPE	6.96	7.11	225
759	p857	n956	5.274	n957	5.172	30	0.34	HDPE	7.11	7.16	225
760	p858	n957	5.172	n958	5.097	22	0.34	HDPE	7.16	7.14	225
761	p859	n959	5.7	n960	5.802	30	0.34	HDPE	7.18	7.17	225
762	p860	n960	5.802	n961	5.904	30	0.34	HDPE	7.17	7.21	225
763	p861	n961	5.904	n962	6.006	30	0.34	HDPE	7.21	7.27	225
764	p862	n962	6.006	n963	6.108	30	0.34	HDPE	7.27	7.31	225
765	p863	n963	6.108	n964	6.21	30	0.34	HDPE	7.31	7.4	225
766	p1531	n1712	4.82	n1713	4.718	30	0.34	HDPE	6.01	6.07	225
767	p1532	n1714	4.616	n1715	4.514	30	0.34	HDPE	6.08	5.99	225
768	p1533	n1715	4.514	n1716	4.674	8.4	1.914	HDPE	5.99	6.01	225
769	p1534	n1716	4.674	n1717	4.748	21.6	0.34	HDPE	6.01	5.98	225
770	p1535	n1717	4.748	n1718	4.85	30	0.34	HDPE	5.98	6.16	225
771	p1536	n1718	4.85	n1719	4.952	30	0.34	HDPE	6.16	6.25	225
772	p1537	n1719	4.952	n1720	5.01	17.2	0.34	HDPE	6.25	6.2	225
773	p1538	n1721	4.265	n1722	4.31	13.2	0.34	HDPE	6.06	6.01	225
774	p1539	n1722	4.31	n1723	4.412	30	0.34	HDPE	6.01	5.98	225
775	p1540	n1723	4.412	n1715	4.514	30	0.34	HDPE	5.98	5.99	225
776	p1541	n1724	4.018	n1725	4.12	30	0.34	HDPE	6.06	6.18	225
777	p1542	n1725	4.12	n1726	4.202	24	0.34	HDPE	6.18	6.18	225
778	p1543	n1726	4.202	n1721	4.265	18.8	0.34	HDPE	6.18	6.06	225
779	p1544	n1727	3.861	n1728	3.916	16.1	0.34	HDPE	6.07	6.11	225
780	p1545	n1728	3.916	n1724	4.018	30	0.34	HDPE	6.11	6.06	225
781	p1546	n1724	4.018	n1729	4.56	30	1.806	HDPE	6.06	6.04	225
782	p1547	n1729	4.56	n1730	4.662	30	0.34	HDPE	6.04	6.04	225
783	p1548	n1730	4.662	n1731	4.764	30	0.34	HDPE	6.04	6.1	225
784	p1549	n1732	4.86	n1731	4.764	28.4	0.34	HDPE	6.05	6.1	225
785	p1550	n1733	4.91	n1734	4.845	19.2	0.34	HDPE	6.1	6.19	225
786	p1551	n1734	4.845	n1735	4.743	30	0.34	HDPE	6.19	6.17	225
787	p1552	n1735	4.743	n1727	3.861	30	2.939	HDPE	6.17	6.07	225
788	p1553	n1721	4.265	n1736	4.948	30	2.277	HDPE	6.06	6.15	225
789	p1554	n1736	4.948	n1737	5.05	30	0.34	HDPE	6.15	6.24	225
790	p1598	n1795	3.055	n1797	3.186	38.6	0.34	HDPE	6.27	6.33	225
791	p1602	n1798	3.288	n1803	3.39	30	0.34	HDPE	6.41	5.97	225
792	p1603	n1803	3.39	n1804	3.492	30	0.34	HDPE	5.97	5.85	225
793	p1604	n1804	3.492	n1805	3.594	30	0.34	HDPE	5.85	5.88	225
794	p1605	n1805	3.594	n1806	3.694	29.4	0.34	HDPE	5.88	6.11	225
795	p1606	n1806	3.694	n1807	4.501	30	2.689	HDPE	6.11	6.2	225
796	p1607	n1807	4.501	n1808	4.603	30	0.34	HDPE	6.2	6.3	225
797	p1608	n1809	4.667	n1810	4.705	11	0.34	HDPE	6.2	6.26	225
798	p1609	n1810	4.705	n1811	4.807	30	0.34	HDPE	6.26	6.27	225
799	p1610	n1811	4.807	n1812	4.909	30	0.34	HDPE	6.27	6.25	225
800	p1611	n1812	4.909	n1813	5.011	30	0.34	HDPE	6.25	6.37	225
801	p1612	n1813	5.011	n1814	5.066	16.4	0.34	HDPE	6.37	6.35	225
802	p1613	n1814	5.066	n1815	5.11	12.9	0.34	HDPE	6.35	6.3	225
803	p1614	n1806	3.694	n1816	3.725	9	0.34	HDPE	6.11	6.05	225
804	p1615	n1816	3.725	n1817	3.827	30	0.34	HDPE	6.05	5.92	225
805	p1617	n1817	3.827	n1819	3.929	30	0.34	HDPE	5.92	5.93	225
806	p1618	n1819	3.929	n1820	4.031	30	0.34	HDPE	5.93	6.12	225

ID	Label	Start Node	Invert (Start) (m)	Stop Node	Invert (Stop) (m)	Length (Scaled) (m)	Slope (Calculated) (%)	Material	Elevation Ground (Start) (m)	Elevation Ground (Stop) (m)	Diameter (mm)
807	p1619	n1820	4.031	n1821	4.098	19.7	0.34	HDPE	6.12	5.99	225
808	p1621	n1821	4.098	n1823	4.2	30	0.34	HDPE	5.99	6.01	225
809	p1623	n1824	4.299	n1826	4.411	33	0.34	HDPE	5.96	6.02	225
810	p1624	n1826	4.411	n1827	4.513	30	0.34	HDPE	6.02	6.22	225
811	p1625	n1827	4.513	n1828	4.615	30	0.34	HDPE	6.22	6.26	225
812	p1626	n1828	4.615	n1829	4.717	30	0.34	HDPE	6.26	6.29	225
813	p1628	n1830	5.13	n1831	5.02	30	0.367	HDPE	6.32	6.21	225
814	p1629	n1832	4.918	n1833	4.816	30	0.34	HDPE	6.26	6.21	225
815	p1630	n1833	4.816	n1834	4.714	30	0.34	HDPE	6.21	6.22	225
816	p1631	n1834	4.714	n1835	4.612	30	0.34	HDPE	6.22	6.22	225
817	p1632	n1835	4.612	n1836	4.532	23.7	0.34	HDPE	6.22	6.22	225
818	p1633	n1836	4.532	n1837	4.804	30	0.908	HDPE	6.22	6.22	225
819	p1634	n1837	4.804	n1838	4.906	30	0.34	HDPE	6.22	6.28	225
820	p1635	n1838	4.906	n1839	4.972	19.4	0.34	HDPE	6.28	6.33	225
821	p1636	n1839	4.972	n1840	5.008	10.6	0.34	HDPE	6.33	6.34	225
822	p1637	n1841	5.052	n1842	5.11	17	0.34	HDPE	6.31	6.3	225
823	p1638	n1842	5.11	n1843	5.35	30	0.8	HDPE	6.3	6.54	225
824	p1639	n1844	5.64	n1845	5.851	22.4	0.943	HDPE	6.83	7.37	225
825	p1640	n1845	5.851	n1846	5.976	36.8	0.34	HDPE	7.37	7.45	225
826	p1641	n1846	5.976	n1847	6.078	30	0.34	HDPE	7.45	7.5	225
827	p1642	n1847	6.078	n1848	6.18	30	0.34	HDPE	7.5	7.55	225
828	p1643	n1849	6.282	n1850	6.384	30	0.34	HDPE	7.64	7.72	225
829	p1644	n1850	6.384	n1851	6.486	30	0.34	HDPE	7.72	7.78	225
830	p1645	n1852	6.588	n1853	6.69	30	0.34	HDPE	7.88	7.88	225
831	p1647	n1855	5.002	n1856	4.75	30	0.838	HDPE	6.23	6.31	225
832	p1648	n1856	4.75	n1857	4.852	30	0.34	HDPE	6.31	6.43	225
833	p1649	n1857	4.852	n1858	4.954	30	0.34	HDPE	6.43	6.54	225
834	p1650	n1858	4.954	n1859	5.056	30	0.34	HDPE	6.54	6.56	225
835	p1651	n1860	5.158	n1861	5.26	30	0.34	HDPE	6.58	6.45	225
836	p1652	n1861	5.26	n1862	5.71	30	1.501	HDPE	6.45	6.9	225
837	p1653	n1862	5.71	n1863	5.912	11.2	1.808	HDPE	6.9	7.4	225
838	p1654	n1864	5.292	n1865	5.394	30	0.34	HDPE	7.31	7.22	225
839	p1655	n1865	5.394	n1866	5.496	30	0.34	HDPE	7.22	7.2	225
840	p1656	n1866	5.496	n1867	5.598	30	0.34	HDPE	7.2	7.22	225
841	p1657	n1867	5.598	n1868	5.7	30	0.34	HDPE	7.22	7.19	225
842	p1658	n1868	5.7	n1869	5.802	30	0.34	HDPE	7.19	7.28	225
843	p1659	n1869	5.802	n1870	5.904	30	0.34	HDPE	7.28	7.34	225
844	p1660	n1871	6.006	n1872	6.108	30	0.34	HDPE	7.37	7.35	225
845	p1661	n1872	6.108	n1873	6.21	30	0.34	HDPE	7.35	7.4	225
846	p1663	n1874	6.014	n1875	6.116	30	0.34	HDPE	7.42	7.43	225
847	p1664	n1875	6.116	n1876	6.218	30	0.34	HDPE	7.43	7.48	225
848	p1665	n1876	6.218	n1877	6.32	30	0.34	HDPE	7.48	7.51	225
849	p1667	n1879	6.208	n1845	5.851	27.4	1.303	HDPE	7.49	7.37	225
850	p1668	n1824	4.299	n1880	4.84	57.5	0.943	HDPE	5.96	6.03	225
852	p1670	n1881	1.914	n1882	2.016	30	0.34	HDPE	5.92	5.92	225
853	p1671	n1882	2.016	n1883	2.118	30	0.34	HDPE	5.92	6.12	225
854	p1672	n1884	2.22	n1885	2.322	30	0.34	HDPE	6.06	6.19	225
855	p1673	n1885	4.03	n1886	4.124	27.6	0.34	HDPE	6.19	6.21	225
856	p1674	n1886	4.124	n1887	4.226	30	0.34	HDPE	6.21	6.26	225
857	p1675	n1888	4.328	n1889	4.43	30	0.34	HDPE	6.32	6.32	225
858	p1676	n1889	4.43	n1836	4.532	30	0.34	HDPE	6.32	6.22	225
859	p1677	n1885	2.322	n1890	2.34	5.3	0.34	HDPE	6.19	6.2	225
860	p1678	n1891	2.442	n1892	2.544	30	0.34	HDPE	5.93	5.88	225
861	p1679	n1892	4.626	n1893	4.65	7.2	0.34	HDPE	5.88	5.84	225
862	p1680	n1893	4.65	n1894	4.81	22.8	0.701	HDPE	5.84	6	225

ID	Label	Start Node	Invert (Start) (m)	Stop Node	Invert (Stop) (m)	Length (Scaled) (m)	Slope (Calculated) (%)	Material	Elevation Ground (Start) (m)	Elevation Ground (Stop) (m)	Diameter (mm)
863	p1681	n1894	4.81	n1895	4.91	19.8	0.505	HDPE	6	6.1	225
864	p1682	n1892	2.544	n1896	2.584	11.9	0.34	HDPE	5.88	5.91	225
865	p1683	n1896	2.584	n1897	2.646	18.3	0.34	HDPE	5.91	5.98	225
866	p1684	n1897	2.646	n1898	2.686	11.6	0.34	HDPE	5.98	6.56	225
867	p1685	n1898	2.686	n1899	2.788	30	0.34	HDPE	6.56	5.97	225
868	p1686	n1899	2.788	n1900	2.89	30	0.34	HDPE	5.97	6	225
869	p1687	n1900	2.89	n1901	2.992	30	0.34	HDPE	6	5.97	225
870	p1688	n1901	2.992	n1902	3.094	30	0.34	HDPE	5.97	5.98	225
871	p1691	n1902	3.094	n1905	3.196	30	0.34	HDPE	5.98	6.06	225
872	p1692	n1905	3.196	n1906	3.298	30	0.34	HDPE	6.06	6.22	225
873	p1693	n1906	3.298	n1907	3.4	30	0.34	HDPE	6.22	6.21	225
874	p1694	n1907	3.4	n1908	3.452	15.4	0.34	HDPE	6.21	6.12	225
875	p1695	n1908	3.452	n1909	3.502	14.6	0.34	HDPE	6.12	6.11	225
876	p1696	n1909	3.502	n1910	3.604	30	0.34	HDPE	6.11	6.02	225
877	p1697	n1911	3.706	n1912	3.808	30	0.34	HDPE	6.1	6.16	225
878	p1698	n1912	3.808	n1727	3.861	15.7	0.34	HDPE	6.16	6.07	225
879	p1751	n1972	6.41	n1973	6.308	30	0.34	HDPE	7.6	7.91	225
880	p1773	n2001	6.87	n2002	6.7	30	0.567	HDPE	8.06	7.89	225
881	p1774	n2002	6.7	n2003	6.56	30	0.467	HDPE	7.89	7.75	225
882	p1775	n2003	6.56	n2004	6.43	30	0.433	HDPE	7.75	7.62	225
883	p1776	n2004	6.43	n2005	6.31	30	0.4	HDPE	7.62	7.5	225
884	p1777	n2006	6.102	n2007	5.661	30	1.469	HDPE	7.44	7.18	225
885	p1778	n2007	5.661	n2008	5.762	29.8	0.34	HDPE	7.18	7.25	225
886	p1779	n2008	5.762	n2009	5.966	60	0.34	HDPE	7.25	7.34	225
887	p1963	n2208	5.29	n2209	5.392	30	0.34	HDPE	7.29	7.16	225
888	p1964	n2209	5.392	n2210	5.494	30	0.34	HDPE	7.16	6.94	225
889	p1965	n2210	5.494	n2211	5.596	30	0.34	HDPE	6.94	6.88	225
890	p1966	n2212	5.698	n2213	5.8	30	0.34	HDPE	7.11	7.38	225
891	p1967	n2213	5.8	n2214	5.902	30	0.34	HDPE	7.38	7.63	225
892	p1968	n2214	5.902	n2215	6.004	30	0.34	HDPE	7.63	7.74	225
893	p1969	n2215	6.004	n2216	6.106	30	0.34	HDPE	7.74	7.59	225
894	p1970	n2216	6.106	n2217	6.208	30	0.34	HDPE	7.59	7.51	225
895	p1971	n2217	6.208	n2218	6.31	30	0.34	HDPE	7.51	7.5	225
896	p1972	n2219	6.43	n2220	6.56	30	0.433	HDPE	7.62	7.75	225
897	p1973	n2220	6.56	n2221	6.73	30	0.567	HDPE	7.75	7.92	225
898	p1974	n2222	5.754	n2207	5.652	30	0.34	HDPE	8.14	8.13	225
899	p1980	n2207	5.652	n2229	5.55	30	0.34	HDPE	8.13	7.78	225
900	p1981	n2230	5.448	n2231	5.346	30	0.34	HDPE	7.54	7.23	225
901	p1982	n2231	5.346	n2232	5.296	14.6	0.34	HDPE	7.23	7.08	225
902	p1983	n2233	3.918	n2234	4.02	30	0.34	HDPE	7	7.17	225
903	p1984	n2234	4.02	n2235	4.086	19.4	0.34	HDPE	7.17	7.34	225
904	p1985	n2236	6.41	n2237	7.09	30	2.267	HDPE	7.6	8.28	225
905	p1986	n2238	7.73	n2239	8.61	30	2.934	HDPE	8.92	9.8	225
906	p1987	n2239	8.61	n2240	10.1	30	4.973	HDPE	9.8	11.29	225
907	p1988	n2240	10.1	n2241	11.314	24.3	5	HDPE	11.29	12.58	225
908	p1993	n2247	12.35	n2248	11.13	30	4.069	HDPE	13.54	12.32	225
909	p1994	n2248	11.13	n2249	10.24	30	2.968	HDPE	12.32	11.43	225
910	p1995	n2249	10.24	n2250	9.71	30	1.767	HDPE	11.43	10.9	225
911	p1996	n2250	9.71	n2251	9.54	30	0.567	HDPE	10.9	10.73	225
912	p1997	n2251	9.54	n2252	9.438	30	0.34	HDPE	10.73	10.79	225
913	p1998	n2252	9.438	n2253	9.336	30	0.34	HDPE	10.79	11.03	225
914	p1999	n2253	9.336	n2254	9.234	30	0.34	HDPE	11.03	11.8	225
915	p2000	n2254	9.234	LS 2	9.132	30	0.34	HDPE	11.8	13.12	225
917	p2002	n2256	11.883	n2257	11.781	30	0.34	HDPE	14.34	14.4	225
918	p2003	n2257	11.781	n2258	11.693	26.1	0.34	HDPE	14.4	14.12	225

ID	Label	Start Node	Invert (Start) (m)	Stop Node	Invert (Stop) (m)	Length (Scaled) (m)	Slope (Calculated) (%)	Material	Elevation Ground (Start) (m)	Elevation Ground (Stop) (m)	Diameter (mm)
919	p2004	n2258	11.693	n2259	11.591	30	0.34	HDPE	14.12	13.92	225
920	p2005	n2260	11.489	n2261	11.387	30	0.34	HDPE	13.96	14.47	225
921	p2006	n2261	11.387	n2262	11.285	30	0.34	HDPE	14.47	14.86	225
922	p2007	n2263	11.226	n2264	11.124	30	0.34	HDPE	14.91	14.49	225
923	p2008	n2264	11.124	n2265	11.022	30	0.34	HDPE	14.49	13.72	225
924	p2009	n2265	11.022	n2266	10.922	29.7	0.34	HDPE	13.72	13.06	225
925	p2046	n2308	10.82	n2309	10.718	30	0.34	HDPE	12.79	12.62	225
926	p2047	n2309	10.718	n2310	10.616	30	0.34	HDPE	12.62	12.47	225
927	p2048	n2311	10.514	n2312	10.412	30	0.34	HDPE	12.14	11.81	225
928	p2049	n2312	10.412	n2313	10.29	30	0.404	HDPE	11.81	11.48	225
929	p2050	n2313	10.29	n2314	10.11	26.6	0.676	HDPE	11.48	11.3	225
930	p2051	n2315	10.074	n2316	9.972	30	0.34	HDPE	11.29	11.31	225
931	p2052	n2316	9.972	n2317	9.87	30	0.34	HDPE	11.31	11.47	225
932	p2053	n2317	9.87	n2318	9.768	30	0.34	HDPE	11.47	11.78	225
933	p2054	n2319	9.666	n2320	9.564	30	0.34	HDPE	12.09	12.14	225
934	p2055	n2320	9.564	n2321	9.462	30	0.34	HDPE	12.14	12.07	225
935	p2056	n2321	9.462	n2322	9.36	30	0.34	HDPE	12.07	11.96	225
936	p2057	n2323	9.338	n2324	9.258	23.6	0.34	HDPE	11.93	11.85	225
937	p2058	n2325	9.19	n2326	9.088	30	0.34	HDPE	11.86	11.89	225
939	p3541	n3947	8.13	n3948	7.17	30	3.202	HDPE	9.32	8.36	225
940	p3542	n3948	7.17	n3949	6.36	30	2.701	HDPE	8.36	7.55	225
941	p3543	n3949	5.468	n3950	5.366	30	0.34	HDPE	7.55	6.86	225
942	p3544	n3950	5.366	n3951	5.264	30	0.34	HDPE	6.86	6.6	225
943	p3545	n3951	5.264	n3952	5.162	30	0.34	HDPE	6.6	6.5	225
944	p3546	n3952	5.162	n3953	5.11	9.1	0.571	HDPE	6.5	6.3	225
945	p3562	n3953	5.11	n3969	5.01	23.1	0.433	HDPE	6.3	6.2	225
946	p3563	n3969	5.01	n3970	4.908	30	0.34	HDPE	6.2	6.34	225
947	p3564	n3970	4.908	n3971	4.806	30	0.34	HDPE	6.34	6.32	225
948	p3565	n3971	4.806	n3972	4.704	30	0.34	HDPE	6.32	6.25	225
949	p3566	n3972	4.704	n3973	4.602	30	0.34	HDPE	6.25	6.18	225
950	p3567	n3973	4.602	n3974	4.5	30	0.34	HDPE	6.18	6.3	225
951	p3568	n3974	4.5	n3975	4.398	30	0.34	HDPE	6.3	6.2	225
952	p3569	n3975	4.398	n3976	4.296	30	0.34	HDPE	6.2	6.18	225
953	p3570	n3976	4.296	n3977	4.194	30	0.34	HDPE	6.18	6.15	225
954	p3571	n3977	4.194	n3978	4.092	30	0.34	HDPE	6.15	6.2	225
955	p3572	n3978	4.092	n3979	3.99	30	0.34	HDPE	6.2	6.48	225
956	p3573	n3949	5.468	n3980	5.536	20	0.34	HDPE	7.55	7.42	225
957	p3574	n3980	5.536	n3981	5.638	30	0.34	HDPE	7.42	7.25	225
958	p3575	n3981	5.638	n3982	5.74	30	0.34	HDPE	7.25	6.93	225
959	p3576	n3983	3.719	n3984	3.636	24.3	0.34	HDPE	6.26	5.75	225
960	p3577	n3984	3.636	n3985	3.534	30	0.34	HDPE	5.75	5.87	225
961	p3578	n3985	3.534	n3986	3.432	30	0.34	HDPE	5.87	5.88	225
962	p3579	n3986	3.432	n3987	3.33	30	0.34	HDPE	5.88	5.62	225
963	p3580	n3987	3.33	n3988	3.228	30	0.34	HDPE	5.62	5.59	225
964	p3581	n3988	3.228	n3989	3.126	30	0.34	HDPE	5.59	5.63	225
965	p3582	n3989	4.44	n3990	4.97	30	1.767	HDPE	5.63	6.16	225
966	p3583	n3990	4.97	n3991	5.3	30	1.1	HDPE	6.16	6.49	225
967	p3584	n3991	5.3	n3992	5.63	30	1.1	HDPE	6.49	6.82	225
968	p3585	n3992	5.63	n3993	6.14	30	1.701	HDPE	6.82	7.33	225
969	p3586	n3993	6.14	n3994	6.96	30	2.734	HDPE	7.33	8.15	225
970	p3587	n3994	6.96	n3995	8.34	30	4.606	HDPE	8.15	9.53	225
971	p3589	n3989	3.126	n3997	3.086	11.8	0.34	HDPE	5.63	5.63	225
972	p3590	n3997	3.086	n3998	2.984	30	0.34	HDPE	5.63	5.69	225
973	p3591	n3998	2.984	n3999	2.882	30	0.34	HDPE	5.69	5.6	225
974	p3592	n3999	2.882	n4000	2.78	30	0.34	HDPE	5.6	5.81	225

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975	p3593	n4000	2.78	n4001	2.678	30	0.34	HDPE	5.81	5.89	225
976	p3594	n4001	2.678	n4002	2.576	30	0.34	HDPE	5.89	5.63	225
977	p3595	n4002	4.44	n4003	4.52	3.4	2.377	HDPE	5.63	5.71	225
978	p3596	n4003	4.52	n4004	4.86	30	1.133	HDPE	5.71	6.05	225
979	p3597	n4004	4.86	n4005	5.12	30	0.867	HDPE	6.05	6.31	225
980	p3598	n4005	5.12	n4006	5.61	30	1.634	HDPE	6.31	6.8	225
981	p3599	n4006	5.61	n4007	5.79	32.6	0.553	HDPE	6.8	6.98	225
982	p3600	n4006	5.61	n4008	6.42	30	2.701	HDPE	6.8	7.61	225
983	p3601	n4008	6.42	n4009	7.448	28.2	3.648	HDPE	7.61	9.09	225
984	p3602	n4009	7.448	n4010	7.499	15	0.34	HDPE	9.09	9.91	225
985	p3603	n4010	7.499	n4011	7.55	14.9	0.34	HDPE	9.91	10.78	225
986	p3604	n4011	7.55	n4012	7.652	30	0.34	HDPE	10.78	11.66	225
987	p3605	n4012	7.652	n4013	7.724	21.1	0.34	HDPE	11.66	11.88	225
988	p3606	n4009	7.448	n4014	8.39	30	3.141	HDPE	9.09	9.58	225
989	p3614	n4021	2.568	n4023	2.466	30	0.34	HDPE	5.79	5.86	225
990	p3615	n4023	2.466	n4024	2.364	30	0.34	HDPE	5.86	5.9	225
991	p3616	n4024	2.364	n4025	2.262	30	0.34	HDPE	5.9	5.84	225
992	p3617	n4025	2.262	n4026	2.16	30	0.34	HDPE	5.84	5.99	225
993	p3618	n4026	2.16	n4027	2.058	30	0.34	HDPE	5.99	5.7	225
994	p3619	n4027	2.058	n4028	1.933	36.8	0.34	HDPE	5.7	5.71	225
995	p3620	n4028	4.52	n4029	4.67	28.5	0.526	HDPE	5.71	5.86	225
996	p3621	n4029	4.67	n4030	5.29	30	2.067	HDPE	5.86	6.48	225
997	p3622	n4030	5.29	n4031	5.84	30	1.834	HDPE	6.48	7.03	225
998	p3623	n4031	5.84	n4032	6.58	30	2.467	HDPE	7.03	7.77	225
999	p3624	n4032	6.58	n4033	7.7	30	3.736	HDPE	7.77	8.89	225
1000	p3625	n4033	7.7	n4034	8.431	30	2.436	HDPE	8.89	9.99	225
1001	p3626	n4035	8.532	n4036	8.634	30	0.34	HDPE	11.03	11.58	225
1002	p3627	n4036	8.634	n4037	8.736	30	0.34	HDPE	11.58	11.58	225
1003	p3628	n4038	8.797	n4039	8.899	30	0.34	HDPE	11.78	11.68	225
1004	p3629	n4039	8.899	n4040	9.001	30	0.34	HDPE	11.68	11.86	225
1005	p3630	n4040	10.599	n4041	10.7	29.9	0.34	HDPE	11.86	11.89	225
1006	p3632	n4042	10.74	n4013	10.638	30	0.34	HDPE	11.93	11.88	225
1007	p3633	n4036	10.39	n4043	10.5	31.3	0.351	HDPE	11.58	11.69	225
1008	p3634	n4043	10.5	n4044	10.86	30	1.2	HDPE	11.69	12.05	225
1009	p3635	n4045	11.05	n4046	11.21	30	0.533	HDPE	12.24	12.4	225
1010	p3636	n4046	11.21	n4047	11.53	30	1.067	HDPE	12.4	12.72	225
1011	p3637	n4047	11.53	n4048	11.698	30	0.56	HDPE	12.72	12.91	225
1012	p3638	n4048	11.698	n4049	11.8	30	0.34	HDPE	12.91	12.99	225
1013	p3639	n4049	11.8	n4050	12.02	30	0.733	HDPE	12.99	13.21	225
1014	p3640	n4051	12.38	n4052	12.698	30	1.06	HDPE	13.57	14.12	225
1015	p3641	n4052	12.698	n4053	12.8	30	0.34	HDPE	14.12	14.47	225
1016	p3642	n4053	12.8	n4054	12.902	30	0.34	HDPE	14.47	14.78	225
1017	p3643	n4055	13.004	n4056	13.106	30	0.34	HDPE	15.14	15.53	225
1018	p3644	n4056	13.106	n4057	13.194	25.9	0.34	HDPE	15.53	15.84	225
1019	p3645	n4058	14.78	n4059	14.678	30	0.34	HDPE	15.97	16.79	225
1020	p3646	n4057	13.194	n4060	13.296	30	0.34	HDPE	15.84	15.91	225
1021	p3647	n4060	13.296	n4061	13.339	12.6	0.34	HDPE	15.91	15.94	225
1022	p3648	n4059	14.678	n4062	15.06	30	1.274	HDPE	16.79	16.25	225
1023	p3650	n4061	13.339	n4063	13.441	30	0.34	HDPE	15.94	15.67	225
1024	p3651	n4063	13.441	n4064	13.543	30	0.34	HDPE	15.67	15.52	225
1025	p3652	n4064	13.543	n4065	13.645	30	0.34	HDPE	15.52	15.54	225
1026	p3653	n4065	13.645	n4066	13.747	30	0.34	HDPE	15.54	15.4	225
1027	p3654	n4067	13.849	n4068	13.92	21	0.34	HDPE	15.27	15.11	225
1028	p4222	n4672	8.54	n4673	8.438	30	0.34	HDPE	9.73	9.77	225
1029	p4223	n4673	8.438	n4674	8.336	30	0.34	HDPE	9.77	9.75	225

ID	Label	Start Node	Invert (Start) (m)	Stop Node	Invert (Stop) (m)	Length (Scaled) (m)	Slope (Calculated) (%)	Material	Elevation Ground (Start) (m)	Elevation Ground (Stop) (m)	Diameter (mm)
1030	p4224	n4674	8.336	n4675	8.234	30	0.34	HDPE	9.75	9.67	225
1031	p4225	n4675	8.234	n4676	8.132	30	0.34	HDPE	9.67	9.65	225
1032	p4226	n4677	8.03	n4678	7.928	30	0.34	HDPE	9.76	9.84	225
1033	p4227	n4678	7.928	n4679	7.826	30	0.34	HDPE	9.84	9.89	225
1034	p4228	n4679	7.826	n4680	7.724	30	0.34	HDPE	9.89	9.9	225
1035	p4229	n4680	7.724	n4681	7.622	30	0.34	HDPE	9.9	10.02	225
1036	p4230	n4681	7.622	n4682	7.52	30	0.34	HDPE	10.02	10.25	225
1037	p4231	n4682	7.52	n4683	7.418	30	0.34	HDPE	10.25	10.29	225
1038	p4232	n4683	7.418	n3946	7.316	30	0.34	HDPE	10.29	10.28	225
1039	p4233	n3946	7.316	n4684	7.214	30	0.34	HDPE	10.28	10.35	225
1040	p4234	n4685	7.112	n4686	7.01	30	0.34	HDPE	10.58	10.67	225
1041	p4235	n4686	7.01	n4687	6.908	30	0.34	HDPE	10.67	10.72	225
1042	p4236	n4687	6.908	n4688	6.806	30	0.34	HDPE	10.72	10.77	225
1043	p4237	n4688	6.806	n4689	6.704	30	0.34	HDPE	10.77	10.78	225
1045	p4239	n4691	9.438	n4692	9.336	30	0.34	HDPE	10.66	10.64	225
1046	p4240	n4692	9.336	n4693	9.234	30	0.34	HDPE	10.64	10.76	225
1047	p4241	n4693	9.234	n4694	9.132	30	0.34	HDPE	10.76	11.47	225
1048	p4242	n4694	9.132	n4695	9.03	30	0.34	HDPE	11.47	11.19	225
1049	p4243	n4695	9.03	n4696	8.928	30	0.34	HDPE	11.19	10.97	225
1050	p4244	n4696	8.928	n4697	8.826	30	0.34	HDPE	10.97	11.04	225
1051	p4245	n4697	8.826	n4698	8.724	30	0.34	HDPE	11.04	11.13	225
1052	p4246	n4698	8.724	n4699	8.622	30	0.34	HDPE	11.13	11.23	225
1053	p4247	n4699	8.622	n4700	8.52	30	0.34	HDPE	11.23	11.32	225
1054	p4248	n4700	8.52	n4701	8.418	30	0.34	HDPE	11.32	11.45	225
1055	p4250	n4703	8.186	n4704	8.084	30	0.34	HDPE	11.67	11.73	225
1056	p4251	n4704	8.084	n4705	7.982	30	0.34	HDPE	11.73	11.73	225
1057	p4252	n4705	7.982	n4706	7.88	30	0.34	HDPE	11.73	11.84	225
1058	p4253	n4706	7.88	n4707	7.778	30	0.34	HDPE	11.84	11.89	225
1059	p4254	n4028	1.933	n4708	1.831	30	0.34	HDPE	5.71	5.7	225
1060	p4255	n4708	1.831	n4709	1.729	30	0.34	HDPE	5.7	5.59	225
1061	p4256	n4709	1.729	n4710	1.627	30	0.34	HDPE	5.59	5.53	225
1062	p4257	n4710	1.627	n4711	1.525	30	0.34	HDPE	5.53	5.51	225
1063	p4258	n4712	4.36	n4713	4.258	30	0.34	HDPE	5.55	5.62	225
1064	p4259	n4713	4.258	n4714	4.156	30	0.34	HDPE	5.62	5.59	225
1065	p4260	n4714	4.156	n4715	4.054	30	0.34	HDPE	5.59	5.5	225
1066	p4261	n4715	4.054	n4716	3.952	30	0.34	HDPE	5.5	5.34	225
1067	p4262	n4716	3.952	n4718	3.813	41	0.34	HDPE	5.34	5.62	225
1068	p4263	n4718	3.813	n4719	4.336	28.1	1.862	HDPE	5.62	5.55	225
1069	p4264	n4719	4.336	n4720	4.438	30	0.34	HDPE	5.55	5.73	225
1070	p4265	n4720	4.438	n4721	4.495	16.7	0.34	HDPE	5.73	5.79	225
1071	p4266	n4721	4.495	n4722	4.54	13.3	0.34	HDPE	5.79	5.73	225
1072	p4267	n4722	4.54	n4723	4.77	30	0.767	HDPE	5.73	5.96	225
1073	p4268	n4723	4.77	n4724	5.93	30	3.871	HDPE	5.96	7.12	225
1074	p4269	n4724	5.93	n4725	6.817	17.7	5	HDPE	7.12	9.27	225
1075	p4275	n4718	3.813	n4731	3.711	30	0.34	HDPE	5.62	5.69	225
1076	p4276	n4731	3.711	n4732	3.609	30	0.34	HDPE	5.69	5.65	225
1077	p4277	n4732	3.609	n4733	3.507	30	0.34	HDPE	5.65	5.67	225
1078	p4278	n4734	3.405	n4735	3.303	30	0.34	HDPE	5.72	5.77	225
1079	p4279	n4735	3.303	n4736	3.195	31.6	0.34	HDPE	5.77	5.87	225
1080	p4282	n4736	3.195	n4740	3.093	30	0.34	HDPE	5.87	5.81	250
1081	p4283	n4740	3.093	n4741	2.991	30	0.34	HDPE	5.81	5.72	250
1082	p4284	n4741	2.991	n4742	2.889	30	0.34	HDPE	5.72	5.71	250
1083	p4285	n4742	2.889	n4743	2.787	30	0.34	HDPE	5.71	5.62	250
1084	p4286	n4743	2.787	n4744	2.685	30	0.34	HDPE	5.62	5.7	250
1085	p4287	n4744	2.685	n4745	2.583	30	0.34	HDPE	5.7	5.82	250

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1086	p4288	n4746	2.481	n4747	2.427	15.9	0.34	HDPE	5.95	6.11	250
1087	p4311	n4059	14.678	n4772	14.61	20.1	0.34	HDPE	16.79	16.92	225
1088	p4312	n4772	14.61	n4773	13.848	29.9	2.546	HDPE	16.92	15.21	225
1089	p4313	n4773	13.848	n4774	12.35	29.9	5	HDPE	15.21	13.54	225
1090	p4314	n4774	12.138	n4775	10.64	30	5	HDPE	13.54	11.83	225
1091	p4315	n4775	9.414	n4776	7.92	29.9	5	HDPE	11.83	9.11	225
1093	p4317	n4778	7.824	n4779	7.722	30	0.34	HDPE	9.38	9.76	250
1094	p4318	n4779	7.722	n4780	7.62	30	0.34	HDPE	9.76	9.75	250
1095	p4319	n4781	7.518	n4782	7.416	30	0.34	HDPE	10.09	9.99	250
1096	p4320	n4783	13.8	n4784	14.19	30	1.3	HDPE	14.99	15.38	225
1097	p4321	n4784	14.19	n4785	14.38	30	0.633	HDPE	15.38	15.57	225
1098	p4322	n4785	14.38	n4786	14.8	30	1.4	HDPE	15.57	15.99	225
1099	p4323	n4786	14.8	n4787	15.43	30	2.101	HDPE	15.99	16.62	225
1100	p4325	n4789	15.968	n4790	15.866	30	0.34	HDPE	17.55	17.91	225
1101	p4326	n4790	15.866	n4791	15.83	10.7	0.34	HDPE	17.91	18.07	225
1102	p4332	n4747	2.427	n4797	2.325	30	0.34	HDPE	6.11	6.27	250
1104	p4334	n4798	5.249	n4799	5.147	30	0.34	HDPE	6.46	6.87	250
1105	p4335	n4799	5.147	n4800	5.045	30	0.34	HDPE	6.87	7.01	250
1106	p4336	n4800	5.045	n4801	4.943	30	0.34	HDPE	7.01	7.3	250
1107	p4337	n4801	4.943	n4802	4.841	30	0.34	HDPE	7.3	8.08	250
1108	p4338	n4802	4.841	n4776	4.748	27.4	0.34	HDPE	8.08	9.11	250
1109	p4359	n4824	5	n4825	4.898	30	0.34	HDPE	6.19	6.36	225
1110	p4360	n4825	4.898	n4826	4.796	30	0.34	HDPE	6.36	6.21	225
1111	p4361	n4826	2.556	n4827	2.647	26.7	0.34	HDPE	6.21	6.19	225
1112	p4362	n4828	2.749	n4829	2.851	30	0.34	HDPE	6.23	6.27	225
1113	p4363	n4829	2.851	n4830	2.953	30	0.34	HDPE	6.27	6.31	225
1114	p4364	n4830	2.953	n1795	3.055	30	0.34	HDPE	6.31	6.27	225
1115	p4365	n1795	4.41	n4831	4.476	19.4	0.34	HDPE	6.27	6.37	225
1116	p4366	n4831	4.476	n4832	4.578	30	0.34	HDPE	6.37	6.37	225
1117	p4367	n4833	4.68	n4834	4.782	30	0.34	HDPE	6.36	6.45	225
1118	p4368	n4834	4.782	n4835	4.884	30	0.34	HDPE	6.45	6.52	225
1119	p4369	n4835	4.884	n4836	4.986	30	0.34	HDPE	6.52	6.59	225
1120	p4370	n4836	4.986	n4837	5.088	30	0.34	HDPE	6.59	6.68	225
1121	p4371	n4838	5.19	n1864	5.292	30	0.34	HDPE	6.92	7.31	225
1122	p4373	n4839	6.17	n4840	6.068	30	0.34	HDPE	7.36	7.35	225
1123	p4374	n4826	4.439	n4841	4.558	35	0.34	HDPE	6.21	6.32	225
1124	p4375	n4842	4.66	n4843	4.762	30	0.34	HDPE	6.29	6.16	225
1125	p4376	n4843	4.762	n4844	4.864	30	0.34	HDPE	6.16	6.13	225
1126	p4377	n4844	4.864	n4845	4.966	30	0.34	HDPE	6.13	6.24	225
1127	p4378	n4845	4.966	n4846	5.068	30	0.34	HDPE	6.24	6.26	225
1128	p4379	n4846	5.068	n4847	5.17	30	0.34	HDPE	6.26	6.36	225
1129	p4380	n4848	5.29	n2007	5.661	30	1.236	HDPE	6.48	7.18	225
1130	p4381	n4849	7.314	n4850	7.212	30	0.34	HDPE	9.36	9.37	250
1131	p4382	n4850	7.212	n4851	7.11	30	0.34	HDPE	9.37	9.63	250
1132	p4383	n4851	7.11	n4852	7.008	30	0.34	HDPE	9.63	10.23	250
1133	p4384	n4852	7.008	n4853	6.906	30	0.34	HDPE	10.23	10.84	250
1134	p4385	n4853	6.906	n4854	6.804	30	0.34	HDPE	10.84	10.22	250
1135	p4386	n4854	6.804	n4855	6.702	30	0.34	HDPE	10.22	9.55	250
1136	p4387	n4855	6.702	n4856	6.6	30	0.34	HDPE	9.55	8.92	250
1137	p4388	n4857	6.57	n4858	6.189	20.9	1.819	HDPE	8.47	7.4	250
1138	p4389	n4858	6.189	n4859	6.039	30	0.5	HDPE	7.4	7.25	250
1139	p4390	n4859	6.039	n4860	5.937	30	0.34	HDPE	7.25	7.74	250
1140	p4391	n4860	5.937	n4861	4.849	29.9	3.634	HDPE	7.74	6.06	250
1141	p4392	n4861	4.849	n4862	4.549	30	1	HDPE	6.06	5.76	250
1142	p4393	n4862	4.549	n4863	4.358	8	2.373	HDPE	5.76	5.66	250

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1143	p4498	n4791	15.83	n4979	15.766	18.8	0.34	HDPE	18.07	18.09	225
1144	p4499	n4979	15.766	n4980	15.664	30	0.34	HDPE	18.09	17.57	225
1145	p4500	n4980	15.664	n4981	15.62	10.4	0.423	HDPE	17.57	16.81	225
1146	p4501	n4982	15.39	n4983	15.03	30	1.2	HDPE	16.58	16.22	225
1147	p4502	n4984	14.68	n4985	14.27	30	1.367	HDPE	15.87	15.46	225
1148	p4503	n4985	14.27	n4986	13.78	30	1.633	HDPE	15.46	14.97	225
1149	p4504	n4986	13.78	n4987	12.42	30	4.539	HDPE	14.97	13.61	225
1150	p4505	n4987	11.776	n4988	10.28	29.9	5	HDPE	13.61	11.47	225
1151	p4506	n4988	10.28	n4989	11.775	29.9	5	HDPE	11.47	14.02	225
1152	p4507	n4990	14.25	n4991	15.48	30	4.104	HDPE	15.44	16.67	225
1153	p4508	n4991	15.48	n4992	15.736	30	0.854	HDPE	16.67	17.36	225
1154	p4509	n4993	15.838	n4994	15.94	30	0.34	HDPE	17.75	17.13	225
1155	p4514	n4999	17.049	n5000	16.06	19.8	5	HDPE	18.49	17.25	225
1156	p4515	n5000	14.924	n5001	13.43	29.9	5	HDPE	17.25	14.62	225
1157	p4516	n5001	13.43	n2246	13.14	8.3	3.478	HDPE	14.62	14.33	225
1158	p4517	n4988	10.28	n5002	8.8	35	4.226	HDPE	11.47	9.99	225
1159	p4518	n5002	8.8	n5003	8.394	35.8	1.136	HDPE	9.99	10.15	225
1160	p4519	n5003	8.394	n5004	7.76	12.7	5	HDPE	10.15	8.95	225
1161	p4520	n5004	7.121	n4860	6.55	11.4	5	HDPE	8.95	7.74	225
1162	p4521	n4860	6.55	n5005	8.035	29.7	5	HDPE	7.74	11.92	225
1163	p4522	n5005	10.73	n5006	12.218	29.8	5	HDPE	11.92	15.75	225
1164	p4523	n5006	14.56	n5007	16.052	29.8	5	HDPE	15.75	18.9	225
1165	p4524	n5007	16.052	n5008	17.078	30	3.423	HDPE	18.9	18.8	225
1166	p4525	n5008	17.078	n5009	17.18	30	0.34	HDPE	18.8	18.37	225
1167	p4526	n5009	17.18	n5010	17.406	30	0.754	HDPE	18.37	19.43	225
1168	p4527	n5010	17.406	n5011	17.508	30	0.34	HDPE	19.43	20.06	225
1169	p4528	n5011	17.508	n5012	17.61	30	0.34	HDPE	20.06	18.8	225
1170	p4529	n5012	17.61	n5013	19.108	30	5	HDPE	18.8	20.41	225
1171	p4530	n5013	19.22	n5014	20.717	29.9	5	HDPE	20.41	22.06	225
1172	p4533	n5017	19.718	n5016	18.07	33	5	HDPE	23.17	19.26	225
1173	p4534	n5016	16.271	n5018	14.78	29.8	5	HDPE	19.26	15.97	225
1174	p4535	n5018	13.474	n5019	11.98	29.9	5	HDPE	15.97	13.17	225
1175	p4536	n5019	11.905	n2241	11.39	10.3	5	HDPE	13.17	12.58	225
1176	p4537	n2245	13.067	n5020	12.997	20.7	0.34	HDPE	14.73	14.86	225
1177	p4538	n5021	17.258	n5022	15.77	29.8	5	HDPE	20.67	16.96	225
1178	p4539	n5022	14.463	n5020	13.67	15.9	5	HDPE	16.96	14.86	225
1179	p4540	n5020	12.997	n5023	12.945	15.4	0.34	HDPE	14.86	14.85	225
1180	p4541	n5023	12.945	n5024	12.843	30	0.34	HDPE	14.85	14.23	225
1181	p4542	n5024	12.843	n5025	11.87	30	3.243	HDPE	14.23	13.06	225
1182	p4543	n4863	4.358	n5026	4.46	30	0.34	HDPE	5.66	5.65	225
1184	p4545	n5027	1.654	n5028	1.756	30	0.34	HDPE	5.47	5.44	225
1185	p4546	n5028	1.756	n5029	1.79	10	0.34	HDPE	5.44	5.44	225
1186	p4547	n5029	1.79	n5030	1.858	20	0.34	HDPE	5.44	5.42	225
1187	p4548	n5030	1.858	n5031	1.96	30	0.34	HDPE	5.42	5.59	225
1188	p4549	n5031	1.96	n5032	2.013	15.6	0.34	HDPE	5.59	5.76	225
1189	p4550	n5032	2.013	n5033	2.062	14.4	0.34	HDPE	5.76	5.52	225
1190	p4551	n5033	2.062	n5034	2.164	30	0.34	HDPE	5.52	5.59	225
1191	p4552	n5034	2.164	n5035	2.266	30	0.34	HDPE	5.59	5.68	225
1192	p4553	n5035	2.266	n5036	2.317	14.8	0.34	HDPE	5.68	5.78	225
1193	p4554	n5036	4.566	n5037	4.668	30	0.34	HDPE	5.78	6.12	225
1194	p4555	n5037	4.668	n5038	4.77	30	0.34	HDPE	6.12	5.96	225
1195	p4556	n5038	4.77	n5039	5.08	30	1.034	HDPE	5.96	6.27	225
1196	p4557	n5039	5.08	n5040	5.28	7.8	2.556	HDPE	6.27	6.47	225
1197	p4558	n5040	5.28	n5041	5.87	22.2	2.662	HDPE	6.47	7.06	225
1198	p4560	n5043	5.03	n5044	4.57	30	1.534	HDPE	6.22	5.76	225

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1199	p4561	n5044	4.57	n5045	4.48	26.5	0.34	HDPE	5.76	5.68	225
1200	p4562	n5045	4.48	n5046	4.455	7.3	0.34	HDPE	5.68	5.81	225
1201	p4563	n5046	4.455	n5047	4.366	26.2	0.34	HDPE	5.81	6.06	225
1202	p4564	n5047	4.366	n5048	4.264	30	0.34	HDPE	6.06	6.93	225
1203	p4565	n5048	4.264	n2236	4.183	24	0.34	HDPE	6.93	7.6	225
1204	p4566	n5036	2.317	n5049	2.419	30	0.34	HDPE	5.78	5.72	225
1205	p4567	n5049	2.419	n5050	2.521	30	0.34	HDPE	5.72	5.65	225
1206	p4568	n5050	2.521	n5051	2.623	30	0.34	HDPE	5.65	5.63	225
1207	p4569	n5051	2.623	n5052	2.725	30	0.34	HDPE	5.63	5.66	225
1208	p4570	n5052	2.725	n5053	2.827	30	0.34	HDPE	5.66	5.73	225
1209	p4571	n5053	2.827	n5054	2.929	30	0.34	HDPE	5.73	5.67	225
1210	p4572	n5054	2.929	n5055	2.969	12	0.34	HDPE	5.67	5.8	225
1211	p4573	n5055	2.969	n5056	3.031	18	0.34	HDPE	5.8	6.08	225
1212	p4574	n5056	3.031	n5057	3.133	30	0.34	HDPE	6.08	5.97	225
1213	p4575	n5057	3.133	n5058	3.235	30	0.34	HDPE	5.97	6.07	225
1214	p4576	n5058	3.235	n5059	3.337	30	0.34	HDPE	6.07	6.13	225
1215	p4577	n5059	3.337	n5060	3.439	30	0.34	HDPE	6.13	6.34	225
1216	p4578	n5060	3.439	n5061	3.541	30	0.34	HDPE	6.34	6.5	225
1217	p4579	n5061	3.541	n5062	3.643	30	0.34	HDPE	6.5	6.64	225
1218	p4580	n5062	3.643	n2232	3.714	20.9	0.34	HDPE	6.64	7.08	225
1219	p4581	n4863	4.358	n5063	4.284	30	0.249	HDPE	5.66	5.68	315
1220	p4582	n5063	4.284	n5064	4.209	30	0.249	HDPE	5.68	5.5	315
1221	p4583	n5065	4.134	n5066	4.06	30	0.249	HDPE	5.43	5.5	315
1222	p4584	n5066	4.06	n5067	3.985	30	0.249	HDPE	5.5	5.55	315
1223	p4585	n5067	3.985	n5068	3.91	30	0.249	HDPE	5.55	5.51	315
1224	p4586	n5068	1.936	n5069	2.014	31.3	0.249	HDPE	5.51	5.56	315
1225	p4587	n5069	2.014	n5070	2.09	30.7	0.249	HDPE	5.56	5.57	315
1226	p4588	n5070	2.09	n5071	2.16	28	0.249	HDPE	5.57	5.53	315
1227	p4589	n5071	2.16	n5072	2.234	30	0.249	HDPE	5.53	5.58	315
1228	p4590	n5072	2.234	n5073	2.309	30	0.249	HDPE	5.58	5.63	315
1229	p4591	n5074	2.383	n5075	2.458	30	0.249	HDPE	5.61	5.55	315
1230	p4592	n5075	2.458	n5076	2.533	30	0.249	HDPE	5.55	5.57	315
1231	p4593	n5076	2.533	n5077	2.607	30	0.249	HDPE	5.57	5.69	315
1232	p4594	n5077	2.607	n5078	2.682	30	0.249	HDPE	5.69	5.83	315
1233	p4595	n5078	2.682	n5079	2.757	30	0.249	HDPE	5.83	6.08	315
1234	p4596	n5079	2.757	n5080	2.831	30	0.249	HDPE	6.08	6.12	315
1235	p4597	n5080	2.831	n5081	2.906	30	0.249	HDPE	6.12	6.14	315
1236	p4598	n5081	2.906	n5082	2.981	30	0.249	HDPE	6.14	6.08	315
1237	p4599	n5082	2.981	n5083	3.055	30	0.249	HDPE	6.08	6.1	315
1238	p4600	n5083	3.055	n5084	3.13	30	0.249	HDPE	6.1	6.09	315
1239	p4601	n5084	3.13	n5085	3.205	30	0.249	HDPE	6.09	6.1	315
1240	p4602	n5085	3.205	n5086	3.26	22.4	0.249	HDPE	6.1	5.97	315
1241	p4603	n5086	3.26	n5087	3.267	2.3	0.313	HDPE	5.97	6.03	280
1242	p4604	n5087	3.267	n5088	3.361	30	0.313	HDPE	6.03	6.2	280
1243	p4605	n5088	3.361	n5089	4.388	30	3.421	HDPE	6.2	6.18	280
1244	p4606	n5089	4.388	n5090	4.482	30	0.313	HDPE	6.18	6.18	280
1245	p4607	n5090	4.482	n5091	4.576	30	0.313	HDPE	6.18	6.16	280
1246	p4608	n5091	4.576	n5092	4.67	30	0.313	HDPE	6.16	6.1	280
1247	p4609	n5092	4.67	n5093	4.764	30	0.313	HDPE	6.1	6	280
1249	p4611	n5094	2.005	n5095	2.016	3.6	0.313	HDPE	5.96	6.06	280
1250	p4612	n5095	3.54	n5096	3.642	30	0.34	HDPE	6.06	6.18	225
1251	p4613	n5096	3.642	n5097	3.744	30	0.34	HDPE	6.18	6.28	225
1252	p4614	n5098	3.846	n5099	3.948	30	0.34	HDPE	6.45	6.43	225
1253	p4615	n5099	3.948	n5100	4.05	30	0.34	HDPE	6.43	6.47	225
1254	p4616	n5100	4.05	n5101	4.152	30	0.34	HDPE	6.47	6.44	225

ID	Label	Start Node	Invert (Start) (m)	Stop Node	Invert (Stop) (m)	Length (Scaled) (m)	Slope (Calculated) (%)	Material	Elevation Ground (Start) (m)	Elevation Ground (Stop) (m)	Diameter (mm)
1255	p4617	n5101	4.152	n5102	4.254	30	0.34	HDPE	6.44	6.39	225
1256	p4618	n5102	4.254	n5103	4.356	30	0.34	HDPE	6.39	6.4	225
1257	p4619	n5103	4.356	n5104	4.458	30	0.34	HDPE	6.4	6.42	225
1258	p4620	n5104	4.458	n5105	4.56	30	0.34	HDPE	6.42	6.41	225
1259	p4621	n5105	4.56	n5106	4.662	30	0.34	HDPE	6.41	6.41	225
1260	p4622	n5107	4.764	n5108	4.866	30	0.34	HDPE	6.44	6.44	225
1261	p4623	n5108	4.866	n5109	4.968	30	0.34	HDPE	6.44	6.49	225
1262	p4624	n5109	4.968	n5110	5.07	30	0.34	HDPE	6.49	6.64	225
1263	p4625	n5110	5.07	n5111	5.189	35	0.34	HDPE	6.64	7.4	225
1264	p4626	n5112	4.884	n5113	4.867	4.9	0.34	HDPE	6.21	6.14	225
1265	p4627	n5113	4.867	n5114	4.784	24.6	0.34	HDPE	6.14	6.06	225
1266	p4628	n5114	4.784	n5115	4.74	12.9	0.34	HDPE	6.06	5.96	225
1267	p4629	n5115	4.74	n5116	4.678	18.2	0.34	HDPE	5.96	5.95	225
1268	p4630	n5116	4.678	n5117	4.58	28.9	0.34	HDPE	5.95	5.98	225
1269	p4631	n5117	4.58	n5118	4.508	21	0.34	HDPE	5.98	6	225
1270	p4632	n5118	4.508	n5119	4.478	8.9	0.34	HDPE	6	6.04	225
1271	p4633	n5119	4.478	n5120	4.404	21.7	0.34	HDPE	6.04	5.9	225
1272	p4634	n5120	4.404	n5121	4.376	8.3	0.34	HDPE	5.9	5.97	225
1273	p4635	n5121	4.376	n5086	3.26	30	3.719	HDPE	5.97	5.97	225
1274	p4637	n5123	6.33	n5124	6.228	30	0.34	HDPE	7.52	7.5	225
1275	p4638	n5125	6.126	n5126	6.024	30	0.34	HDPE	7.53	7.52	225
1276	p4639	n5126	6.024	n5127	5.922	30	0.34	HDPE	7.52	7.53	225
1277	p4640	n5127	5.922	n5128	5.82	30	0.34	HDPE	7.53	8.09	225
1278	p4641	n5122	6.02	n5129	5.04	30	3.269	HDPE	7.21	6.23	225
1279	p4642	n5129	5.04	n5130	4.89	30	0.5	HDPE	6.23	6.08	225
1280	p4643	n5130	4.89	n5131	4.788	30	0.34	HDPE	6.08	6.13	225
1281	p4644	n5131	4.788	n5132	4.686	30	0.34	HDPE	6.13	6.1	225
1282	p4645	n5132	4.686	n5133	4.584	30	0.34	HDPE	6.1	6.11	225
1283	p4646	n5133	4.584	n5134	4.482	30	0.34	HDPE	6.11	6.06	225
1284	p4647	n5134	4.482	n5135	4.38	30	0.34	HDPE	6.06	6.17	225
1285	p4648	n5135	4.38	n5136	4.306	21.8	0.34	HDPE	6.17	6.12	225
1286	p4649	n5136	4.306	n5137	4.202	30.7	0.34	HDPE	6.12	6.33	225
1287	p4651	n5138	5.32	n5139	5.218	30	0.34	HDPE	6.51	6.51	225
1288	p4652	n5139	5.218	n5140	5.117	29.7	0.34	HDPE	6.51	6.48	225
1289	p4653	n5140	5.117	n5141	5.096	6.3	0.34	HDPE	6.48	6.35	225
1290	p4654	n5141	5.096	n5142	5.014	24	0.34	HDPE	6.35	6.41	225
1291	p4655	n5142	5.014	n5143	4.977	11	0.34	HDPE	6.41	6.42	225
1292	p4656	n5143	4.977	n5144	4.94	10.9	0.34	HDPE	6.42	6.39	225
1293	p4657	n5144	4.94	n5145	4.912	8.1	0.34	HDPE	6.39	6.39	225
1294	p4658	n5145	4.912	n5146	4.81	30	0.34	HDPE	6.39	6.44	225
1295	p4659	n5146	4.81	n5147	4.708	30	0.34	HDPE	6.44	6.4	225
1296	p4660	n5147	4.708	n5148	4.606	30	0.34	HDPE	6.4	6.59	225
1297	p4661	n5148	4.606	n5149	4.501	31.1	0.34	HDPE	6.59	6.72	225
1298	p4662	n5149	4.501	n5150	4.402	28.9	0.34	HDPE	6.72	6.62	225
1299	p4663	n5150	4.402	n5151	4.3	30	0.34	HDPE	6.62	6.58	225
1300	p4664	n5151	4.3	n5152	4.231	20.3	0.34	HDPE	6.58	6.48	225
1301	p4665	n5152	4.231	n5153	4.198	9.7	0.34	HDPE	6.48	6.43	225
1302	p4666	n5153	4.198	n5154	4.096	30	0.34	HDPE	6.43	6.26	225
1303	p4667	n5154	4.096	n5155	4.086	3.1	0.34	HDPE	6.26	6.41	225
1304	p4668	n5088	3.361	n5156	3.463	30	0.34	HDPE	6.2	6.37	225
1305	p4669	n5156	3.463	n5157	3.565	30	0.34	HDPE	6.37	6.25	225
1306	p4670	n5157	3.565	n5158	3.667	30	0.34	HDPE	6.25	6.2	225
1307	p4671	n5158	3.667	n5155	3.692	7.2	0.34	HDPE	6.2	6.41	225
1308	p4672	n5155	3.692	n5159	3.794	30	0.34	HDPE	6.41	6.39	225
1309	p4673	n5159	3.794	n5160	3.897	30.3	0.34	HDPE	6.39	6.31	225

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1310	p4674	n5161	3.998	n5162	4.1	30	0.34	HDPE	6.39	6.26	225
1311	p4675	n5162	4.1	n5137	4.202	30	0.34	HDPE	6.26	6.33	225
1312	p4676	n5095	2.016	n5163	2.08	18.7	0.34	HDPE	6.06	6.03	250
1313	p4677	n5163	2.08	n5164	2.182	30	0.34	HDPE	6.03	6.02	250
1314	p4678	n5164	2.182	n5165	2.284	30	0.34	HDPE	6.02	6.15	250
1315	p4679	n5165	2.284	n5166	2.386	30	0.34	HDPE	6.15	6.06	250
1316	p4680	n5166	2.386	n5167	2.488	30	0.34	HDPE	6.06	6.06	250
1317	p4681	n5167	2.488	n5168	2.59	30	0.34	HDPE	6.06	6.12	250
1318	p4682	n5168	2.59	n5169	2.692	30	0.34	HDPE	6.12	6.19	250
1319	p4683	n5169	2.692	n5170	2.794	30	0.34	HDPE	6.19	6.24	250
1320	p4684	n5170	2.794	n5171	2.871	22.7	0.34	HDPE	6.24	6.27	250
1321	p4685	n5171	2.871	n5172	2.896	7.3	0.34	HDPE	6.27	6.28	250
1322	p4686	n5172	2.896	n5173	2.998	30	0.34	HDPE	6.28	6.28	250
1323	p4687	n5173	2.998	n5174	3.1	30	0.34	HDPE	6.28	6.46	250
1324	p4688	n5174	3.1	n5175	3.203	30.4	0.34	HDPE	6.46	6.19	250
1325	p4693	n5180	5.1	n5181	4.998	30	0.34	HDPE	6.29	6.3	225
1326	p4694	n5181	4.998	n5182	4.896	30	0.34	HDPE	6.3	6.23	225
1327	p4695	n5182	3.406	n5183	3.304	30	0.34	HDPE	6.23	6.23	250
1328	p4696	n5183	3.304	n5175	3.203	29.6	0.34	HDPE	6.23	6.19	250
1329	p4697	n5182	3.406	n5184	3.478	21.3	0.34	HDPE	6.23	6.24	250
1330	p4698	n5184	3.478	n5185	3.58	30	0.34	HDPE	6.24	6.29	250
1331	p4699	n5185	3.58	n5186	3.682	30	0.34	HDPE	6.29	6.23	250
1332	p4700	n5186	3.682	n5187	3.784	30	0.34	HDPE	6.23	6.19	250
1333	p4701	n5187	3.784	n5188	3.886	30	0.34	HDPE	6.19	6.25	250
1334	p4702	n5188	4.857	n5189	4.904	14	0.34	HDPE	6.25	6.25	225
1335	p4703	n5189	4.904	n5190	5.006	30	0.34	HDPE	6.25	6.26	225
1336	p4704	n5190	5.006	n5191	5.108	30	0.34	HDPE	6.26	6.31	225
1337	p4705	n5191	5.108	n5192	5.21	30	0.34	HDPE	6.31	6.4	225
1338	p4706	n5182	3.406	n5193	4.033	30	2.092	HDPE	6.23	6.33	225
1339	p4707	n5194	4.135	n5195	4.237	30	0.34	HDPE	6.29	6.54	225
1340	p4708	n5195	4.237	n5196	4.339	30	0.34	HDPE	6.54	6.68	225
1341	p4709	n5196	4.339	n5197	4.441	30	0.34	HDPE	6.68	6.59	225
1342	p4710	n5197	4.441	n5198	4.543	30	0.34	HDPE	6.59	6.51	225
1343	p4711	n5198	4.543	n5199	4.645	30	0.34	HDPE	6.51	6.4	225
1344	p4712	n5199	4.645	n5200	4.747	30	0.34	HDPE	6.4	6.48	225
1345	p4713	n5200	4.747	n5201	4.849	30	0.34	HDPE	6.48	6.49	225
1346	p4714	n5201	4.849	n5202	4.951	30	0.34	HDPE	6.49	6.55	225
1347	p4715	n5203	5.053	n958	5.097	12.9	0.34	HDPE	6.81	7.14	225
1348	p4716	n5188	3.886	n5204	4.125	70.1	0.34	HDPE	6.25	6.27	250
1349	p4717	n5204	4.125	n5205	4.902	34.5	2.256	HDPE	6.27	6.3	225
1350	p4718	n5205	4.902	n5206	5.004	30	0.34	HDPE	6.3	6.42	225
1351	p4719	n5206	5.004	n5207	5.106	30	0.34	HDPE	6.42	6.34	225
1352	p4720	n5207	5.106	n5208	5.208	30	0.34	HDPE	6.34	6.66	225
1353	p4721	n5208	5.208	n5209	5.31	30	0.34	HDPE	6.66	6.75	225
1354	p4722	n5210	5.412	n5211	5.514	30	0.34	HDPE	6.77	6.87	225
1355	p4723	n5211	5.514	n5212	5.616	30	0.34	HDPE	6.87	6.96	225
1356	p4724	n5213	5.718	n5214	5.82	30	0.34	HDPE	6.96	7.01	225
1357	p4726	n5204	4.125	n5215	4.228	30.3	0.34	HDPE	6.27	6.21	225
1358	p4727	n5215	4.228	n5216	4.329	29.7	0.34	HDPE	6.21	6.22	225
1359	p4728	n5216	4.329	n5217	4.405	22.4	0.34	HDPE	6.22	6.23	225
1360	p4729	n5217	4.405	n5218	4.554	29.9	0.501	HDPE	6.23	6.2	225
1361	p4730	n5218	4.554	n5219	4.656	30	0.34	HDPE	6.2	6.26	225
1362	p4731	n5219	4.656	n5220	4.758	30	0.34	HDPE	6.26	6.57	225
1363	p4732	n5220	4.758	n5221	4.86	30	0.34	HDPE	6.57	6.79	225
1364	p4733	n5221	4.86	n5222	4.962	30	0.34	HDPE	6.79	6.78	225

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1365	p4734	n5223	5.064	n5224	5.166	30	0.34	HDPE	6.74	6.57	225
1366	p4735	n5224	5.166	n5225	5.268	30	0.34	HDPE	6.57	6.49	225
1367	p4736	n5226	5.37	n5227	5.93	30	1.867	HDPE	6.56	7.12	225
1368	p4737	n5227	5.93	n2000	6.191	30	0.87	HDPE	7.12	8.18	225
1369	p4738	n5217	4.405	n5228	4.507	30	0.34	HDPE	6.23	6.36	225
1370	p4739	n5228	4.507	n5229	4.609	30	0.34	HDPE	6.36	6.35	225
1371	p4740	n5229	4.609	n5230	4.711	30	0.34	HDPE	6.35	6.31	225
1372	p4741	n5231	4.813	n5232	4.915	30	0.34	HDPE	6.29	6.21	225
1373	p4742	n5232	4.915	n5233	4.96	13.4	0.34	HDPE	6.21	6.15	225
1375	p4744	n5235	2.215	n5236	2.302	25.4	0.34	HDPE	6.23	6.2	225
1376	p4745	n5236	4.941	n5237	5.008	19.8	0.34	HDPE	6.2	6.28	225
1377	p4746	n5237	5.008	n5238	5.11	30	0.34	HDPE	6.28	6.3	225
1378	p4749	n5236	2.302	n4826	2.556	74.8	0.34	HDPE	6.2	6.21	225
1379	p5113	n5111	5.189	n2208	5.29	29.9	0.34	HDPE	7.4	7.29	225
1380	p5114	n5160	3.897	n5161	3.998	29.7	0.34	HDPE	6.31	6.39	225
1381	p5116	n5124	6.228	n5125	6.126	30	0.34	HDPE	7.5	7.53	225
1382	p5117	n5064	4.209	n5065	4.134	30	0.249	HDPE	5.5	5.43	315
1383	p5118	n5073	2.309	n5074	2.383	30	0.249	HDPE	5.63	5.61	315
1384	p5119	n5386	4.95	n5112	4.884	19.5	0.34	HDPE	6.14	6.21	225
1385	p5120	n5042	5.48	n5043	5.03	11.3	3.972	HDPE	6.67	6.22	225
1386	p5121	n2238	7.73	n2237	7.09	30	2.134	HDPE	8.92	8.28	225
1387	p5122	n2236	4.183	n2235	4.086	28.6	0.34	HDPE	7.6	7.34	225
1388	p5123	n2235	6.099	n5387	6.15	15.1	0.34	HDPE	7.34	7.34	225
1389	p5124	n2233	3.918	n5388	3.816	29.8	0.34	HDPE	7	6.85	225
1390	p5125	n5388	3.816	n2232	3.714	30.2	0.34	HDPE	6.85	7.08	225
1391	p5126	n2230	5.448	n2229	5.55	30	0.34	HDPE	7.54	7.78	225
1392	p5127	n2222	5.754	n5128	5.82	19.5	0.34	HDPE	8.14	8.09	225
1393	p5129	n2219	6.43	n2218	6.31	30	0.4	HDPE	7.62	7.5	225
1394	p5130	n2212	5.698	n2211	5.596	30	0.34	HDPE	7.11	6.88	225
1395	p5132	n949	6.21	n950	6.108	30	0.34	HDPE	7.4	7.37	225
1396	p5133	n5097	3.744	n5098	3.846	30	0.34	HDPE	6.28	6.45	225
1397	p5134	n5106	4.662	n5107	4.764	30	0.34	HDPE	6.41	6.44	225
1398	p5135	n953	5.58	n954	5.478	30	0.34	HDPE	6.77	6.78	225
1399	p5136	n5193	4.033	n5194	4.135	30	0.34	HDPE	6.33	6.29	225
1400	p5137	n5202	4.951	n5203	5.053	30	0.34	HDPE	6.55	6.81	225
1401	p5138	n958	5.097	n959	5.7	41.2	1.463	HDPE	7.14	7.18	225
1402	p5140	n5209	5.31	n5210	5.412	30	0.34	HDPE	6.75	6.77	225
1403	p5141	n5212	5.616	n5213	5.718	30	0.34	HDPE	6.96	6.96	225
1404	p5143	n1973	6.308	n1974	6.292	4.9	0.34	HDPE	7.91	7.97	225
1405	p5144	n1974	6.292	n2000	6.191	29.6	0.34	HDPE	7.97	8.18	225
1406	p5145	n5222	4.962	n5223	5.064	30	0.34	HDPE	6.78	6.74	225
1407	p5146	n5225	5.268	n5226	5.37	30	0.34	HDPE	6.49	6.56	225
1408	p5147	n5230	4.711	n5231	4.813	30	0.34	HDPE	6.31	6.29	225
1409	p5188	n2246	13.14	n2245	13.067	21.5	0.34	HDPE	14.33	14.73	225
1410	p5214	n4733	3.507	n4734	3.405	30	0.34	HDPE	5.67	5.72	225
1411	p5241	n1910	3.604	n1911	3.706	30	0.34	HDPE	6.02	6.1	225
1412	p5244	n1851	6.486	n1852	6.588	30	0.34	HDPE	7.78	7.88	225
1413	p5245	n1848	6.18	n1849	6.282	30	0.34	HDPE	7.55	7.64	225
1414	p5246	n1841	5.052	n1840	5.008	13	0.34	HDPE	6.31	6.34	225
1415	p5247	n1843	5.35	n1844	5.64	30	0.967	HDPE	6.54	6.83	225
1416	p5248	n1878	6.31	n1879	6.208	30	0.34	HDPE	7.5	7.49	225
1417	p5249	n1863	5.912	n1874	6.014	30	0.34	HDPE	7.4	7.42	225
1418	p5250	n1859	5.056	n1860	5.158	30	0.34	HDPE	6.56	6.58	225
1419	p5251	n1856	4.75	n1829	4.717	9.9	0.34	HDPE	6.31	6.29	225
1420	p5252	n1831	5.02	n1832	4.918	30	0.34	HDPE	6.21	6.26	225

ID	Label	Start Node	Invert (Start) (m)	Stop Node	Invert (Stop) (m)	Length (Scaled) (m)	Slope (Calculated) (%)	Material	Elevation Ground (Start) (m)	Elevation Ground (Stop) (m)	Diameter (mm)
1421	p5253	n5403	5.09	n1855	5.002	26	0.34	HDPE	6.28	6.23	225
1422	p5255	n1713	4.718	n1714	4.616	30	0.34	HDPE	6.07	6.08	225
1423	p5256	n1883	2.118	n1884	2.22	30	0.34	HDPE	6.12	6.06	225
1424	p5257	n1890	2.34	n1891	2.442	30	0.34	HDPE	6.2	5.93	225
1425	p5258	n1887	4.226	n1888	4.328	30	0.34	HDPE	6.26	6.32	225
1426	p5259	n1823	4.2	n1824	4.299	29.1	0.34	HDPE	6.01	5.96	225
1427	p5260	n1870	5.904	n1871	6.006	30	0.34	HDPE	7.34	7.37	225
1428	p5261	n1808	4.603	n1809	4.667	19	0.34	HDPE	6.3	6.2	225
1429	p5264	n1798	3.288	n1797	3.186	30	0.34	HDPE	6.41	6.33	225
1430	p5265	n4832	4.578	n4833	4.68	30	0.34	HDPE	6.37	6.36	225
1431	p5266	n4837	5.088	n4838	5.19	30	0.34	HDPE	6.68	6.92	225
1432	p5270	n4827	2.647	n4828	2.749	30	0.34	HDPE	6.19	6.23	225
1433	p5324	n2005	6.31	n5414	6.277	9.9	0.34	HDPE	7.5	7.47	225
1434	p5326	n5414	6.277	n2006	6.102	51.4	0.34	HDPE	7.47	7.44	225
1435	p5328	n4847	5.17	n4848	5.29	30	0.399	HDPE	6.36	6.48	225
1436	p5330	n2009	5.966	n4840	6.068	30	0.34	HDPE	7.34	7.35	225
1437	p5331	n5234	2.113	n5235	2.215	30	0.34	HDPE	6.19	6.23	225
1438	p5332	n4841	4.558	n4842	4.66	30	0.34	HDPE	6.32	6.29	225
1439	p5335	n4676	8.132	n4677	8.03	30	0.34	HDPE	9.65	9.76	225
1440	p5340	n4684	7.214	n4685	7.112	30	0.34	HDPE	10.35	10.58	225
1441	p5341	n4690	9.54	n4691	9.438	30	0.34	HDPE	10.73	10.66	225
1442	p5364	n2308	10.82	n2266	10.922	30	0.34	HDPE	12.79	13.06	225
1443	p5371	n4701	8.418	n4702	8.316	30	0.34	HDPE	11.45	11.53	225
1444	p5372	n4702	8.316	n4703	8.186	38.4	0.34	HDPE	11.53	11.67	225
1445	p5437	n4745	2.583	n4746	2.481	30	0.34	HDPE	5.82	5.95	250
1446	p5460	n4037	8.736	n5431	8.781	13	0.34	HDPE	11.58	11.8	225
1447	p5461	n4038	8.797	n5431	8.781	4.8	0.34	HDPE	11.78	11.8	225
1448	p5462	n2325	9.19	n2324	9.258	20	0.34	HDPE	11.86	11.85	225
1449	p5463	n2323	9.338	n2322	9.36	6.4	0.34	HDPE	11.93	11.96	225
1450	p5474	n2327	9.038	n2326	9.088	14.5	0.34	HDPE	11.91	11.89	225
1451	p5502	n2319	9.666	n2318	9.768	30	0.34	HDPE	12.09	11.78	225
1452	p5503	n2315	10.074	n2314	10.11	10.8	0.34	HDPE	11.29	11.3	225
1453	p5505	n2311	10.514	n2310	10.616	30	0.34	HDPE	12.14	12.47	225
1454	p5506	n4034	8.431	n4035	8.532	30	0.34	HDPE	9.99	11.03	225
1455	p5507	n4044	10.86	n4045	11.05	30	0.633	HDPE	12.05	12.24	225
1456	p5508	n4050	12.02	n4051	12.38	30	1.2	HDPE	13.21	13.57	225
1457	p5509	n4054	12.902	n4055	13.004	30	0.34	HDPE	14.78	15.14	225
1458	p5511	n4066	13.747	n4067	13.849	30	0.34	HDPE	15.4	15.27	225
1459	p5512	n2263	11.226	n2262	11.285	17.1	0.34	HDPE	14.91	14.86	225
1460	p5513	n2260	11.489	n2259	11.591	30	0.34	HDPE	13.96	13.92	225
1461	p5514	n4783	13.8	n2257	13.21	30	1.967	HDPE	14.99	14.4	225
1462	p5521	n4780	7.62	n4781	7.518	30	0.34	HDPE	9.75	10.09	250
1463	p5522	n4782	7.416	n4849	7.314	30	0.34	HDPE	9.99	9.36	250
1464	p5523	n4981	15.62	n4982	15.39	19.6	1.176	HDPE	16.81	16.58	225
1465	p5524	n4983	15.03	n4984	14.68	30	1.167	HDPE	16.22	15.87	225
1466	p5525	n4989	12.83	n4990	14.25	30	4.738	HDPE	14.02	15.44	225
1467	p5526	n4992	15.736	n4993	15.838	30	0.34	HDPE	17.36	17.75	225
1468	p5528	n4788	16.07	n4789	15.968	30	0.34	HDPE	17.26	17.55	225
1469	p5529	n5025	11.87	n2241	11.314	11.2	4.969	HDPE	13.06	12.58	225
1470	p5531	n4856	6.6	n4857	6.57	9.1	0.34	HDPE	8.92	8.47	250
1472	p5537	n4707	7.778	n4013	7.724	15.9	0.34	HDPE	11.89	11.88	225
1473	p5539	n4021	2.568	n4002	2.576	2.3	0.34	HDPE	5.79	5.63	225
1474	p5540	n4776	4.748	LS 5	4.739	2.6	0.34	HDPE	9.11	9.12	250
1480	CO-4	n5068	1.936	CW-1	1.907	13.6	0.208	HDPE	5.51	5.5	400
1481	CO-6	n2327	9.038	n4040	9.001	11	0.34	HDPE	11.91	11.86	225

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1482	AL-1	n3979	3.99	n3983	3.719	79.8	0.34	HDPE	6.48	6.26	225
1503	p4238(1)	n4689	6.704	LS 1	6.611	27.6	0.34	HDPE	10.78	10.734	225
1526	p2001(2)	MH-11	11.981	n2256	11.883	28.7	0.34	HDPE	13.171	14.34	225
1532	p5532(1)	n4711	1.525	LS 3	1.427	28.9	0.34	HDPE	5.51	5.549	225
1550	p4333(1)	n4797	2.325	LS 4	2.238	25.6	0.34	HDPE	6.27	6.432	250
1554	p4316(2)	MH-16	7.921	n4778	7.824	28.6	0.34	HDPE	9.132	9.38	250
1558	p1669(2)	LS 7	1.821	n1881	1.914	27.4	0.34	HDPE	6.02	5.92	225
1561	p4743(2)	LS 8	2.08	n5234	2.113	9.7	0.34	HDPE	6.167	6.19	225
1567	p4610(2)	LS 9	1.914	n5094	2.005	28.9	0.313	HDPE	5.999	5.96	280
1571	p4544(2)	LS 6	1.558	n5027	1.654	28.2	0.34	HDPE	5.639	5.47	225
336	p2004	n2258	12.93	n2259	12.73	30	0.667	HDPE	14.12	13.92	225
337	p2005	n2260	12.628	n2261	12.526	30	0.34	HDPE	13.96	14.47	225
338	p2006	n2261	12.526	n2262	12.424	30	0.34	HDPE	14.47	14.86	225
339	p2007	n2263	12.366	n2264	12.264	30	0.34	HDPE	14.91	14.49	225
340	p2008	n2264	12.264	n2265	12.162	30	0.34	HDPE	14.49	13.72	225
341	p2009	n2265	12.162	n2266	11.87	29.7	0.983	HDPE	13.72	13.06	225
342	p2046	n2308	11.6	n2309	11.43	30	0.567	HDPE	12.79	12.62	225
343	p2047	n2309	11.43	n2310	11.28	30	0.5	HDPE	12.62	12.47	225
344	p2048	n2311	10.95	n2312	10.62	30	1.1	HDPE	12.14	11.81	225
345	p2049	n2312	10.62	n2313	10.29	30	1.1	HDPE	11.81	11.48	225
346	p2050	n2313	10.29	n2314	10.11	26.6	0.676	HDPE	11.48	11.3	225
347	p2051	n2315	7	n2316	6.898	30	0.34	HDPE	11.29	11.31	225
349	p2053	n2317	10.28	n2318	10.178	30	0.34	HDPE	11.47	11.78	225
350	p2054	n2319	10.076	n2320	9.974	30	0.34	HDPE	12.09	12.14	225
351	p2055	n2320	9.974	n2321	9.872	30	0.34	HDPE	12.14	12.07	225
352	p2056	n2321	9.872	n2322	9.77	30	0.34	HDPE	12.07	11.96	225
353	p2057	n2323	9.749	n2324	9.668	23.6	0.34	HDPE	11.93	11.85	225
354	p2058	n2325	9.6	n2326	9.498	30	0.34	HDPE	11.86	11.89	225
355	p2059	n2327	9.449	n2328	9.347	30	0.34	HDPE	11.91	11.92	225
356	p2060	n2328	9.347	n2329	9.245	30	0.34	HDPE	11.92	11.92	225
357	p2061	n2329	9.245	n2330	9.143	30	0.34	HDPE	11.92	11.98	225
358	p2062	n2330	9.143	n2331	9.041	30	0.34	HDPE	11.98	12	225
359	p2063	n2331	9.041	n2332	8.939	30	0.34	HDPE	12	11.93	225
360	p2064	n2332	8.939	n2333	8.837	30	0.34	HDPE	11.93	11.83	225
361	p2065	n2333	8.837	n2334	8.714	36.3	0.34	HDPE	11.83	11.71	225
362	p2066	n2334	8.714	n2335	8.612	30	0.34	HDPE	11.71	11.66	225
363	p2067	n2335	8.612	n2336	8.51	30	0.34	HDPE	11.66	11.58	225
364	p2068	n2336	8.51	n2337	8.408	30	0.34	HDPE	11.58	11.48	225
365	p2069	n2337	8.408	n2338	8.25	22.2	0.709	HDPE	11.48	11.4	225
366	p2070	n2338	8.25	n2339	8.148	30	0.34	HDPE	11.4	11.33	225
367	p2071	n2339	8.148	n2340	8.046	30	0.34	HDPE	11.33	11.23	225
368	p2072	n2340	8.046	n2341	7.944	30	0.34	HDPE	11.23	11.18	225
369	p2073	n2341	7.944	n2342	7.842	30	0.34	HDPE	11.18	11.16	225
370	p2074	n2342	7.842	n2343	7.74	30	0.34	HDPE	11.16	11.08	225
371	p2075	n2343	7.74	n2344	7.638	30	0.34	HDPE	11.08	11.01	225
372	p2076	n2344	7.638	n2345	7.536	30	0.34	HDPE	11.01	10.97	225
373	p2077	n2345	7.536	n2346	7.434	30	0.34	HDPE	10.97	10.95	225
374	p2078	n2346	7.434	n2347	7.357	22.5	0.34	HDPE	10.95	10.93	225
375	p2079	n2347	7.357	n2348	7.238	35.2	0.34	HDPE	10.93	10.89	225
376	p2080	n2348	7.238	n2349	7.136	30	0.34	HDPE	10.89	10.88	225
377	p2081	n2349	7.136	n2350	7.034	30	0.34	HDPE	10.88	10.87	225
378	p2082	n2350	7.034	n2351	6.932	30	0.34	HDPE	10.87	10.85	225
379	p2083	n2351	6.932	n2352	6.83	30	0.34	HDPE	10.85	10.8	225
380	p2084	n2352	6.83	n2353	6.728	30	0.34	HDPE	10.8	10.65	225
381	p2085	n2353	6.728	n2354	6.626	30	0.34	HDPE	10.65	10.46	225

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382	p2086	n2354	6.626	n2355	6.524	30	0.34	HDPE	10.46	10.46	225
383	p2087	n2355	7.27	n2356	7.31	11.8	0.34	HDPE	10.46	9.98	225
384	p2088	n2355	6.524	n2357	6.422	30	0.34	HDPE	10.46	10.37	225
385	p2089	n2357	6.422	n2358	6.32	30	0.34	HDPE	10.37	10.28	225
386	p2090	n2359	6.217	n2360	6.116	29.9	0.34	HDPE	10.07	9.96	225
387	p2091	n2360	6.116	n2361	6.014	30	0.34	HDPE	9.96	9.98	225
388	p2092	n2361	6.014	n2362	5.912	30	0.34	HDPE	9.98	9.94	225
389	p2093	n2362	5.912	n2363	5.81	30	0.34	HDPE	9.94	9.78	225
390	p2094	n2363	5.81	n2364	5.708	30	0.34	HDPE	9.78	9.73	225
391	p2095	n2364	5.708	n2365	5.606	30	0.34	HDPE	9.73	9.75	225
392	p2096	n2365	5.606	n2366	5.504	30	0.34	HDPE	9.75	9.78	225
393	p2097	n2366	5.504	n2367	5.402	30	0.34	HDPE	9.78	9.76	225
394	p2098	n2367	5.402	n5490	5.28	35.9	0.34	HDPE	9.76	9.78	225
396	p2108	MH-39	8.888	n2380	8.924	10.8	0.34	HDPE	10.94	10.97	225
397	p2109	n2380	8.924	n2381	9.026	30	0.34	HDPE	10.97	11.34	225
398	p2110	n2381	9.026	n2382	9.095	20.2	0.34	HDPE	11.34	10.98	225
399	p2111	n2382	9.095	n2383	9.14	13.1	0.34	HDPE	10.98	10.65	225
400	p2112	n2383	9.14	n2384	9.23	26.7	0.34	HDPE	10.65	10.42	225
402	p2114	n2385	6.326	n2386	6.428	30	0.34	HDPE	10.29	10.14	225
403	p2115	n2386	6.428	n2387	6.53	30	0.34	HDPE	10.14	9.8	225
404	p2116	n2387	6.53	n2388	6.632	30	0.34	HDPE	9.8	9.47	225
405	p2117	n2388	6.632	n2389	6.694	18.2	0.34	HDPE	9.47	9.24	225
406	p2118	n2389	6.694	n2390	6.796	30	0.34	HDPE	9.24	8.94	225
407	p2119	n2390	6.796	n2391	6.898	30	0.34	HDPE	8.94	8.48	225
408	p2120	n2392	6.941	n2393	7	17.4	0.34	HDPE	8.27	8.19	225
409	p2121	n2393	7	n2394	7.12	30	0.4	HDPE	8.19	8.31	225
410	p2122	n2395	7.54	n2396	7.91	30	1.233	HDPE	8.73	9.1	225
411	p2123	n2396	7.91	n2397	8.14	30	0.767	HDPE	9.1	9.33	225
412	p2124	n2397	8.14	n2398	8.56	30	1.4	HDPE	9.33	9.75	225
413	p2126	n2399	9.08	n2400	9.05	9	0.34	HDPE	10.27	10.53	225
414	p2127	n2400	9.05	n2401	8.948	30	0.34	HDPE	10.53	10.68	225
415	p2128	n2401	8.948	n2402	8.846	30	0.34	HDPE	10.68	10.67	225
416	p2129	n2402	8.846	n2403	8.744	30	0.34	HDPE	10.67	10.81	225
417	p2130	n2403	8.744	n2404	8.642	30	0.34	HDPE	10.81	10.91	225
418	p2131	n2405	8.54	n2406	8.438	30	0.34	HDPE	11.05	11.06	225
419	p2132	n2406	8.438	n2407	8.336	30	0.34	HDPE	11.06	11.17	225
420	p2133	n2407	8.336	n2338	8.25	25.3	0.34	HDPE	11.17	11.4	225
421	p2134	n2400	9.05	n2408	10.17	30	3.737	HDPE	10.53	11.36	225
422	p2135	n2408	10.17	n2409	11.08	30	3.034	HDPE	11.36	12.27	225
423	p2137	n2411	11.89	n2412	11.788	30	0.34	HDPE	13.08	13.02	225
424	p2138	n2412	11.788	n2413	11.6	30	0.627	HDPE	13.02	12.79	225
425	p2139	n2413	11.6	n2414	11.32	30	0.933	HDPE	12.79	12.51	225
426	p2140	n2415	11.04	n2416	10.79	30	0.833	HDPE	12.23	11.98	225
427	p2141	n2416	10.79	n2417	10.4	30	1.3	HDPE	11.98	11.59	225
428	p2142	n2417	10.4	n2334	10.311	26.4	0.34	HDPE	11.59	11.71	225
429	p2144	n2419	11.74	n2420	11.61	30	0.433	HDPE	12.93	12.8	225
430	p2145	n2420	11.61	n2421	11.44	30	0.567	HDPE	12.8	12.63	225
431	p2146	n2421	11.44	n2422	11.23	30	0.7	HDPE	12.63	12.42	225
432	p2147	n2422	11.23	n2423	11	30	0.767	HDPE	12.42	12.19	225
433	p2148	n2423	11	n2424	10.82	30	0.6	HDPE	12.19	12.01	225
434	p2149	n2424	10.82	n2425	10.7	30	0.4	HDPE	12.01	11.89	225
435	p2150	n2325	9.6	n2426	10.454	30	2.847	HDPE	11.86	12.1	225
436	p2151	n2426	10.454	n2427	10.556	30	0.34	HDPE	12.1	12.13	225
437	p2152	n2427	10.556	n2428	10.658	30	0.34	HDPE	12.13	12.16	225
438	p2153	n2428	10.658	n2429	10.76	30	0.34	HDPE	12.16	11.95	225

ID	Label	Start Node	Invert (Start) (m)	Stop Node	Invert (Stop) (m)	Length (Scaled) (m)	Slope (Calculated) (%)	Material	Elevation Ground (Start) (m)	Elevation Ground (Stop) (m)	Diameter (mm)
439	p2155	n2425	7.91	n2430	7.808	30	0.34	HDPE	11.89	11.71	225
440	p2156	n2430	7.808	n2431	7.706	30	0.34	HDPE	11.71	11.53	225
441	p2157	n2431	7.706	n2432	7.604	30	0.34	HDPE	11.53	11.33	225
442	p2158	n2432	7.604	n2433	7.502	30	0.34	HDPE	11.33	11.23	225
443	p2159	n2433	7.502	n2434	7.4	30	0.34	HDPE	11.23	11.31	225
444	p2160	n2434	7.4	n2435	7.298	30	0.34	HDPE	11.31	11.17	225
445	p2161	n2435	7.298	n2436	7.196	30	0.34	HDPE	11.17	11.1	225
446	p2162	n2436	7.196	n2437	7.094	30	0.34	HDPE	11.1	11.15	225
447	p2163	n2437	7.094	n2438	7.05	12.9	0.34	HDPE	11.15	11.19	225
448	p2190	n2466	15.87	n2467	15.28	30	1.967	HDPE	17.06	16.47	225
449	p2191	n2467	15.28	n2468	14.69	30	1.967	HDPE	16.47	15.88	225
450	p2192	n2469	14.24	n2470	13.74	30	1.667	HDPE	15.43	14.93	225
451	p2193	n2470	13.74	n2471	13.34	30	1.333	HDPE	14.93	14.53	225
452	p2195	n2411	11.89	n2473	12.09	30	0.667	HDPE	13.08	13.28	225
453	p2196	n2473	12.09	n2474	12.33	30	0.8	HDPE	13.28	13.52	225
454	p2197	n2474	12.33	n2476	12.539	32.9	0.633	HDPE	13.52	13.75	225
455	p2199	n2476	12.539	n2477	12.578	11.6	0.34	HDPE	13.75	13.82	225
456	p2200	n2477	12.578	n2478	12.68	30	0.34	HDPE	13.82	13.87	225
457	p2201	n2478	12.68	n2479	13.12	30	1.467	HDPE	13.87	14.31	225
458	p2202	n2479	13.12	n2471	13.34	19.3	1.139	HDPE	14.31	14.53	225
459	p2206	n2476	12.539	n2483	12.898	30	1.197	HDPE	13.75	14.19	225
460	p2207	n2483	12.898	n2484	13.03	38.9	0.34	HDPE	14.19	14.22	225
461	p2208	n2425	7.91	n2485	7.942	9.4	0.34	HDPE	11.89	11.86	225
462	p2209	n2485	7.942	n2486	8.044	30	0.34	HDPE	11.86	11.48	225
463	p2210	n2486	8.044	n2487	8.168	36.6	0.34	HDPE	11.48	10.57	225
464	p2211	n2487	8.168	n2488	8.209	12	0.34	HDPE	10.57	10.38	225
465	p2212	n2488	8.209	n2489	8.248	11.4	0.34	HDPE	10.38	10.2	225
466	p2213	n2489	8.248	n2490	8.35	30	0.34	HDPE	10.2	9.61	225
467	p2214	n2490	8.35	n2491	8.38	9	0.34	HDPE	9.61	9.57	225
468	p2215	n2491	8.38	n2492	8.59	21	0.998	HDPE	9.57	9.78	225
469	p2216	n2492	8.59	n2493	9.05	30.4	1.511	HDPE	9.78	10.24	225
470	p2217	n2494	9.54	n2495	9.581	4.8	0.851	HDPE	10.73	10.84	225
471	p2218	n2495	9.581	n2496	9.62	11.6	0.34	HDPE	10.84	10.81	225
472	p2219	n2496	9.62	n2497	10.19	18.4	3.1	HDPE	10.81	11.38	225
473	p2220	n2497	10.19	n2498	11.32	30	3.769	HDPE	11.38	12.51	225
474	p2221	n2498	11.32	n2499	12.53	30	4.037	HDPE	12.51	13.72	225
475	p2222	n2499	12.53	n2500	13.03	30	1.667	HDPE	13.72	14.22	225
476	p2274	n2552	15.84	n2553	15.738	30	0.34	HDPE	17.03	16.98	225
477	p2275	n2554	15.66	n2555	15.33	15.7	2.098	HDPE	16.85	16.52	225
478	p2276	n2555	15.33	n2556	15.11	6.3	3.492	HDPE	16.52	16.3	225
479	p2277	n2556	15.11	n2557	14.61	20	2.5	HDPE	16.3	15.8	225
480	p2278	n2557	14.61	n2558	13.94	30	2.234	HDPE	15.8	15.13	225
481	p2279	n2558	13.94	n2559	12.73	29.9	4.047	HDPE	15.13	13.92	225
482	p2281	n2560	12.81	n2561	11.9	30	3.034	HDPE	14	13.09	225
483	p2282	n2561	11.9	n2562	11.08	30	2.734	HDPE	13.09	12.27	225
484	p2283	n2562	11.08	n2563	10.64	30	1.467	HDPE	12.27	11.83	225
485	p2284	n2563	10.64	n2564	10.26	30	1.267	HDPE	11.83	11.45	225
486	p2285	n2564	10.26	n2565	9.95	30	1.033	HDPE	11.45	11.14	225
487	p2286	n2565	9.95	n2566	9.73	30	0.733	HDPE	11.14	10.92	225
488	p2287	n2566	9.73	n2567	9.53	30	0.667	HDPE	10.92	10.72	225
489	p2288	n2567	9.53	n2568	9.428	30	0.34	HDPE	10.72	10.73	225
490	p2289	n2568	9.428	n2399	9.08	30	1.16	HDPE	10.73	10.27	225
491	p2290	n2569	14.56	n2570	13.77	19.8	3.982	HDPE	15.75	14.96	225
492	p2291	n2570	13.77	n2571	12.75	30	3.402	HDPE	14.96	13.94	225
493	p2292	n2571	12.75	n2572	11.7	30	3.504	HDPE	13.94	12.89	225

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494	p2293	n2572	11.7	n2573	10.93	30	2.568	HDPE	12.89	12.12	225
495	p2294	n2573	10.93	n2574	10.11	30	2.734	HDPE	12.12	11.3	225
496	p2295	n2574	10.11	n2575	9.31	30	2.668	HDPE	11.3	10.5	225
497	p2296	n2575	9.31	n2576	8.53	30	2.601	HDPE	10.5	9.72	225
498	p2297	n2576	8.53	n2577	7.46	30	3.569	HDPE	9.72	8.65	225
499	p2298	n2578	6.71	n2579	6.17	30	1.801	HDPE	7.9	7.36	225
500	p2299	n2389	8.05	n2580	8.49	30	1.467	HDPE	9.24	9.68	225
501	p2300	n2581	9.34	n2582	10.66	30	4.404	HDPE	10.53	11.85	225
502	p2301	n2582	10.66	n2583	12.14	30	4.94	HDPE	11.85	13.33	225
503	p2302	n2583	12.14	n2584	12.68	30	1.801	HDPE	13.33	13.87	225
504	p2303	n2584	12.68	n2585	13.08	30	1.333	HDPE	13.87	14.27	225
508	p2313	n2597	4.254	n2598	4.356	30	0.34	HDPE	7.55	6.32	225
509	p2314	n2598	4.356	n2599	4.458	30	0.34	HDPE	6.32	5.81	225
510	p2315	n2599	4.458	n2600	4.56	30	0.34	HDPE	5.81	5.75	225
511	p2316	n2600	4.56	n2601	4.8	30	0.8	HDPE	5.75	5.99	225
512	p2317	n2601	4.8	n2602	5.1	30	1	HDPE	5.99	6.29	225
513	p2318	n2602	5.1	n2603	5.218	30	0.393	HDPE	6.29	6.44	225
514	p2319	n2603	5.218	n2604	5.83	30	2.041	HDPE	6.44	7.02	225
515	p2320	n2604	5.83	n2579	6.17	27	1.258	HDPE	7.02	7.36	225
516	p2321	n2579	6.17	n2605	6.68	33.1	1.54	HDPE	7.36	7.87	225
517	p2322	n2605	6.68	n2606	7.3	30	2.067	HDPE	7.87	8.49	225
518	p2323	n2606	7.3	n2607	8.35	30	3.502	HDPE	8.49	9.54	225
519	p2324	n2607	8.35	n2608	9.415	21.3	5	HDPE	9.54	10.61	225
520	p2325	n2608	9.415	n2609	9.76	8.7	3.984	HDPE	10.61	10.95	225
521	p2326	n2609	9.76	n2610	10.82	30	3.536	HDPE	10.95	12.01	225
522	p2327	n2610	10.82	n2611	11.17	14.6	2.396	HDPE	12.01	12.36	225
523	p2328	n2611	11.17	n2612	11.672	10	5	HDPE	12.36	12.94	225
524	p2329	n2612	11.672	n2613	12.26	35.3	1.666	HDPE	12.94	13.45	225
525	p2330	n2613	12.26	n2614	12.38	30	0.4	HDPE	13.45	13.57	225
526	p2331	n2614	12.38	n2615	12.628	30	0.827	HDPE	13.57	14.09	225
527	p2332	n2615	12.628	n2559	12.73	30	0.34	HDPE	14.09	13.92	225
528	p2798	n3129	16.49	n3130	16.25	7.7	3.132	HDPE	17.68	17.44	225
529	p2799	n3130	16.25	n3131	15.22	30	3.436	HDPE	17.44	16.41	225
530	p2800	n3131	15.22	n3132	14.36	30	2.868	HDPE	16.41	15.55	225
531	p2801	n3132	14.36	n3133	13.57	30	2.634	HDPE	15.55	14.76	225
532	p2802	n3133	13.57	n3134	12.94	30	2.101	HDPE	14.76	14.13	225
533	p2803	n3134	12.94	n3135	11.57	30	4.571	HDPE	14.13	12.76	225
534	p2804	n3135	11.57	n3136	10.11	30	4.873	HDPE	12.76	11.3	225
535	p2805	n3136	9.577	n3137	8.08	29.9	5	HDPE	11.3	9.27	225
536	p2806	n3137	7.867	n3138	6.37	29.9	5	HDPE	9.27	7.56	225
537	p2807	n3138	6.37	n3139	6.17	27.3	0.732	HDPE	7.56	7.36	225
538	p2808	n3139	6.17	n3140	5.32	32.7	2.603	HDPE	7.36	6.51	225
539	p2809	n3140	5.32	n2603	5.218	30	0.34	HDPE	6.51	6.44	225
540	p5037	n5367	7.14	n2578	6.71	22.3	1.926	HDPE	8.33	7.9	225
541	p5038	n2577	7.46	n5367	7.14	7.7	4.181	HDPE	8.65	8.33	225
542	p5039	n5368	13.207	n2586	13.26	15.8	0.34	HDPE	14.42	14.45	225
543	p5040	n5368	13.207	n2585	13.08	14.2	0.889	HDPE	14.42	14.27	225
544	p5069	n2553	15.738	n2554	15.66	18	0.434	HDPE	16.98	16.85	225
545	p5193	n2581	9.34	n2580	8.49	30	2.834	HDPE	10.53	9.68	225
546	p5194	n2391	6.898	n2392	6.941	12.6	0.34	HDPE	8.48	8.27	225
547	p5195	n2394	7.12	n2395	7.54	30	1.4	HDPE	8.31	8.73	225
548	p5330	n2359	6.217	n2358	6.32	30.1	0.34	HDPE	10.07	10.28	225
549	p5356	n2308	11.6	n2266	11.87	30	0.9	HDPE	12.79	13.06	225
550	p5359	n2405	8.54	n2404	8.642	30	0.34	HDPE	11.05	10.91	225
551	p5360	n2409	11.08	n2410	11.36	30	0.933	HDPE	12.27	12.55	225

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552	p5361	n2415	11.04	n2414	11.32	30	0.933	HDPE	12.23	12.51	225
553	p5454	n2325	9.6	n2324	9.668	20	0.34	HDPE	11.86	11.85	225
554	p5455	n2323	9.749	n2322	9.77	6.4	0.34	HDPE	11.93	11.96	225
555	p5460	n2418	11.98	n5428	11.86	30	0.4	HDPE	13.17	13.05	225
556	p5461	n5428	11.86	n2419	11.74	30	0.4	HDPE	13.05	12.93	225
557	p5462	n2493	9.05	n2494	9.54	24.8	1.977	HDPE	10.24	10.73	225
558	p5463	n2469	14.24	n2468	14.69	30	1.5	HDPE	15.43	15.88	225
559	p5466	n2327	9.449	n2326	9.498	14.5	0.34	HDPE	11.91	11.89	225
560	p5494	n2319	10.076	n2318	10.178	30	0.34	HDPE	12.09	11.78	225
561	p5495	n2315	7	n2314	7.037	10.8	0.34	HDPE	11.29	11.3	225
562	p5496	n2314	7.037	n2438	7.05	3.8	0.34	HDPE	11.3	11.19	225
563	p5497	n2311	10.95	n2310	11.28	30	1.1	HDPE	12.14	12.47	225
564	p5504	n2263	12.366	n2262	12.424	17.1	0.34	HDPE	14.91	14.86	225
565	p5505	n2260	12.628	n2259	12.73	30	0.34	HDPE	13.96	13.92	225
566	p5551	n2356	7.31	n5451	7.412	30	0.34	HDPE	9.98	9.52	225
567	p5552	n5451	7.412	n5452	7.514	30	0.34	HDPE	9.52	9.28	225
568	p5553	n5452	7.514	n5453	7.616	30	0.34	HDPE	9.28	9.03	225
569	p5554	n5453	7.616	n5454	7.718	30	0.34	HDPE	9.03	9.09	225
570	p5555	n5454	7.718	n5455	7.82	30	0.34	HDPE	9.09	9.01	225
571	p5556	n5455	7.82	n5456	8.09	30	0.9	HDPE	9.01	9.28	225
572	p5557	n5456	8.09	n5457	8.7	30	2.034	HDPE	9.28	9.89	225
573	p5558	n5457	8.7	n5458	9.44	30	2.467	HDPE	9.89	10.63	225
575	p5560	n5460	12.73	n5461	13.06	30.1	1.1	HDPE	13.92	14.25	225
576	p5562	n5464	12.232	n2587	12.266	10.2	0.34	HDPE	14.53	14.48	225
577	p5563	n5463	12.028	n5465	12.13	30	0.34	HDPE	13.95	14.21	225
578	p5564	n5465	12.13	n5464	12.232	30	0.34	HDPE	14.21	14.53	225
581	p5567	n5470	4.008	n5471	4.11	30	0.34	HDPE	5.41	5.3	225
582	p5568	n5471	4.11	n5472	4.25	30	0.467	HDPE	5.3	5.44	225
584	p5570	n5475	4.31	n5476	4.208	30	0.34	HDPE	5.5	5.47	225
585	p5571	n5477	5.805	n5475	4.31	29.9	5	HDPE	7.85	5.5	225
586	p5572	n5478	7.046	n5477	5.805	30	4.14	HDPE	8.42	7.85	225
587	p5573	n5479	7.148	n5478	7.046	30	0.34	HDPE	8.37	8.42	225
588	p5574	n5480	7.25	n5479	7.148	30	0.34	HDPE	8.44	8.37	225
589	p5575	n5481	7.94	n5480	7.25	30	2.301	HDPE	9.13	8.44	225
590	p5576	n5482	8.71	n5481	7.94	30	2.568	HDPE	9.9	9.13	225
591	p5577	n5483	9.4	n5482	8.71	30	2.301	HDPE	10.59	9.9	225
592	p5578	n5484	10.12	n5483	9.4	30	2.401	HDPE	11.31	10.59	225
595	p5581	n5463	12.028	n5488	12.007	6.2	0.34	HDPE	13.95	13.94	225
596	p5582	n5488	12.007	n5489	11.905	30	0.34	HDPE	13.94	13.21	225
597	p5585	n5490	5.28	n5491	5.246	10	0.34	HDPE	9.78	9.26	225
598	p5586	n5491	5.246	n5492	5.144	30	0.34	HDPE	9.26	7.95	225
599	p5587	n5492	5.144	n5493	5.042	30	0.34	HDPE	7.95	7.19	225
602	p5590	n5496	4.841	n5497	4.58	30.8	0.844	HDPE	6.24	5.77	225
603	p5591	n5497	4.58	n5498	3.86	30	2.401	HDPE	5.77	5.05	225
604	p5592	n5498	3.86	n5499	3.33	30	1.767	HDPE	5.05	4.52	225
605	p5593	n5499	3.33	n5500	3.039	30	0.97	HDPE	4.52	4.25	225
606	p5594	n5500	3.039	n5501	2.937	30	0.34	HDPE	4.25	4.35	250
608	p5596	n5503	2.835	n5504	1.839	30	3.32	HDPE	4.28	4.18	250
609	p5597	n5504	1.839	n5505	1.941	30	0.34	HDPE	4.18	4.38	225
611	p5599	n5507	2.043	n5508	2.145	30	0.34	HDPE	4.44	4.53	225
612	p5600	n5508	2.145	n5509	2.247	30	0.34	HDPE	4.53	4.61	225
613	p5601	n5509	2.247	n5510	2.349	30	0.34	HDPE	4.61	4.71	225
614	p5602	n5510	2.349	n5511	2.451	30	0.34	HDPE	4.71	4.72	225
615	p5603	n5511	2.451	n5512	2.553	30	0.34	HDPE	4.72	4.75	225
616	p5604	n5512	2.553	n5513	2.655	30	0.34	HDPE	4.75	4.75	225

ID	Label	Start Node	Invert (Start) (m)	Stop Node	Invert (Stop) (m)	Length (Scaled) (m)	Slope (Calculated) (%)	Material	Elevation Ground (Start) (m)	Elevation Ground (Stop) (m)	Diameter (mm)
619	p5607	n5516	2.859	n5517	2.961	30	0.34	HDPE	4.66	4.72	225
620	p5608	n5517	2.961	n5518	3.063	30	0.34	HDPE	4.72	4.78	225
621	p5609	n5518	3.063	n5519	3.165	30	0.34	HDPE	4.78	4.97	225
622	p5610	n5519	3.165	n5520	3.267	30	0.34	HDPE	4.97	5.18	225
623	p5611	n5520	3.267	n5474	3.369	30	0.34	HDPE	5.18	5.46	225
624	p5612	n5468	3.899	n5521	3.777	35.9	0.34	HDPE	6.11	5.86	225
625	p5613	n5521	3.777	n5522	3.695	24.1	0.34	HDPE	5.86	5.8	225
626	p5614	n5522	3.695	n5523	3.593	30	0.34	HDPE	5.8	5.73	225
627	p5615	n5466	3.491	n5474	3.369	35.9	0.34	HDPE	5.66	5.46	225
628	p5616	n5458	9.44	n5524	10.85	29.5	4.773	HDPE	10.63	12.04	225
629	p5617	n5524	10.85	n5525	12.16	30.4	4.309	HDPE	12.04	13.35	225
633	CO-2	n5504	1.839	CW-2	1.778	19.7	0.313	HDPE	4.18	4.17	280
638	p5588(1)	n5493	5.042	MH-2	4.949	27.2	0.34	HDPE	7.19	7.054	225
642	p5589(2)(1)	MH-1	4.925	MH-4	4.886	11.4	0.34	HDPE	6.922	6.61	225
643	p5589(2)(2)	MH-4	4.886	n5496	4.841	13.5	0.34	HDPE	6.61	6.24	225
644	CO-4	MH-2	4.949	MH-1	4.925	7.1	0.34	HDPE	7.054	6.922	225
648	CO-10	n5501	2.937	n5503	2.835	30	0.34	HDPE	4.35	4.28	250
649	CO-12	n5505	1.941	n5507	2.043	30	0.34	HDPE	4.38	4.44	225
651	p5605(1)	n5513	2.655	MH-6	2.697	12.2	0.34	HDPE	4.75	4.726	225
654	p5606(1)	n5515	2.757	MH-7	2.8	12.4	0.34	HDPE	4.69	4.678	225
655	p5606(2)	MH-7	2.8	n5516	2.859	17.6	0.34	HDPE	4.678	4.66	225
656	CO-14	MH-6	2.697	n5515	2.757	17.8	0.34	HDPE	4.726	4.69	225
657	CO-16	n5468	3.899	n5470	4.008	32.1	0.34	HDPE	6.11	5.41	225
658	CO-18	n5466	3.491	n5523	3.593	30	0.34	HDPE	5.66	5.73	225
661	p5569(2)	MH-8	4.134	n5474	4.107	7.8	0.34	HDPE	5.463	5.46	225
662	CO-20	MH-8	4.134	n5476	4.208	22	0.34	HDPE	5.463	5.47	225
665	p5579(2)	MH-9	10.811	n5484	10.12	22.3	3.101	HDPE	12	11.31	225
666	CO-22	MH-9	10.811	n5487	11.05	7.7	3.109	HDPE	12	12.24	225
667	CO-24	n5487	11.05	n5489	11.905	30	2.85	HDPE	12.24	13.21	225
668	CO-26	n5525	12.16	n5460	12.73	30	1.901	HDPE	13.35	13.92	225
722	p2312(2)	LS 12	4.172	n2597	4.254	24.4	0.34	HDPE	9.186	7.55	225
740	p2305(1)(1)	n2587	12.266	MH-32	12.323	16.8	0.34	HDPE	14.48	13.513	225
756	p2052(1)	n2316	6.898	LS 10	6.806	27.1	0.34	HDPE	11.31	11.455	225
765	CO-30	MH-39	8.888	n2347	8.823	19.1	0.34	HDPE	10.94	10.93	225
768	p2113(2)	LS 11	6.235	n2385	6.326	27	0.34	HDPE	10.407	10.29	225
806	p1931	n2169	21.63	n2170	21.17	30	1.533	HDPE	22.82	22.36	225
807	p2012	n2268	12.3	n2269	13.28	30	3.269	HDPE	13.49	14.47	225
808	p2013	n2269	13.28	n2270	13.586	30	1.021	HDPE	14.47	14.98	225
809	p2014	n2270	13.586	n2271	13.688	30	0.34	HDPE	14.98	15.63	225
810	p2015	n2271	13.688	n2272	13.737	14.3	0.34	HDPE	15.63	15.32	225
811	p2016	n2272	13.737	n2273	13.79	15.6	0.34	HDPE	15.32	15.3	225
812	p2017	n2274	13.892	n2275	13.994	30	0.34	HDPE	15.43	15.58	225
813	p2018	n2275	13.994	n2276	14.096	30	0.34	HDPE	15.58	15.99	225
814	p2019	n2276	14.096	n2277	14.198	30	0.34	HDPE	15.99	16.41	225
815	p2020	n2277	14.198	n2278	14.264	19.3	0.34	HDPE	16.41	16.19	225
816	p2021	n2278	14.264	n2279	14.3	10.7	0.34	HDPE	16.19	15.49	225
817	p2023	n2281	7.44	n2282	7.368	21.2	0.34	HDPE	8.63	8.64	225
818	p2024	n2282	7.368	n2283	7.266	30	0.34	HDPE	8.64	8.61	225
819	p2025	n2283	7.266	n2284	7.241	7.5	0.34	HDPE	8.61	8.65	225
820	p2026	n2285	7.164	n2286	7.144	6	0.34	HDPE	8.73	8.72	225
821	p2027	n2286	7.144	n2287	7.062	24	0.34	HDPE	8.72	8.76	225
822	p2028	n2287	7.062	n2288	6.96	30	0.34	HDPE	8.76	8.66	225
823	p2029	n2288	6.96	n2289	6.858	30	0.34	HDPE	8.66	8.45	225
824	p2030	n2289	6.858	n2290	6.78	23.1	0.34	HDPE	8.45	8.7	225
825	p2031	n2290	6.78	n2291	6.761	5.4	0.34	HDPE	8.7	8.72	225

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826	p2032	n2291	6.761	n2292	6.654	31.5	0.34	HDPE	8.72	9.24	225
827	p2033	n2292	8.05	n2293	9.19	23.7	4.814	HDPE	9.24	10.38	225
828	p2034	n2293	9.19	n2294	11.71	29.9	8.431	HDPE	10.38	12.9	225
829	p2035	n2295	13.22	n2296	14.07	18.7	4.543	HDPE	14.41	15.26	225
830	p2036	n2297	15.15	n2298	16.33	30	3.936	HDPE	16.34	17.52	225
831	p2038	n2299	16.66	n2300	16.34	30	1.067	HDPE	17.85	17.53	225
832	p2039	n2300	16.34	n2301	15.86	30	1.601	HDPE	17.53	17.05	225
833	p2040	n2301	15.86	n2302	15.758	30	0.34	HDPE	17.05	17.74	225
834	p2041	n2302	15.758	n2303	15.35	30	1.362	HDPE	17.74	16.54	225
835	p2042	n2303	15.35	n2304	14.21	30	3.803	HDPE	16.54	15.4	225
836	p2043	n2268	12.3	n2305	12.08	30	0.733	HDPE	13.49	13.27	225
837	p2044	n2306	12.051	n2307	11.978	21.3	0.34	HDPE	13.33	14.1	225
838	p2045	n2307	11.978	n2304	11.891	25.6	0.34	HDPE	14.1	15.4	225
839	p2165	n2304	11.891	n2439	11.771	35.4	0.34	HDPE	15.4	13.93	225
840	p2166	n2439	11.771	n2440	11.688	24.6	0.34	HDPE	13.93	14.09	225
841	p2167	n2440	11.688	n2441	11.586	30	0.34	HDPE	14.09	13.8	225
842	p2168	n2441	11.586	n2442	10.52	29.9	3.561	HDPE	13.8	11.71	225
843	p2169	n2442	10.52	n2443	9.31	30	4.036	HDPE	11.71	10.5	225
844	p2170	n2443	9.31	n2444	7.82	30	4.973	HDPE	10.5	9.01	225
845	p2171	n2444	7.82	n2445	7.61	30	0.7	HDPE	9.01	8.8	225
846	p2172	n2445	7.61	n2446	7.508	30	0.34	HDPE	8.8	8.82	225
847	p2173	n2446	7.508	n2447	7.406	30	0.34	HDPE	8.82	8.91	225
848	p2174	n2447	7.406	n2448	7.044	19.2	1.884	HDPE	8.91	8.69	225
849	p2175	n2448	7.044	n2449	7.146	30	0.34	HDPE	8.69	8.61	225
850	p2176	n2449	7.146	n2450	7.248	30	0.34	HDPE	8.61	8.51	225
851	p2177	n2450	7.248	n2451	7.35	30	0.34	HDPE	8.51	8.54	225
852	p2178	n2451	7.35	n2452	7.49	23.4	0.597	HDPE	8.54	8.68	225
853	p2179	n2448	7.044	n2453	6.959	25.1	0.34	HDPE	8.69	8.68	225
854	p2180	n2453	6.959	n2454	7.59	30	2.105	HDPE	8.68	8.78	225
855	p2181	n2454	7.59	n2455	7.85	30	0.867	HDPE	8.78	9.04	225
856	p2182	n2456	8.16	n2457	8.4	19	1.263	HDPE	9.35	9.59	225
857	p2183	n2458	8.67	n2459	8.85	8.3	2.174	HDPE	9.86	10.04	225
858	p2184	n2459	8.85	n2460	9.98	30	3.769	HDPE	10.04	11.17	225
859	p2185	n2460	9.98	n2461	11.26	30	4.271	HDPE	11.17	12.45	225
860	p2186	n2461	11.26	n2462	12.21	30	3.169	HDPE	12.45	13.4	225
861	p2187	n2462	12.21	n2463	13.21	30	3.336	HDPE	13.4	14.4	225
862	p2188	n2463	13.21	n2464	14.83	30	5.407	HDPE	14.4	16.02	225
863	p2189	n2464	14.83	n2465	15.8	30	3.235	HDPE	16.02	16.99	225
864	p2225	n2292	6.654	n2501	6.552	30	0.34	HDPE	9.24	9.04	225
865	p2226	n2501	6.552	n2502	6.45	30	0.34	HDPE	9.04	8.89	225
866	p2227	n2502	6.45	n2503	6.348	30	0.34	HDPE	8.89	8.8	225
867	p2228	n2503	6.348	n2505	5.409	37.4	2.508	HDPE	8.8	8.73	225
868	p2230	n2505	5.409	n2506	5.511	30	0.34	HDPE	8.73	8.69	225
869	p2231	n2506	5.511	n2507	5.614	30.1	0.34	HDPE	8.69	8.75	225
870	p2232	n2507	5.614	n2508	5.644	8.9	0.34	HDPE	8.75	8.96	225
871	p2233	n2508	5.644	n2509	5.746	30	0.34	HDPE	8.96	8.84	225
872	p2234	n2509	5.746	n2510	5.848	30	0.34	HDPE	8.84	8.64	225
873	p2235	n2510	5.848	n2511	5.95	30	0.34	HDPE	8.64	8.61	225
874	p2236	n2511	5.95	n2512	6.052	30	0.34	HDPE	8.61	8.63	225
875	p2237	n2512	6.052	n2513	6.154	30	0.34	HDPE	8.63	8.49	225
876	p2238	n2514	6.204	n2515	6.256	15.1	0.34	HDPE	8.37	8.36	225
877	p2239	n2515	6.256	n2516	6.358	30	0.34	HDPE	8.36	8.29	225
878	p2240	n2516	6.358	n2517	6.402	12.9	0.34	HDPE	8.29	8.33	225
879	p2241	n2517	6.402	n2518	6.46	17.1	0.34	HDPE	8.33	8.3	225
880	p2242	n2518	6.46	n2519	6.562	30	0.34	HDPE	8.3	8.47	225

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881	p2243	n2519	6.562	n2520	6.664	30	0.34	HDPE	8.47	8.47	225
882	p2244	n2520	6.664	n2521	6.766	30	0.34	HDPE	8.47	8.43	225
883	p2245	n2521	6.766	n2522	6.868	30	0.34	HDPE	8.43	8.56	225
884	p2246	n2522	6.868	n2453	6.959	26.8	0.34	HDPE	8.56	8.68	225
885	p2247	n2508	5.644	n2523	7.89	30	7.488	HDPE	8.96	9.08	225
886	p2248	n2523	7.89	n2524	8	30	0.367	HDPE	9.08	9.19	225
887	p2249	n2524	8	n2525	9.05	30	3.504	HDPE	9.19	10.24	225
888	p2250	n2525	9.05	n2526	11.28	29.9	7.456	HDPE	10.24	12.47	225
889	p2251	n2526	11.28	n2527	11.83	12.8	4.294	HDPE	12.47	13.02	225
890	p2252	n2528	12.1	n2529	12.323	21	1.06	HDPE	13.29	13.56	225
891	p2253	n2529	12.323	n2530	12.664	35.6	0.955	HDPE	13.56	13.91	225
892	p2254	n2530	12.664	n2531	12.761	28.7	0.34	HDPE	13.91	14.72	225
893	p2255	n2531	12.761	n2532	14.42	30	5.532	HDPE	14.72	15.61	225
894	p2256	n2532	14.42	n2533	14.65	30	0.767	HDPE	15.61	15.84	225
895	p2257	n2533	14.65	n2534	14.832	30	0.607	HDPE	15.84	16.17	225
896	p2258	n2534	14.832	n2535	14.934	30	0.34	HDPE	16.17	16.53	225
897	p2259	n2536	15.036	n2537	15.138	30	0.34	HDPE	16.62	16.74	225
898	p2260	n2537	15.138	n2538	15.24	30	0.34	HDPE	16.74	16.43	225
899	p2341	n2622	24.62	n2623	23.52	30	3.669	HDPE	25.81	24.71	225
900	p2349	n2631	18.497	n2632	18.602	30.8	0.34	HDPE	20.23	21.53	225
901	p2350	n2632	18.602	n2633	20.67	30	6.894	HDPE	21.53	21.86	225
902	p2351	n2633	20.67	n2634	20.82	30	0.5	HDPE	21.86	22.01	225
903	p2352	n2634	20.82	n2635	21.093	30	0.908	HDPE	22.01	22.36	225
904	p2353	n2635	21.093	n2170	21.17	22.8	0.34	HDPE	22.36	22.36	225
905	p2354	n2632	18.602	n2636	18.682	23.4	0.34	HDPE	21.53	22.18	225
906	p2355	n2636	18.682	n2637	18.784	30	0.34	HDPE	22.18	22.82	225
907	p2356	n2637	18.784	n2638	18.886	30	0.34	HDPE	22.82	23.15	225
908	p2357	n2638	18.886	n2639	18.988	30	0.34	HDPE	23.15	23.14	225
909	p2358	n2639	18.988	n2640	19.09	30	0.34	HDPE	23.14	23.12	225
910	p2359	n2640	19.09	n2641	19.192	30	0.34	HDPE	23.12	23.11	225
911	p2360	n2641	19.192	n2642	19.294	30	0.34	HDPE	23.11	23.17	225
912	p2361	n2642	19.294	n2643	19.396	30	0.34	HDPE	23.17	23.63	225
913	p2362	n2643	19.396	n2644	19.43	10.2	0.34	HDPE	23.63	23.63	225
914	p2363	n2645	19.532	n2646	19.634	30	0.34	HDPE	22.88	22.26	225
915	p2364	n2646	19.634	n2647	19.736	30	0.34	HDPE	22.26	21.73	225
916	p2365	n2647	19.736	n2648	19.838	30	0.34	HDPE	21.73	21.35	225
917	p2366	n2648	19.838	n2649	19.94	30	0.34	HDPE	21.35	21.13	225
918	p2367	n2650	20.19	n2651	20.63	30	1.467	HDPE	21.38	21.82	225
919	p2368	n2651	20.63	n2652	21.15	30	1.733	HDPE	21.82	22.34	225
920	p2369	n2652	21.15	n2653	21.71	30	1.867	HDPE	22.34	22.9	225
921	p2370	n2653	21.71	n2654	22.24	30	1.767	HDPE	22.9	23.43	225
922	p2371	n2654	22.24	n2655	22.72	30	1.6	HDPE	23.43	23.91	225
923	p2372	n2655	22.72	n2656	23.35	30	2.101	HDPE	23.91	24.54	225
924	p2373	n2656	23.35	n2657	24	30	2.167	HDPE	24.54	25.19	225
925	p2374	n2657	24	n2658	24.232	30	0.774	HDPE	25.19	25.81	225
926	p2377	n2661	24.74	n2662	24.676	19	0.34	HDPE	25.93	26.08	225
927	p2378	n2662	24.676	n2663	24.595	23.7	0.34	HDPE	26.08	26.1	225
928	p2379	n2663	24.595	n2664	24.574	6.3	0.34	HDPE	26.1	25.98	225
929	p2380	n2664	24.574	n2665	24.03	30	1.811	HDPE	25.98	25.22	225
930	p2381	n2665	24.03	n2666	23.88	2.5	5.948	HDPE	25.22	25.07	225
931	p2382	n2666	23.686	n2667	23.82	39.5	0.34	HDPE	25.07	25.01	225
932	p2383	n2666	23.686	n2668	23.66	7	0.366	HDPE	25.07	24.85	225
933	p2384	n2668	23.66	n2669	23.14	30	1.733	HDPE	24.85	24.33	225
934	p2385	n2670	23.11	n2671	22.88	20.9	1.094	HDPE	24.33	24.07	225
935	p2386	n2671	22.88	n2672	22.778	30	0.34	HDPE	24.07	24.2	225

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937	p2393	n2679	22.675	n2680	23.73	30	3.52	HDPE	24.41	24.92	225
938	p2394	n2680	23.73	n2681	24.41	30	2.267	HDPE	24.92	25.6	225
939	p2395	n2681	24.41	n2682	25.27	30	2.868	HDPE	25.6	26.46	225
940	p2396	n2682	25.27	n2683	26.36	30	3.636	HDPE	26.46	27.55	225
941	p2397	n2683	26.36	n2684	27.09	28.6	2.556	HDPE	27.55	28.28	225
942	p2399	n2685	27.38	n2686	27.16	30	0.733	HDPE	28.57	28.35	225
943	p2400	n2686	27.16	n2687	26.31	30	2.834	HDPE	28.35	27.5	225
944	p2401	n2687	26.31	n2688	26.13	10.4	1.727	HDPE	27.5	27.32	225
945	p2402	n2689	26.064	n2690	25.981	24.5	0.34	HDPE	27.46	27.19	225
946	p2403	n2659	24.334	n2691	24.436	30	0.34	HDPE	26.32	26.51	225
947	p2404	n2692	24.538	n2693	24.64	30	0.34	HDPE	26.3	25.83	225
953	p2425	n2631	18.497	n2715	18.406	26.8	0.34	HDPE	20.23	20.77	225
954	p2426	n2715	18.406	n2716	18.304	30	0.34	HDPE	20.77	20.86	225
956	p2428	n2718	18.1	n2719	16.09	29.9	6.724	HDPE	19.56	17.28	225
957	p2429	n2719	14.35	n2720	11.39	29.6	10	HDPE	17.28	12.58	225
958	p2430	n2720	11.39	n2721	10.63	30	2.535	HDPE	12.58	11.82	225
959	p2431	n2721	10.63	n2722	10.528	30	0.34	HDPE	11.82	11.94	225
960	p2432	n2722	10.528	n2723	10.426	30	0.34	HDPE	11.94	11.92	225
964	p2436	n2726	14.05	n2727	13.998	15.4	0.34	HDPE	15.24	16.31	225
965	p2437	n2728	13.963	n2729	13.896	19.7	0.34	HDPE	16.26	16.45	225
966	p2438	n2729	13.896	n2730	13.794	30	0.34	HDPE	16.45	16.87	225
967	p2439	n2730	13.794	n2731	13.746	13.9	0.34	HDPE	16.87	16.78	225
968	p2440	n2731	13.746	n2732	13.692	16.1	0.34	HDPE	16.78	17.02	225
969	p2441	n2505	5.409	n2733	5.361	14.1	0.34	HDPE	8.73	9	225
970	p2442	n2733	5.361	n2734	5.307	15.9	0.34	HDPE	9	8.92	225
971	p2443	n2735	5.205	n2736	5.103	30	0.34	HDPE	8.88	8.8	225
972	p2444	n2736	5.103	n2737	5.001	30	0.34	HDPE	8.8	8.72	225
973	p2445	n2738	4.899	n2739	4.797	30	0.34	HDPE	8.68	8.62	225
974	p2446	n2739	4.797	n2740	4.695	30	0.34	HDPE	8.62	8.58	225
975	p2447	n2740	4.695	n2741	4.61	25.2	0.34	HDPE	8.58	8.53	225
976	p2448	n2741	4.61	n2742	7.111	30	8.339	HDPE	8.53	8.58	250
977	p2449	n2743	7.213	n2744	7.315	30	0.34	HDPE	8.66	8.82	250
978	p2450	n2744	7.315	n2745	7.417	30	0.34	HDPE	8.82	8.7	250
979	p2451	n2745	7.417	n2746	7.519	30	0.34	HDPE	8.7	8.73	250
980	p2452	n2746	7.519	n2747	7.709	29.8	0.637	HDPE	8.73	8.92	250
981	p2453	n2747	7.709	n2748	7.849	16.5	0.85	HDPE	8.92	9.06	250
982	p2454	n2748	7.849	n2749	8.119	13.7	1.977	HDPE	9.06	9.33	250
983	p2455	n2749	8.119	n2750	9.559	30	4.806	HDPE	9.33	10.77	250
984	p2456	n2750	9.559	n2751	11.279	30	5.743	HDPE	10.77	12.49	250
985	p2457	n2751	11.279	n2752	11.847	30	1.894	HDPE	12.49	13.21	250
986	p2458	n2752	11.847	n2753	11.949	30	0.34	HDPE	13.21	13.16	250
987	p2459	n2753	11.949	n2754	12.089	30	0.467	HDPE	13.16	13.3	250
988	p2460	n2754	12.089	n2755	12.559	30	1.567	HDPE	13.3	13.77	250
989	p2461	n2755	12.559	n2756	13.441	30	2.943	HDPE	13.77	14.78	250
990	p2462	n2756	13.441	n2757	13.53	26.2	0.34	HDPE	14.78	16.4	250
991	p2463	n2757	13.53	n2758	13.571	12	0.34	HDPE	16.4	16.58	250
992	p2464	n2758	13.571	n2759	13.632	18	0.34	HDPE	16.58	16.78	250
993	p2465	n2759	13.632	n2732	13.692	17.6	0.34	HDPE	16.78	17.02	250
994	p2466	n2732	15.83	n2760	16.7	30	2.902	HDPE	17.02	17.89	225
995	p2467	n2760	16.7	n2761	17.39	39.4	1.753	HDPE	17.89	18.58	225
996	p2468	n2761	17.39	n2762	17.85	20.6	2.231	HDPE	18.58	19.04	225
997	p2469	n2762	17.85	n2763	18.41	30	1.867	HDPE	19.04	19.6	225
998	p2470	n2764	18.95	n2765	19.56	30	2.034	HDPE	20.14	20.75	225
999	p2471	n2765	19.56	n2766	20.12	30	1.867	HDPE	20.75	21.31	225
1000	p2472	n2766	20.12	n2767	20.61	27.9	1.756	HDPE	21.31	21.8	225

ID	Label	Start Node	Invert (Start) (m)	Stop Node	Invert (Stop) (m)	Length (Scaled) (m)	Slope (Calculated) (%)	Material	Elevation Ground (Start) (m)	Elevation Ground (Stop) (m)	Diameter (mm)
1001	p2478	n2767	20.61	n2773	20.72	30	0.367	HDPE	21.8	22.16	225
1002	p2479	n2773	20.72	n2774	20.822	30	0.34	HDPE	22.16	22.2	225
1003	p2480	n2774	20.822	n2775	20.924	30	0.34	HDPE	22.2	22.16	225
1004	p2481	n2776	20.96	n2777	21.527	19.4	2.92	HDPE	22.15	22.79	225
1005	p2482	n2777	21.527	n2778	21.629	30	0.34	HDPE	22.79	23.82	225
1006	p2483	n2778	21.629	n2779	21.676	13.8	0.34	HDPE	23.82	24.06	225
1007	p2484	n2779	21.676	n2780	21.705	8.4	0.34	HDPE	24.06	24.15	225
1008	p2485	n2780	21.705	n2781	21.778	21.6	0.34	HDPE	24.15	24.45	225
1009	p2486	n2781	21.778	n2782	21.88	30	0.34	HDPE	24.45	24.8	225
1010	p2487	n2782	21.88	n2783	21.982	30	0.34	HDPE	24.8	25.22	225
1011	p2488	n2783	21.982	n2784	22.084	30	0.34	HDPE	25.22	24.98	225
1012	p2489	n2784	22.084	n2785	22.186	30	0.34	HDPE	24.98	24.25	225
1013	p2490	n2785	22.186	n2786	22.288	30	0.34	HDPE	24.25	23.9	225
1014	p2491	n2786	22.288	n2787	22.39	30	0.34	HDPE	23.9	23.72	225
1015	p2492	n2787	22.39	n2788	22.492	30	0.34	HDPE	23.72	24.15	225
1016	p2493	n2788	22.492	n2789	22.594	30	0.34	HDPE	24.15	24.53	225
1017	p2494	n2789	22.594	n2679	22.675	23.7	0.34	HDPE	24.53	24.41	225
1018	p2495	n2694	21.318	n2790	23.89	30	8.576	HDPE	25.2	25.08	225
1019	p2496	n2790	23.89	n2791	24.46	30	1.901	HDPE	25.08	25.65	225
1020	p2497	n2791	24.46	n2792	25.42	30	3.202	HDPE	25.65	26.61	225
1022	p2499	n2793	27.36	n2794	27.258	30	0.34	HDPE	28.55	28.52	225
1023	p2501	n2795	26.92	n2796	26.33	30	1.967	HDPE	28.11	27.52	225
1024	p2502	n2796	26.33	n2797	23.424	30	9.686	HDPE	27.52	27.02	225
1025	p2503	n2783	21.982	n2798	23.322	21.3	6.302	HDPE	25.22	25.95	225
1026	p2504	n2798	23.322	n2797	23.424	30	0.34	HDPE	25.95	27.02	225
1027	p2505	n2757	13.53	n2799	13.924	30	1.312	HDPE	16.4	15.84	225
1028	p2506	n2799	13.924	n2800	14.026	30	0.34	HDPE	15.84	15.46	225
1029	p2507	n2800	14.026	n2801	14.128	30	0.34	HDPE	15.46	15.43	225
1030	p2508	n2802	14.155	n2803	14.23	22	0.34	HDPE	15.57	16.16	225
1031	p2509	n2803	14.23	n2804	14.332	30	0.34	HDPE	16.16	16.92	225
1032	p2510	n2804	14.332	n2805	14.434	30	0.34	HDPE	16.92	17.26	225
1033	p2511	n2805	14.434	n2806	14.487	15.6	0.34	HDPE	17.26	17.41	225
1034	p2512	n2806	14.487	n2807	14.536	14.4	0.34	HDPE	17.41	17.9	225
1035	p2513	n2807	14.536	n2808	14.638	30	0.34	HDPE	17.9	17.61	225
1038	p2516	n2811	11.54	n2812	11.438	30	0.34	HDPE	12.73	13.92	225
1039	p2517	n2812	11.438	n2813	11.336	30	0.34	HDPE	13.92	14.5	225
1040	p2518	n2813	11.336	n2814	11.251	25.1	0.34	HDPE	14.5	15	225
1041	p2519	n2814	11.251	n2810	11.234	4.9	0.34	HDPE	15	15.04	225
1042	p2520	n2810	13.836	n2815	13.9	18.9	0.34	HDPE	15.04	15.09	225
1043	p2521	n2815	13.9	n2816	14.68	11	7.091	HDPE	15.09	15.87	225
1044	p2522	n2816	14.68	n2817	15.39	30	2.367	HDPE	15.87	16.58	225
1045	p2523	n2817	15.39	n2818	16.37	30	3.269	HDPE	16.58	17.56	225
1046	p2524	n2818	16.37	n2819	17.25	30	2.934	HDPE	17.56	18.44	225
1047	p2525	n2819	17.25	n2820	18.26	30	3.369	HDPE	18.44	19.45	225
1048	p2526	n2820	18.26	n2821	19.21	30	3.169	HDPE	19.45	20.4	225
1049	p2527	n2821	19.21	n2822	20.04	30	2.768	HDPE	20.4	21.23	225
1050	p2528	n2822	20.04	n2823	20.93	24.3	3.664	HDPE	21.23	22.12	225
1051	p2529	n2823	20.93	n2824	21.09	5.7	2.812	HDPE	22.12	22.28	225
1052	p2530	n2824	21.09	n2825	21.32	14.1	1.628	HDPE	22.28	22.51	225
1053	p2531	n2825	21.32	n2826	21.698	15.8	2.384	HDPE	22.51	23.01	225
1054	p2532	n2826	21.698	n2827	21.8	30	0.34	HDPE	23.01	22.99	225
1055	p2533	n2827	21.8	n2828	22.9	24	4.589	HDPE	22.99	24.09	225
1056	p2535	n2830	23.37	n2831	23.15	30	0.733	HDPE	24.56	24.34	225
1057	p2536	n2831	23.15	n2832	23.05	13.8	0.724	HDPE	24.34	24.24	225
1058	p2537	n2832	23.05	n2833	22.77	3.7	7.596	HDPE	24.24	23.96	225

ID	Label	Start Node	Invert (Start) (m)	Stop Node	Invert (Stop) (m)	Length (Scaled) (m)	Slope (Calculated) (%)	Material	Elevation Ground (Start) (m)	Elevation Ground (Stop) (m)	Diameter (mm)
1059	p2538	n2833	22.77	n2778	21.629	14	8.146	HDPE	23.96	23.82	225
1061	p2540	n2835	21.522	n2836	21.624	30	0.34	HDPE	24.63	24.32	225
1062	p2541	n2836	21.624	n2837	21.726	30	0.34	HDPE	24.32	23.97	225
1063	p2542	n2838	21.828	n2839	21.93	30	0.34	HDPE	23.58	23.12	225
1065	p2544	n2840	18.578	n2841	18.68	30	0.34	HDPE	22.61	22.1	225
1067	p2546	n2843	18.884	n2844	18.986	30	0.34	HDPE	21.48	21.12	225
1069	p2548	n2846	19.19	n2847	19.3	30	0.367	HDPE	20.38	20.49	225
1070	p2549	n2847	19.3	n2848	19.74	30	1.467	HDPE	20.49	20.93	225
1071	p2550	n2849	20.61	n2850	21.67	30	3.536	HDPE	21.8	22.86	225
1072	p2551	n2850	21.67	n2851	23.07	30	4.671	HDPE	22.86	24.26	225
1073	p2552	n2852	24.37	n2853	25.19	30	2.734	HDPE	25.56	26.38	225
1074	p2553	n2853	25.19	n2854	25.86	30	2.234	HDPE	26.38	27.05	225
1075	p2554	n2854	25.86	n2855	26.59	30	2.434	HDPE	27.05	27.78	225
1076	p2555	n2855	26.59	n2856	27.17	30	1.934	HDPE	27.78	28.36	225
1077	p2556	n2856	27.17	n2857	27.66	30	1.633	HDPE	28.36	28.85	225
1078	p2557	n2858	28.21	n2859	29.06	30	2.834	HDPE	29.4	30.25	225
1079	p2558	n2859	29.06	n2860	30.05	30	3.302	HDPE	30.25	31.24	225
1081	p2561	n2863	30.52	n2864	30.418	30	0.34	HDPE	31.71	31.84	225
1082	p2562	n2864	30.418	n2865	30.316	30	0.34	HDPE	31.84	31.88	225
1083	p2563	n2865	30.316	n2866	30.214	30	0.34	HDPE	31.88	31.83	225
1084	p2564	n2866	30.214	n2867	30.112	30	0.34	HDPE	31.83	31.38	225
1085	p2566	n2867	30.112	n2869	29.4	39.6	1.798	HDPE	31.38	30.59	225
1086	p2567	n2869	29.4	n2870	28.66	30	2.467	HDPE	30.59	29.85	225
1087	p2571	n2870	28.66	n2874	27.68	23.5	4.165	HDPE	29.85	28.87	225
1088	p2572	n2874	27.68	n2875	26.56	30	3.736	HDPE	28.87	27.75	225
1089	p2573	n2875	26.56	n2876	25.42	30	3.803	HDPE	27.75	26.61	225
1090	p2574	n2876	25.42	n2877	22.793	29.9	8.791	HDPE	26.61	24.32	225
1091	p2575	n2877	22.793	n2878	22.11	6.8	10	HDPE	24.32	23.3	225
1092	p2576	n2878	22.11	n2879	20.41	23	7.378	HDPE	23.3	21.6	225
1093	p2577	n2879	20.41	n2880	18.9	30	5.04	HDPE	21.6	20.09	225
1094	p2578	n2880	18.9	n2881	17.99	30	3.034	HDPE	20.09	19.18	225
1095	p2579	n2881	17.99	n2882	17.28	30	2.367	HDPE	19.18	18.47	225
1096	p2580	n2882	17.28	n2883	17.178	30	0.34	HDPE	18.47	18.58	225
1097	p2581	n2883	17.178	n2884	17.076	30	0.34	HDPE	18.58	19.34	225
1098	p2582	n2884	17.076	n2885	16.974	30	0.34	HDPE	19.34	20.24	225
1099	p2595	n2885	16.974	n2899	16.885	26.4	0.34	HDPE	20.24	21.31	225
1100	p2596	n2900	16.865	n2901	16.669	29.9	0.655	HDPE	21.04	18.34	225
1101	p2597	n2901	16.669	n2902	13.69	29.8	10	HDPE	18.34	14.88	225
1102	p2598	n2902	13.69	n2903	12.13	30	5.209	HDPE	14.88	13.32	225
1103	p2599	n2903	12.13	LS 14	11.76	30	1.234	HDPE	13.32	12.95	225
1115	p2611	n2916	21.18	n2917	20.33	30	2.835	HDPE	22.37	21.52	225
1116	p2612	n2917	20.33	n2918	19.05	26	4.931	HDPE	21.52	20.24	225
1117	p2613	n2918	19.05	n2919	18.47	30	1.934	HDPE	20.24	19.66	225
1118	p2614	n2920	18.14	n2921	17.18	17.9	5.354	HDPE	19.33	18.37	225
1119	p2615	n2921	17.18	n2922	16.41	30	2.568	HDPE	18.37	17.6	225
1120	p2616	n2922	16.41	n2923	16.308	30	0.34	HDPE	17.6	17.61	225
1122	p2618	n2924	19.62	n2925	21.13	18.2	8.31	HDPE	20.81	22.32	225
1124	p2621	n2927	18.937	n2928	18.978	12.2	0.34	HDPE	22.61	22.01	225
1125	p2622	n2928	18.978	n2929	19.08	29.9	0.34	HDPE	22.01	20.27	225
1126	p2623	n2929	19.08	n2930	19.47	30	1.301	HDPE	20.27	20.66	225
1127	p2624	n2930	19.47	n2931	21.46	29.9	6.649	HDPE	20.66	22.65	225
1128	p2625	n2931	21.46	n2932	23.14	29.9	5.609	HDPE	22.65	24.33	225
1129	p2627	n2933	23.73	n2934	23.628	30	0.34	HDPE	24.92	25.62	225
1130	p2628	n2934	23.628	n2935	23.526	30	0.34	HDPE	25.62	26.51	225
1131	p2629	n2935	23.526	n2797	23.424	30	0.34	HDPE	26.51	27.02	225

ID	Label	Start Node	Invert (Start) (m)	Stop Node	Invert (Stop) (m)	Length (Scaled) (m)	Slope (Calculated) (%)	Material	Elevation Ground (Start) (m)	Elevation Ground (Stop) (m)	Diameter (mm)
1132	p2630	n2861	30.81	n2936	31.67	30	2.868	HDPE	32	32.86	225
1133	p2631	n2936	31.67	n2937	32.57	30	3.001	HDPE	32.86	33.76	225
1134	p2632	n2938	33.61	n2939	34.72	30	3.702	HDPE	34.8	35.91	225
1135	p2633	n2940	35.91	n2941	36.83	23	4	HDPE	37.1	38.02	225
1136	p2634	n2941	36.83	n2942	37.86	30	3.436	HDPE	38.02	39.05	225
1137	p2635	n2942	37.86	n2943	39.17	30	4.371	HDPE	39.05	40.36	225
1138	p2636	n2943	39.17	n2944	40.75	30	5.274	HDPE	40.36	41.94	225
1139	p2637	n2944	40.75	n2945	42.16	30	4.705	HDPE	41.94	43.35	225
1140	p2638	n2945	42.16	n2946	43.27	30	3.702	HDPE	43.35	44.46	225
1141	p2639	n2946	43.27	n2947	44.62	30	4.505	HDPE	44.46	45.81	225
1142	p2640	n2947	44.62	n2948	46.16	30	5.14	HDPE	45.81	47.35	225
1143	p2641	n2948	46.16	n2949	47.58	30	4.738	HDPE	47.35	48.77	225
1144	p2642	n2949	47.58	n2950	48.59	30	3.369	HDPE	48.77	49.78	225
1145	p2643	n2950	48.59	n2951	49.16	30	1.901	HDPE	49.78	50.35	225
1146	p2644	n2951	49.16	n2952	49.312	30	0.507	HDPE	50.35	50.64	225
1147	p2645	n2952	49.312	n2953	49.414	30	0.34	HDPE	50.64	50.81	225
1148	p2646	n2953	49.414	n2954	49.516	30	0.34	HDPE	50.81	50.97	225
1149	p2647	n2954	49.516	n2955	49.618	30	0.34	HDPE	50.97	50.91	225
1150	p2648	n2955	49.618	n2956	49.72	30	0.34	HDPE	50.91	50.91	225
1151	p2649	n2956	49.72	n2957	49.91	30	0.633	HDPE	50.91	51.1	225
1152	p2650	n2958	50.55	n2959	51.89	30	4.471	HDPE	51.74	53.08	225
1153	p2651	n2959	51.89	n2960	52.75	30	2.868	HDPE	53.08	53.94	225
1154	p2652	n2960	52.75	n2961	53.48	30	2.434	HDPE	53.94	54.67	225
1155	p2653	n2961	53.48	n2962	54.2	30	2.401	HDPE	54.67	55.39	225
1156	p2654	n2962	54.2	n2963	55.02	30	2.734	HDPE	55.39	56.21	225
1157	p2655	n2963	55.02	n2964	55.75	30	2.434	HDPE	56.21	56.94	225
1158	p2656	n2964	55.75	n2965	56.51	30	2.534	HDPE	56.94	57.7	225
1159	p2657	n2965	56.51	n2966	57.26	30	2.501	HDPE	57.7	58.45	225
1160	p2658	n2966	57.26	n2967	58.3	30	3.469	HDPE	58.45	59.49	225
1161	p2659	n2967	58.3	n2968	59.54	30	4.137	HDPE	59.49	60.73	225
1162	p2660	n2968	59.54	n2969	60.59	30	3.502	HDPE	60.73	61.78	225
1163	p2661	n2969	60.59	n2970	61.36	30	2.568	HDPE	61.78	62.55	225
1164	p2662	n2970	61.36	n2971	62.2	30	2.801	HDPE	62.55	63.39	225
1165	p2663	n2971	62.2	n2972	63.12	30	3.068	HDPE	63.39	64.31	225
1166	p2664	n2972	63.12	n2973	64.25	30	3.769	HDPE	64.31	65.44	225
1167	p2665	n2973	64.25	n2974	65.56	30	4.371	HDPE	65.44	66.75	225
1168	p2666	n2974	65.56	n2975	66.89	30	4.438	HDPE	66.75	68.08	225
1169	p2667	n2975	66.89	n2976	68.19	30	4.338	HDPE	68.08	69.38	225
1170	p2668	n2976	68.19	n2977	69.47	30	4.271	HDPE	69.38	70.66	225
1171	p2669	n2977	69.47	n2978	70.79	30	4.404	HDPE	70.66	71.98	225
1172	p2670	n2978	70.79	n2979	71.252	30	1.541	HDPE	71.98	72.93	225
1173	p2671	n2979	71.252	n2980	71.331	23.2	0.34	HDPE	72.93	73.12	225
1174	p2672	n2980	71.331	n2981	71.456	36.7	0.34	HDPE	73.12	73.54	225
1175	p2673	n2981	71.456	n2982	71.558	30	0.34	HDPE	73.54	73.25	225
1176	p2674	n2982	71.558	n2983	71.66	30	0.34	HDPE	73.25	72.85	225
1177	p2675	n2983	71.66	n2984	71.84	30	0.6	HDPE	72.85	73.03	225
1178	p2676	n2984	71.84	n2985	72.68	30	2.801	HDPE	73.03	73.87	225
1179	p2677	n2986	74.68	n2987	75.162	30	1.608	HDPE	75.87	77.39	225
1180	p2678	n2987	75.162	n2988	75.264	30	0.34	HDPE	77.39	77.14	225
1181	p2679	n2988	75.264	n2989	75.34	22.4	0.34	HDPE	77.14	76.53	225
1182	p2680	n2990	37.4	n2991	37.78	30	1.267	HDPE	38.59	38.97	225
1183	p2681	n2992	38.13	n2993	38.35	30	0.733	HDPE	39.32	39.54	225
1184	p2682	n2994	38.55	n2995	38.89	30	1.133	HDPE	39.74	40.08	225
1185	p2683	n2995	38.89	n2996	39.46	30	1.901	HDPE	40.08	40.65	225
1186	p2684	n2997	40.17	n2998	41.08	30	3.034	HDPE	41.36	42.27	225

ID	Label	Start Node	Invert (Start) (m)	Stop Node	Invert (Stop) (m)	Length (Scaled) (m)	Slope (Calculated) (%)	Material	Elevation Ground (Start) (m)	Elevation Ground (Stop) (m)	Diameter (mm)
1187	p2685	n2998	41.08	n2999	41.76	30	2.267	HDPE	42.27	42.95	225
1188	p2686	n2999	41.76	n3000	42.03	15	1.8	HDPE	42.95	43.22	225
1189	p2707	n3024	41.03	n3025	40.35	8.3	8.149	HDPE	42.22	41.54	225
1190	p2708	n3025	40.35	n3026	39.49	30	2.869	HDPE	41.54	40.68	225
1191	p2709	n3026	39.49	n3027	38.263	30	4.094	HDPE	40.68	39.9	225
1192	p2710	n3027	38.263	n3028	35.99	22.7	10	HDPE	39.9	37.18	225
1193	p2711	n3029	32.97	n3030	32.42	19.1	2.877	HDPE	34.16	33.61	225
1194	p2712	n3030	32.42	n3031	32.318	30	0.34	HDPE	33.61	34.77	225
1195	p2713	n3031	32.318	n3032	32.217	30	0.34	HDPE	34.77	34.33	225
1196	p2714	n3032	32.217	n3033	31.99	30	0.755	HDPE	34.33	33.18	225
1197	p2715	n3033	31.99	n3034	30.91	30	3.602	HDPE	33.18	32.1	225
1198	p2716	n3034	30.91	n3035	29.84	30	3.569	HDPE	32.1	31.03	225
1199	p2717	n3035	29.84	n3023	29.01	30	2.768	HDPE	31.03	30.2	225
1200	p2718	n3023	29.01	n3036	28.08	30	3.103	HDPE	30.2	29.27	225
1201	p2719	n3036	28.08	n3037	27.46	30	2.067	HDPE	29.27	28.65	225
1202	p2720	n3037	27.46	n3038	26.5	30	3.202	HDPE	28.65	27.69	225
1203	p2721	n3038	26.5	n3039	25.98	30	1.734	HDPE	27.69	27.17	225
1204	p2722	n3039	25.98	n3040	25.74	30	0.8	HDPE	27.17	26.93	225
1205	p2723	n3040	25.74	n3041	25.28	28.8	1.596	HDPE	26.93	26.47	225
1206	p2724	n3042	43.242	n3043	40.26	29.8	10	HDPE	44.55	41.45	225
1207	p2725	n3043	40.26	n3044	37.97	29.9	7.656	HDPE	41.45	39.16	225
1208	p2726	n3044	37.97	n3045	36.01	29.9	6.549	HDPE	39.16	37.2	225
1209	p2727	n3045	36.01	n3046	34.61	30	4.671	HDPE	37.2	35.8	225
1210	p2728	n3046	34.61	n3047	33.66	30	3.169	HDPE	35.8	34.85	225
1211	p2729	n3047	33.66	n3048	32.72	30	3.135	HDPE	34.85	33.91	225
1212	p2730	n3048	32.72	n3049	31.67	30	3.502	HDPE	33.91	32.86	225
1213	p2731	n3049	31.67	n3050	30.87	30	2.668	HDPE	32.86	32.06	225
1214	p2732	n3050	30.87	n3051	30.49	30	1.267	HDPE	32.06	31.68	225
1215	p2733	n3051	30.49	n3052	30.37	30	0.4	HDPE	31.68	31.56	225
1216	p2734	n3052	30.37	n3053	30.12	30	0.833	HDPE	31.56	31.31	225
1217	p2735	n3053	30.12	n3054	28.74	30	4.606	HDPE	31.31	29.93	225
1218	p2736	n3054	28.74	n3055	26.67	29.9	6.916	HDPE	29.93	27.86	225
1219	p2737	n3055	26.67	n3056	25.6	30	3.569	HDPE	27.86	26.79	225
1220	p2738	n3041	25.28	n3057	23.604	29.9	5.596	HDPE	26.47	24.86	225
1221	p2739	n3057	23.604	n3058	20.62	29.8	10	HDPE	24.86	21.81	225
1222	p2740	n3059	16.44	n3060	15.03	30	4.708	HDPE	17.63	16.22	225
1223	p2741	n3060	15.03	n3061	14.9	30	0.433	HDPE	16.22	16.09	225
1224	p2742	n3061	14.9	n3062	14.74	30	0.533	HDPE	16.09	15.93	225
1225	p2743	n3062	14.74	n3063	15.29	30	1.834	HDPE	15.93	16.48	225
1226	p2744	n3063	15.29	n3064	16.74	23.6	6.144	HDPE	16.48	17.93	225
1227	p2745	n3064	16.74	n3065	17.12	7.1	5.336	HDPE	17.93	18.31	225
1228	p2746	n3066	17.28	n3067	18.11	30	2.768	HDPE	18.47	19.3	225
1229	p2747	n3067	18.11	n3068	19.49	30	4.605	HDPE	19.3	20.68	225
1230	p2748	n3068	19.49	n3069	20.28	30	2.634	HDPE	20.68	21.47	225
1231	p2749	n3069	20.28	n3070	22.68	29.9	8.029	HDPE	21.47	23.87	225
1232	p2750	n3070	22.68	n3071	22.938	30	0.861	HDPE	23.87	24.83	225
1233	p2751	n3071	22.938	n3072	23.024	25.1	0.34	HDPE	24.83	24.23	225
1234	p2752	n3073	23.04	n3074	23.49	30	1.501	HDPE	24.23	24.68	225
1235	p2753	n3064	16.74	n3075	17.77	14.6	7.045	HDPE	17.93	18.96	225
1236	p2754	n3075	17.77	n3076	19.88	29.9	7.05	HDPE	18.96	21.07	225
1237	p2755	n3076	19.88	n3077	20.47	30	1.967	HDPE	21.07	22.48	225
1238	p2756	n3077	20.47	n3078	20.572	30	0.34	HDPE	22.48	23.16	225
1239	p2757	n3078	20.572	n3079	20.69	34.9	0.34	HDPE	23.16	21.88	225
1240	p2758	n3079	20.69	n3080	21.69	25.1	3.982	HDPE	21.88	22.88	225
1242	p2760	n3081	23.59	n3082	24.14	19.3	2.848	HDPE	24.78	25.33	225

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1243	p2761	n3082	24.14	n3083	25.3	30	3.869	HDPE	25.33	26.49	225
1244	p2762	n3084	25.73	n3085	26.28	30	1.834	HDPE	26.92	27.47	225
1245	p2764	n3087	25.69	n3088	24.72	30	3.235	HDPE	26.88	25.91	225
1246	p2765	n3088	24.72	n3089	24.618	30	0.34	HDPE	25.91	25.85	225
1247	p2766	n3089	24.618	n3090	24.516	30	0.34	HDPE	25.85	26.59	225
1248	p2767	n3091	24.414	n3092	24.312	30	0.34	HDPE	27.34	27.48	225
1249	p2768	n3092	24.312	n3093	24.21	30	0.34	HDPE	27.48	26.95	225
1250	p2769	n3093	24.21	n3094	24.108	30	0.34	HDPE	26.95	26.28	225
1251	p2770	n3094	24.108	n3095	24.006	30	0.34	HDPE	26.28	25.47	225
1252	p2771	n3095	24.006	n3096	23.4	30	2.021	HDPE	25.47	24.59	225
1253	p2772	n3097	21.063	n3098	18.08	29.8	10	HDPE	22.43	19.27	225
1254	p2773	n3098	17.114	n3099	14.14	29.7	10	HDPE	19.27	15.33	225
1255	p2774	n3099	13.316	n3100	10.34	29.8	10	HDPE	15.33	11.53	225
1256	p2775	n3100	9.997	n3101	7.43	25.7	10	HDPE	11.53	8.62	225
1258	p2777	n3103	6	n3104	5.32	30	2.267	HDPE	7.19	6.51	225
1259	p2778	n3104	5.32	n3105	4.88	30	1.467	HDPE	6.51	6.07	225
1260	p2779	n3105	4.88	n3106	4.66	30	0.733	HDPE	6.07	5.85	225
1261	p2780	n3106	4.66	n3107	4.559	29.9	0.34	HDPE	5.85	6.12	225
1262	p2781	n3107	4.559	n3108	4.456	30.1	0.34	HDPE	6.12	5.99	225
1263	p2782	n3108	4.456	n3109	4.369	25.7	0.34	HDPE	5.99	5.97	225
1264	p2783	n3110	4.252	n3111	4.15	30	0.34	HDPE	6.08	6.26	225
1265	p2784	n3111	4.15	n3112	4.048	30	0.34	HDPE	6.26	6.38	225
1266	p2785	n3112	4.048	n3113	3.946	30	0.34	HDPE	6.38	6.51	225
1267	p2786	n3113	3.946	n3114	4.75	30	2.68	HDPE	6.51	6.79	225
1268	p2787	n3115	4.852	n3116	4.954	30	0.34	HDPE	7.01	7.01	225
1269	p2788	n3116	4.954	n3117	5.056	30	0.34	HDPE	7.01	6.84	225
1270	p2789	n3117	5.056	n3118	5.158	30	0.34	HDPE	6.84	6.6	225
1271	p2790	n3118	5.158	n3119	5.229	20.7	0.34	HDPE	6.6	6.52	225
1272	p2791	n3119	5.229	n3120	5.26	9.3	0.34	HDPE	6.52	6.45	225
1273	p2792	n3120	5.26	n3121	5.59	30	1.1	HDPE	6.45	6.78	225
1274	p2793	n3122	6.67	n3123	7.22	30	1.834	HDPE	7.86	8.41	225
1275	p2794	n3123	7.22	n3124	9.08	36.4	5.111	HDPE	8.41	10.27	225
1276	p2795	n3124	9.08	n3125	11.42	23.4	10	HDPE	10.27	12.91	225
1277	p2796	n3126	14.45	n3127	16.2	29.9	5.857	HDPE	15.64	17.39	225
1278	p2797	n3127	16.2	n3128	16.83	30.1	2.096	HDPE	17.39	18.02	225
1279	p2798	n3128	16.83	n3129	17.08	30	0.833	HDPE	18.02	18.27	225
1280	p2799	n3129	17.08	n3130	17.12	6.6	0.603	HDPE	18.27	18.31	225
1281	p2838	n3168	15.619	n3169	15.721	30	0.34	HDPE	17.45	17.88	225
1282	p2839	n3169	15.721	n3170	15.823	30	0.34	HDPE	17.88	17.7	225
1283	p2840	n3170	15.823	n3171	15.925	29.9	0.34	HDPE	17.7	19.49	225
1284	p2841	n3171	15.925	n3172	15.983	17	0.34	HDPE	19.49	19.63	225
1285	p2842	n3172	15.983	n3173	16.026	12.9	0.34	HDPE	19.63	18.6	225
1286	p2843	n3173	16.026	n3174	16.074	13.9	0.34	HDPE	18.6	17.32	225
1289	p2846	n2927	18.937	n3176	18.835	30	0.34	HDPE	22.61	23.39	225
1290	p2847	n3176	18.835	n3177	18.733	30	0.34	HDPE	23.39	23.26	225
1291	p2848	n3178	18.631	n3179	18.529	30	0.34	HDPE	22.66	21.25	225
1292	p2849	n3179	18.529	n3180	18.427	30	0.34	HDPE	21.25	20.23	225
1293	p2850	n3180	18.427	n3181	18.26	30	0.557	HDPE	20.23	19.45	225
1294	p2851	n3181	18.26	n3182	17.16	30	3.669	HDPE	19.45	18.35	225
1295	p2852	n3182	17.16	n3183	16.76	5.6	7.153	HDPE	18.35	17.95	225
1299	p2856	LS 20	7.329	n3189	7.414	25.2	0.34	HDPE	12.38	11.03	225
1300	p2857	n3189	7.414	n3190	7.516	30	0.34	HDPE	11.03	9.98	225
1302	p2859	n3192	7.72	n3193	8.18	30	1.533	HDPE	8.91	9.37	225
1303	p2860	n3193	8.18	n3194	9.46	30	4.271	HDPE	9.37	10.65	225
1304	p2861	n3194	9.46	n3195	11.45	29.9	6.649	HDPE	10.65	12.64	225

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1305	p2862	n3196	12.41	n3197	14.597	21.9	10	HDPE	13.6	16.02	225
1306	p2863	n3198	15.583	n3168	15.619	10.5	0.34	HDPE	17.55	17.45	225
1307	p2864	n2741	4.61	n3199	4.535	30	0.249	HDPE	8.53	8.36	315
1308	p2865	n3200	4.514	n3201	4.46	21.3	0.249	HDPE	8.31	8.23	315
1309	p2866	n3201	4.46	n3202	4.386	30	0.249	HDPE	8.23	8.02	315
1310	p2867	n3202	4.386	n3203	4.311	30	0.249	HDPE	8.02	7.95	315
1311	p2868	n3204	4.272	n3205	4.258	5.4	0.249	HDPE	7.91	7.73	315
1312	p2869	n3205	4.258	n3206	4.237	8.8	0.249	HDPE	7.73	7.68	315
1313	p2870	n3206	4.237	n3207	4.162	30	0.249	HDPE	7.68	7.72	315
1314	p2871	n3208	4.087	n3209	4.013	30	0.249	HDPE	7.55	7.71	315
1315	p2872	n3210	3.97	n3211	3.938	12.7	0.249	HDPE	7.65	7.64	315
1316	p2873	n3211	3.938	n3213	3.862	30.5	0.249	HDPE	7.64	7.47	315
1318	p2877	n3217	6.424	n3218	6.35	30	0.249	HDPE	7.69	7.66	315
1319	p2878	n3218	6.35	n3219	6.275	30	0.249	HDPE	7.66	7.62	315
1320	p2879	n3219	6.275	n3220	6.144	30	0.436	HDPE	7.62	7.41	315
1321	p2880	n3220	6.144	n3221	6.054	30	0.3	HDPE	7.41	7.32	315
1322	p2881	n3221	6.054	n3222	5.974	30	0.267	HDPE	7.32	7.24	315
1323	p2882	n3222	5.974	n3223	5.9	30	0.249	HDPE	7.24	7.35	315
1325	p2884	n3225	5.796	n3226	5.751	18.4	0.249	HDPE	7.41	7.5	315
1326	p2885	n3226	5.751	n3227	5.676	30	0.249	HDPE	7.5	7.73	315
1327	p2886	n3227	5.676	n3228	5.656	9.6	0.209	HDPE	7.73	8.06	355
1328	p2887	n3228	5.656	n3229	5.613	20.4	0.209	HDPE	8.06	8.08	355
1329	p2888	n3230	5.551	n3231	5.516	16.9	0.209	HDPE	7.88	8.01	355
1330	p2889	n3231	5.516	n3232	5.488	13.1	0.209	HDPE	8.01	7.96	355
1331	p2890	n3232	5.488	n3233	5.451	18	0.209	HDPE	7.96	7.88	355
1332	p2891	n3233	5.451	n3234	5.408	20.3	0.209	HDPE	7.88	8	355
1333	p2892	n3234	5.408	n3235	5.363	21.7	0.209	HDPE	8	8.1	355
1334	p2893	n3235	5.363	n3236	5.3	30	0.209	HDPE	8.1	8.36	355
1336	p2895	n3238	7.69	n3239	7.88	21.7	0.925	HDPE	8.88	9.07	225
1337	p2896	n3239	7.88	n3240	9.24	30	4.539	HDPE	9.07	10.43	225
1338	p2897	n3240	9.24	n3241	12.11	29.9	9.612	HDPE	10.43	13.3	225
1339	p2898	n3241	12.11	n3242	13.59	30	4.94	HDPE	13.3	14.78	225
1340	p2899	n3242	13.59	n3243	15.35	29.9	5.878	HDPE	14.78	16.54	225
1341	p2900	n3243	15.35	n3244	15.9	30	1.834	HDPE	16.54	17.09	225
1342	p2901	n3244	15.9	n3183	16.76	30	2.868	HDPE	17.09	17.95	225
1343	p2902	n3245	7.6	n3246	7.18	20.4	2.06	HDPE	8.79	8.37	225
1344	p2903	n3246	7.18	n3247	7.078	30	0.34	HDPE	8.37	8.32	225
1345	p2904	n3247	7.078	n3248	6.98	4.8	2.025	HDPE	8.32	8.17	225
1346	p2905	n3249	6.972	n3250	6.8	22.6	0.757	HDPE	8.17	7.99	225
1347	p2906	n3250	6.8	n3251	6.57	24.1	0.953	HDPE	7.99	7.76	225
1348	p2907	n3251	6.57	n3211	3.938	35.8	7.342	HDPE	7.76	7.64	225
1349	p2908	n2531	12.761	n3253	12.863	30	0.34	HDPE	14.72	14.77	225
1350	p2909	n3253	12.863	n3254	12.965	30	0.34	HDPE	14.77	14.36	225
1351	p2910	n3254	12.965	n3255	13.03	19.1	0.34	HDPE	14.36	14.23	225
1352	p2911	n3255	13.03	n3257	13.08	14.7	0.34	HDPE	14.23	14.27	225
1358	p2917	n3257	13.08	n3263	13.53	30.2	1.492	HDPE	14.27	14.72	225
1359	p2918	n3263	13.53	n3264	13.76	30	0.767	HDPE	14.72	14.95	225
1363	p2922	n3264	13.76	n3268	14.04	30	0.933	HDPE	14.95	15.23	225
1364	p2923	n3268	14.04	n3269	14.216	30	0.586	HDPE	15.23	15.84	225
1365	p2924	n3269	14.216	n3270	14.287	20.8	0.34	HDPE	15.84	15.69	225
1366	p2925	n3270	14.287	n3272	14.4	33.4	0.34	HDPE	15.69	15.59	225
1367	p2934	n3238	5.235	n3282	5.172	28.6	0.209	HDPE	8.88	8.56	355
1368	p2935	n3283	4.814	n3284	4.916	30	0.34	HDPE	8.45	8.19	225
1369	p2936	n3284	4.916	n3285	5.018	30	0.34	HDPE	8.19	8.08	225
1370	p2937	n3285	5.018	n3286	5.12	30	0.34	HDPE	8.08	7.87	225

ID	Label	Start Node	Invert (Start) (m)	Stop Node	Invert (Stop) (m)	Length (Scaled) (m)	Slope (Calculated) (%)	Material	Elevation Ground (Start) (m)	Elevation Ground (Stop) (m)	Diameter (mm)
1371	p2938	n3286	5.12	n3287	5.222	30	0.34	HDPE	7.87	7.73	225
1372	p2939	n3287	5.222	n3288	5.324	30	0.34	HDPE	7.73	7.65	225
1373	p2940	n3288	5.324	n3289	5.426	30	0.34	HDPE	7.65	7.53	225
1374	p2941	n3289	5.426	n3290	5.528	30	0.34	HDPE	7.53	7.57	225
1375	p2942	n3290	5.528	n3291	5.63	30	0.34	HDPE	7.57	7.85	225
1376	p2943	n3291	5.63	n3292	5.732	30	0.34	HDPE	7.85	7.37	225
1377	p2944	n3292	5.732	n3293	5.834	30	0.34	HDPE	7.37	7.25	225
1378	p2945	n3293	5.834	n3294	5.936	30	0.34	HDPE	7.25	7.22	225
1379	p2946	n3294	5.936	n3295	6.038	30	0.34	HDPE	7.22	7.23	225
1380	p2947	n3295	6.038	n3296	6.14	30	0.34	HDPE	7.23	7.33	225
1381	p2948	n3297	6.3	n3298	7.1	30	2.668	HDPE	7.49	8.29	225
1382	p2949	n3298	7.1	n3299	8.21	30	3.702	HDPE	8.29	9.4	225
1383	p2950	n3299	8.21	n3300	9.01	29.5	2.714	HDPE	9.4	10.2	225
1384	p2951	n3300	9.01	n3301	9.89	30.5	2.885	HDPE	10.2	11.08	225
1385	p2952	n3302	10.87	n3303	12.3	29.8	4.8	HDPE	12.06	13.49	225
1386	p2953	n3303	12.3	n3304	13.04	19.1	3.882	HDPE	13.49	14.23	225
1387	p2954	n3283	4.814	n3305	4.752	30	0.209	HDPE	8.45	8.46	355
1388	p2955	n3305	4.752	n3306	4.689	30	0.209	HDPE	8.46	8.45	355
1389	p2956	n3306	4.689	n3307	4.626	30	0.209	HDPE	8.45	8.35	355
1390	p2957	n3307	4.626	n3308	4.573	30	0.179	HDPE	8.35	8.27	400
1391	p2958	n3308	4.573	n3309	4.508	36	0.179	HDPE	8.27	8.23	400
1392	p2960	n3310	4.476	n3311	4.422	30	0.179	HDPE	7.99	8	400
1393	p2961	n3311	4.422	n3312	4.369	30	0.179	HDPE	8	8.2	400
1394	p2962	n3312	4.369	n3313	4.338	16.9	0.179	HDPE	8.2	7.95	400
1395	p2963	n3313	4.338	n3314	4.315	13.1	0.179	HDPE	7.95	8	400
1396	p2964	n3314	4.315	n3315	4.261	30	0.179	HDPE	8	7.84	400
1397	p2965	n3315	4.261	n3316	4.207	30	0.179	HDPE	7.84	7.65	400
1398	p2966	n3317	4.1	n3318	4.046	30	0.179	HDPE	7.43	7.4	400
1399	p2967	n3318	4.046	n3319	3.995	28.6	0.179	HDPE	7.4	7.09	400
1400	p2968	n3320	3.983	n3321	3.939	24.5	0.179	HDPE	7.11	6.98	400
1401	p2969	n3321	3.939	n3322	3.885	30	0.179	HDPE	6.98	6.89	400
1402	p2970	n3322	3.885	n3323	3.831	30	0.179	HDPE	6.89	7.06	400
1403	p2971	n3324	3.813	n3325	3.778	20.1	0.179	HDPE	6.98	6.71	400
1404	p2972	n3325	3.778	n3326	3.724	30	0.179	HDPE	6.71	6.74	400
1406	p2974	n3327	6.93	n3328	6.828	30	0.34	HDPE	8.12	8.06	225
1407	p2975	n3328	6.828	n3329	6.35	20.7	2.305	HDPE	8.06	7.54	225
1408	p2976	n3330	6.27	n3331	6.09	26.7	0.674	HDPE	7.46	7.28	225
1409	p2977	n3332	6.48	n3333	6.63	22.3	0.671	HDPE	7.67	7.82	225
1410	p2978	n3333	6.63	n3334	6.92	30	0.967	HDPE	7.82	8.11	225
1411	p2979	n3334	6.92	n3335	7.5	30	1.934	HDPE	8.11	8.69	225
1412	p2980	n3335	7.5	n3336	7.92	30	1.4	HDPE	8.69	9.11	225
1413	p2981	n3336	7.92	n3337	8.04	9	1.336	HDPE	9.11	9.23	225
1414	p2982	n3338	8.63	n3339	9.89	30	4.204	HDPE	9.82	11.08	225
1415	p2983	n3339	9.89	n3340	10.99	30	3.669	HDPE	11.08	12.18	225
1416	p2984	n3341	11.37	n3342	12.29	17.3	5.312	HDPE	12.56	13.48	225
1417	p2985	n3342	12.29	n3343	14.48	29.9	7.32	HDPE	13.48	15.67	225
1418	p2986	n3343	14.48	n3344	16.35	29.9	6.246	HDPE	15.67	17.54	225
1419	p2987	n3344	16.35	n3345	17.08	30	2.435	HDPE	17.54	18.61	225
1420	p2988	n3345	17.08	n3346	17.182	30	0.34	HDPE	18.61	19.46	225
1421	p2989	n3346	17.182	n3347	17.284	30	0.34	HDPE	19.46	19.73	225
1422	p2990	n3348	17.369	n3349	17.488	35	0.34	HDPE	19.65	19.25	225
1423	p2991	n3349	17.488	n3350	17.59	30	0.34	HDPE	19.25	18.78	225
1424	p2992	n3350	17.59	n3351	18.3	30	2.367	HDPE	18.78	19.49	225
1431	p2999	n3351	18.3	n3358	19.44	30	3.803	HDPE	19.49	20.63	225
1432	p3000	n3358	19.44	n3359	20.24	30	2.668	HDPE	20.63	21.43	225

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1433	p3001	n3359	20.24	n3360	21.04	30	2.668	HDPE	21.43	22.23	225
1434	p3002	n3360	21.04	n3361	21.96	30	3.068	HDPE	22.23	23.15	225
1435	p3003	n3361	21.96	n3081	23.59	53.2	3.067	HDPE	23.15	24.78	225
1436	p3005	n3362	17.094	n3363	17	30	0.313	HDPE	18.33	18.9	280
1437	p3006	n3364	5.987	n3365	5.885	30	0.34	HDPE	7.32	7.51	225
1438	p3007	n3365	5.885	n3366	5.783	30	0.34	HDPE	7.51	7.58	225
1439	p3008	n3366	5.783	n3367	5.681	30	0.34	HDPE	7.58	7.75	225
1440	p3009	n3367	5.681	n3368	5.601	23.4	0.34	HDPE	7.75	7.86	225
1441	p3010	n3369	5.579	n3370	5.477	30	0.34	HDPE	7.79	7.75	225
1442	p3011	n3370	5.477	n3371	5.375	30	0.34	HDPE	7.75	7.55	225
1443	p3012	n3371	5.375	n3372	5.3	22	0.34	HDPE	7.55	7.52	225
1444	p3013	n3372	5.3	n3373	5.273	8	0.34	HDPE	7.52	7.41	225
1445	p3014	n3373	5.273	n3374	5.171	30	0.34	HDPE	7.41	7.08	225
1446	p3015	n3374	5.171	n3326	3.724	30	4.823	HDPE	7.08	6.74	225
1447	p3016	n3326	3.724	n3375	3.678	25.4	0.179	HDPE	6.74	6.4	400
1448	p3017	n3375	5.21	n3376	5.28	7.7	0.905	HDPE	6.4	6.47	225
1449	p3018	n3376	5.28	n3377	5.5	30	0.733	HDPE	6.47	6.69	225
1450	p3019	n3377	5.5	n3378	6.2	30	2.334	HDPE	6.69	7.39	225
1451	p3020	n3378	6.2	n3379	7.5	30	4.338	HDPE	7.39	8.69	225
1452	p3021	n3379	7.5	n3380	9.92	29.9	8.096	HDPE	8.69	11.11	225
1453	p3022	n3380	9.92	n3381	12.904	29.8	10	HDPE	11.11	14.23	225
1454	p3023	n3381	12.904	n3382	15.79	29.9	9.665	HDPE	14.23	16.98	225
1455	p3024	n3382	15.79	n3383	17.31	30	5.073	HDPE	16.98	18.5	225
1456	p3026	n3384	16.906	n3385	16.224	32.7	2.084	HDPE	18.78	17.46	280
1457	p3027	n3385	16.224	n3386	14.704	16.4	9.24	HDPE	17.46	15.94	280
1458	p3028	n3386	14.704	n3387	13.548	31.3	3.689	HDPE	15.94	14.88	280
1459	p3029	n3387	13.548	n3388	12.344	12	10	HDPE	14.88	13.58	280
1460	p3030	n3388	12.344	n3389	9.824	29.9	8.431	HDPE	13.58	11.06	280
1461	p3031	n5364	8.404	n3391	7.334	37.8	2.833	HDPE	9.64	8.57	280
1462	p3032	n3392	6.019	n3393	5.834	19.2	0.964	HDPE	7.31	7.07	280
1463	p3033	n3393	5.834	n3394	5.764	10.8	0.648	HDPE	7.07	7	280
1464	p3034	n3394	3.538	n3395	3.64	30	0.34	HDPE	7	6.84	225
1465	p3035	n3395	3.64	n3396	3.742	30	0.34	HDPE	6.84	6.62	225
1466	p3036	n3396	3.742	n3397	3.776	10	0.34	HDPE	6.62	6.57	225
1467	p3037	n3398	3.844	n3113	3.946	30	0.34	HDPE	6.55	6.51	225
1468	p4851	n2985	72.68	n2986	74.68	29.9	6.682	HDPE	73.87	75.87	225
1470	p4910	n3195	11.45	n3196	12.244	7.9	10	HDPE	12.64	13.6	225
1471	p4911	n3197	14.597	n3198	15.583	15.7	6.263	HDPE	16.02	17.55	225
1472	p4912	n2919	18.47	n2920	18.14	12	2.743	HDPE	19.66	19.33	225
1474	p4916	n3347	17.284	n3348	17.369	25	0.34	HDPE	19.73	19.65	225
1475	p4917	n3065	17.12	n3066	17.28	30	0.533	HDPE	18.31	18.47	225
1476	p4918	n3058	19.41	n3059	16.44	29.7	10	HDPE	21.81	17.63	225
1477	p4919	n3056	25.6	n3041	25.28	24.3	1.315	HDPE	26.79	26.47	225
1478	p4920	n5351	44.33	n3042	43.242	29	3.756	HDPE	45.52	44.55	225
1479	p4921	n2997	40.17	n2996	39.46	30	2.367	HDPE	41.36	40.65	225
1480	p5004	n3177	18.733	n3178	18.631	30	0.34	HDPE	23.26	22.66	225
1484	p5008	n3282	5.172	n3283	4.814	14.4	2.492	HDPE	8.56	8.45	355
1485	p5009	n3229	5.613	n5359	5.563	24.4	0.209	HDPE	8.08	7.91	355
1486	p5010	n5359	5.563	n3230	5.551	5.6	0.209	HDPE	7.91	7.88	355
1487	p5011	n3028	34.741	n3029	32.97	17.7	10	HDPE	37.18	34.16	225
1488	p5015	n2993	38.35	n2994	38.55	30	0.667	HDPE	39.54	39.74	225
1489	p5019	n3109	4.369	n5361	4.316	15.6	0.34	HDPE	5.97	6.08	225
1490	p5020	n5361	4.316	n3110	4.252	18.7	0.34	HDPE	6.08	6.08	225
1491	p5021	n3114	4.75	n3115	4.852	30	0.34	HDPE	6.79	7.01	225
1492	p5022	n3121	5.59	n5362	5.86	20.4	1.322	HDPE	6.78	7.05	225

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1493	p5023	n5363	6.21	n3122	6.67	21.7	2.117	HDPE	7.4	7.86	225
1494	p5024	n3125	11.72	n3126	14.45	29.9	9.14	HDPE	12.91	15.64	225
1495	p5025	n3363	17	n3384	16.906	30	0.313	HDPE	18.9	18.78	280
1496	p5026	n3389	9.824	n5364	8.404	22.2	6.405	HDPE	11.06	9.64	280
1497	p5028	n5365	6.054	n3392	6.019	11.2	0.313	HDPE	7.29	7.31	280
1498	p5029	n5366	6.364	n5365	6.054	18.8	1.651	HDPE	7.6	7.29	280
1499	p5030	n5367	6.804	n5366	6.364	30	1.465	HDPE	8.04	7.6	280
1500	p5031	n3391	7.334	n5367	6.804	30	1.767	HDPE	8.57	8.04	280
1501	p5032	n3398	3.844	n3397	3.776	19.9	0.34	HDPE	6.55	6.57	225
1502	p5033	n3368	5.601	n3369	5.579	6.6	0.34	HDPE	7.86	7.79	225
1503	p5034	n3331	6.09	n5368	6.04	11	0.457	HDPE	7.28	7.23	225
1504	p5035	n3364	5.987	n5368	6.04	15.8	0.34	HDPE	7.32	7.23	225
1505	p5036	n3331	6.09	n3332	6.48	11.3	3.454	HDPE	7.28	7.67	225
1507	p5038	n3316	4.207	n5369	4.166	23.2	0.179	HDPE	7.65	7.47	400
1508	p5039	n5370	4.138	n3317	4.1	21	0.179	HDPE	7.32	7.43	400
1509	p5040	n5370	4.138	n5369	4.166	15.7	0.179	HDPE	7.32	7.47	400
1510	p5041	n3323	3.831	n3324	3.813	9.9	0.179	HDPE	7.06	6.98	400
1511	p5042	n3296	6.14	n3297	6.3	30	0.533	HDPE	7.33	7.49	225
1512	p5058	n2957	49.91	n2958	50.55	30	2.134	HDPE	51.1	51.74	225
1513	p5059	n2688	26.13	n2689	26.064	19.6	0.34	HDPE	27.32	27.46	225
1514	p5060	n2801	14.128	n2802	14.155	8	0.34	HDPE	15.43	15.57	225
1515	p5061	n2727	13.998	n2728	13.963	10.3	0.34	HDPE	16.31	16.26	225
1517	p5148	n2992	38.13	n2991	37.78	30	1.167	HDPE	39.32	38.97	225
1518	p5149	n2990	37.4	n2941	36.83	30	1.901	HDPE	38.59	38.02	225
1519	p5150	n2939	34.72	n2940	35.91	30	3.969	HDPE	35.91	37.1	225
1520	p5151	n2938	33.61	n2937	32.57	30	3.469	HDPE	34.8	33.76	225
1521	p5152	n2860	30.05	n2861	30.81	21.4	3.558	HDPE	31.24	32	225
1522	p5153	n2857	27.66	n2858	28.21	30	1.834	HDPE	28.85	29.4	225
1523	p5155	n2718	18.1	n5390	18.203	30.2	0.34	HDPE	19.56	20.58	225
1524	p5156	n2643	22.44	n2623	23.52	25.5	4.239	HDPE	23.63	24.71	225
1525	p5157	n2644	19.43	n2645	19.532	30	0.34	HDPE	23.63	22.88	225
1526	p5158	n2649	19.94	n2650	20.19	30	0.833	HDPE	21.13	21.38	225
1528	p5160	n2669	23.14	n2670	23.11	9	0.34	HDPE	24.33	24.33	225
1529	p5161	n2775	20.924	n2776	20.96	10.6	0.34	HDPE	22.16	22.15	225
1530	p5162	n2764	18.95	n2763	18.41	30	1.8	HDPE	20.14	19.6	225
1531	p5163	n2690	25.981	n2792	25.42	15.1	3.708	HDPE	27.19	26.61	225
1533	p5165	n2691	24.436	n2692	24.538	30	0.34	HDPE	26.51	26.3	225
1534	p5166	n2658	24.232	n2659	24.334	30	0.34	HDPE	25.81	26.32	225
1535	p5168	n2837	21.726	n2838	21.828	30	0.34	HDPE	23.97	23.58	225
1536	p5169	n5391	18.778	n2843	18.884	31.3	0.34	HDPE	21.8	21.48	225
1538	p5171	n2848	19.74	n2849	20.61	30	2.901	HDPE	20.93	21.8	225
1539	p5172	n2851	23.07	n2852	24.37	30	4.338	HDPE	24.26	25.56	225
1540	p5173	n3203	4.311	n3204	4.272	15.8	0.249	HDPE	7.95	7.91	315
1541	p5174	n3248	6.98	n3249	6.972	2.5	0.34	HDPE	8.17	8.17	225
1542	p5176	n3213	3.862	n3215	3.809	21.4	0.249	HDPE	7.47	7.53	315
1543	p5177	n3215	3.809	n3216	3.796	5.2	0.249	HDPE	7.53	7.51	315
1544	p5178	n5392	3.993	n3210	3.97	9.5	0.249	HDPE	7.75	7.65	315
1545	p5179	n3209	4.013	n5392	3.993	7.8	0.249	HDPE	7.71	7.75	315
1546	p5180	n5393	4.109	n3208	4.087	8.5	0.249	HDPE	7.52	7.55	315
1547	p5181	n3207	4.162	n5393	4.109	21.5	0.249	HDPE	7.72	7.52	315
1548	p5182	n3200	4.514	n3199	4.535	8.7	0.249	HDPE	8.31	8.36	315
1549	p5183	n2742	7.111	n2743	7.213	30	0.34	HDPE	8.58	8.66	250
1550	p5184	n2737	5.001	n2738	4.899	30	0.34	HDPE	8.72	8.68	225
1551	p5185	n2455	7.85	n2456	8.16	11	2.821	HDPE	9.04	9.35	225
1552	p5186	n2457	8.4	n2458	8.67	21.7	1.243	HDPE	9.59	9.86	225

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1553	p5187	n2513	6.154	n2514	6.204	14.9	0.34	HDPE	8.49	8.37	225
1554	p5189	n3073	23.04	n3072	23.024	4.9	0.34	HDPE	24.23	24.23	225
1555	p5190	n3084	25.73	n3083	25.3	30	1.433	HDPE	26.92	26.49	225
1556	p5191	n3091	24.414	n3090	24.516	30	0.34	HDPE	27.34	26.59	225
1557	p5192	n3097	21.063	n3096	23.4	29.9	7.811	HDPE	22.43	24.59	225
1558	p5193	n3340	10.99	n3341	11.37	12.6	3.004	HDPE	12.18	12.56	225
1559	p5194	n3337	8.04	n3338	8.63	21	2.808	HDPE	9.23	9.82	225
1560	p5195	n3302	10.87	n3301	9.89	30.2	3.249	HDPE	12.06	11.08	225
1562	p5205	n2529	12.323	n5397	12.37	13.8	0.34	HDPE	13.56	13.56	225
1563	p5206	n5398	11.91	n2528	12.1	8.9	2.131	HDPE	13.1	13.29	225
1564	p5207	n5398	11.91	n2527	11.83	8.3	0.969	HDPE	13.1	13.02	225
1565	p5208	n2536	15.036	n2535	14.934	30	0.34	HDPE	16.62	16.53	225
1566	p5209	n2734	5.307	n2735	5.205	30	0.34	HDPE	8.92	8.88	225
1567	p5210	n2284	7.241	n2285	7.164	22.5	0.34	HDPE	8.65	8.73	225
1568	p5211	n5399	7.66	n2281	7.44	14.7	1.493	HDPE	8.85	8.63	225
1569	p5362	n2294	11.71	n2295	13.22	17.7	8.512	HDPE	12.9	14.41	225
1570	p5363	n2297	15.15	n2296	14.07	23.4	4.608	HDPE	16.34	15.26	225
1571	p5365	n2305	12.08	n2306	12.051	8.6	0.34	HDPE	13.27	13.33	225
1572	p5366	n2899	16.885	n2900	16.865	5.7	0.34	HDPE	21.31	21.04	225
1573	p5466	n5363	6.21	n5362	5.86	17.8	1.961	HDPE	7.4	7.05	225
1574	p5467	n3320	3.983	n3319	3.995	6.9	0.179	HDPE	7.11	7.09	400
1575	p5533	n2273	13.79	n2274	13.892	30	0.34	HDPE	15.3	15.43	225
1576	p5543	n5441	7.91	n5399	7.66	25.3	0.989	HDPE	9.1	8.85	225
1578	CO-2	n3103	6	n3101	7.43	33.4	4.276	HDPE	7.19	8.62	225
1579	CO-4	n2716	18.304	n5390	18.203	29.7	0.34	HDPE	20.86	20.58	225
1580	CO-6	n2679	22.675	n2672	22.778	30.5	0.34	HDPE	24.41	24.2	225
1582	CO-8	n3394	3.538	MH-1	3.407	63	0.209	HDPE	7	6.5	355
1584	CO-10	MH-1	3.407	MH-2	3.288	56.8	0.209	HDPE	6.5	6	355
1586	CO-12	n3375	3.678	MH-3	3.58	55.1	0.179	HDPE	6.4	6	400
1587	CO-14	MH-3	3.58	MH-2	3.288	49.3	0.592	HDPE	6	6	400
1589	CO-16	MH-2	3.288	CW-3	3.224	48.9	0.132	HDPE	6	5	500
1592	CO-18	n5391	18.778	n2841	18.68	28.6	0.34	HDPE	21.8	22.1	225
1602	CO-22	n3062	14.74	LS 13	14.31	20.7	2.075	HDPE	15.93	15.5	225
1606	CO-24	n3310	4.476	n3309	4.508	17.9	0.179	HDPE	7.99	8.23	400
1612	CO-26	n3329	6.35	n3330	6.27	9.3	0.865	HDPE	7.54	7.46	225
1617	CO-32	n2925	21.13	MH-10	21.26	11.7	1.109	HDPE	22.32	22.45	225
1627	CO-36	n2795	26.92	n2794	27.258	29.9	1.129	HDPE	28.11	28.52	225
1651	CO-46	n2924	19.24	n2923	16.42	28.2	10	HDPE	20.81	17.61	225
1659	p2547(2)	MH-11	19.103	n2846	19.19	25.8	0.34	HDPE	20.647	20.38	225
1660	CO-48	MH-11	19.103	n2844	18.986	34.2	0.34	HDPE	20.647	21.12	225
1661	CO-50	n2835	21.522	n2694	21.318	60	0.34	HDPE	24.63	25.2	225
1663	p2433(1)	n2723	10.426	MH-12	10.333	27.5	0.34	HDPE	11.92	12.314	225
1665	CO-52	MH-12	10.333	n2725	10.223	32.3	0.34	HDPE	12.314	13.75	225
1669	CO-54	MH-13	14.749	n2808	14.638	32.7	0.34	HDPE	15.938	17.61	225
1671	p2883(1)	n3223	5.9	MH-14	5.829	28.5	0.249	HDPE	7.35	7.407	315
1673	CO-56	MH-14	5.829	n3225	5.796	13	0.249	HDPE	7.407	7.41	315
1687	p2845(2)	MH-19	16.132	n2923	16.308	17.7	0.996	HDPE	17.322	17.61	225
1688	CO-62	MH-19	16.132	n3174	16.074	17.3	0.34	HDPE	17.322	17.32	225
1691	p4909(2)	MH-20	7.627	n3192	7.72	27.4	0.34	HDPE	9.111	8.91	225
1692	CO-64	MH-20	7.627	n3190	7.516	32.6	0.34	HDPE	9.111	9.98	225
1698	p5007(1)	n3236	5.3	MH-22	5.284	8	0.209	HDPE	8.36	8.552	355
1700	CO-68	MH-22	5.284	n3238	5.235	23.2	0.209	HDPE	8.552	8.88	355
1739	p2543(2)	LS 15	18.486	n2840	18.578	27.1	0.34	HDPE	23.072	22.61	225
1742	p2405(2)	LS 16	21.227	n2694	21.318	27	0.34	HDPE	25.766	25.2	225
1744	p2435(1)	n2725	10.223	LS 17	10.204	5.4	0.34	HDPE	13.75	14.31	225

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1748	2515(2)(2)	LS 18	11.198	n2810	11.234	10.6	0.34	HDPE	15.734	15.04	225
1750	p2876(1)	n3216	3.796	LS 19	3.753	17.4	0.249	HDPE	7.51	7.672	315
327	p37	n47	10.281	n48	10.208	21.4	0.34	HDPE	13.66	13.72	225
328	p38	n48	10.208	LS 22	10.106	30	0.34	HDPE	13.72	14.03	225
330	p40	n50	12.891	n51	12.789	30	0.34	HDPE	14.92	15.9	225
331	p41	n52	12.755	n53	12.712	30	0.143	HDPE	16.05	16.11	500
332	p42	n53	12.712	n54	12.669	30	0.143	HDPE	16.11	15.78	500
333	p43	n54	12.669	n55	12.626	30	0.143	HDPE	15.78	15.18	500
334	p44	n56	12.287	n57	13.36	30	3.578	HDPE	13.85	14.55	225
335	p46	n55	12.626	n58	12.408	30	0.728	HDPE	15.18	13.83	500
336	p47	n59	10.818	n60	9.32	30	5	HDPE	12.33	10.74	500
337	p48	n60	9.098	n61	7.6	29.9	5	HDPE	10.74	9.02	500
338	p49	n61	7.6	n62	6.14	30	4.873	HDPE	9.02	7.56	500
339	p50	n62	6.14	n63	5.18	30	3.202	HDPE	7.56	6.6	500
340	p51	n63	5.18	n64	4.41	30	2.568	HDPE	6.6	5.83	500
341	p798	n47	10.281	n888	10.383	30	0.34	HDPE	13.66	13.95	225
342	p799	n888	10.383	n889	10.485	30	0.34	HDPE	13.95	14.36	225
343	p800	n889	10.485	n891	10.61	36.9	0.34	HDPE	14.36	13.95	225
344	p801	n892	13.066	n893	13.168	30	0.34	HDPE	14.6	14.69	225
345	p803	n895	12.85	n896	13.01	30	0.534	HDPE	14.04	14.2	225
346	p804	n896	13.01	n897	13.75	30	2.467	HDPE	14.2	14.94	225
347	p805	n897	13.75	n898	14.32	30	1.901	HDPE	14.94	15.51	225
348	p806	n899	14.83	n900	14.728	30	0.34	HDPE	16.02	16.09	225
349	p807	n900	14.728	n901	14.626	30	0.34	HDPE	16.09	15.92	225
350	p808	n901	14.626	n51	14.511	33.9	0.34	HDPE	15.92	15.9	225
351	p809	n56	12.287	n902	13.357	32.2	3.32	HDPE	13.85	14.55	225
352	p810	n902	13.357	n903	13.459	30	0.34	HDPE	14.55	14.94	225
353	p811	n904	13.561	n905	13.65	26.3	0.34	HDPE	15.06	14.84	225
354	p813	n906	12.843	n908	11.25	31.9	5	HDPE	14.59	12.44	225
355	p814	n908	11.25	n909	10.46	30	2.634	HDPE	12.44	11.65	225
356	p815	n909	10.46	n910	9.48	30	3.27	HDPE	11.65	10.67	225
357	p816	n910	9.48	n911	8.95	30	1.767	HDPE	10.67	10.14	225
358	p818	n912	8.84	n914	8.53	30	1.033	HDPE	10.03	9.72	225
359	p819	n914	8.53	n915	8.428	30	0.34	HDPE	9.72	9.8	225
360	p820	n915	8.428	n916	8.326	30	0.34	HDPE	9.8	10.07	225
361	p821	n916	8.326	n917	8.224	30	0.34	HDPE	10.07	10.76	225
362	p822	n917	8.224	n918	8.146	23	0.34	HDPE	10.76	12	225
363	p823	n918	8.146	n919	8.044	30	0.34	HDPE	12	12.7	225
364	p824	n919	8.044	n920	7.942	29.9	0.34	HDPE	12.7	11.04	225
365	p825	n920	7.942	n921	7.923	5.6	0.34	HDPE	11.04	10.77	225
366	p826	n921	7.923	n922	7.84	24.4	0.34	HDPE	10.77	10.46	225
367	p827	n923	7.738	n924	7.7	5.9	0.643	HDPE	8.94	8.89	225
368	p828	n924	7.7	n925	7.619	24	0.34	HDPE	8.89	9.33	225
369	p829	n925	7.619	n926	7.28	30	1.129	HDPE	9.33	8.47	225
370	p830	n926	7.28	n927	7.12	30	0.533	HDPE	8.47	8.31	225
371	p831	n927	7.12	n928	7.04	15.5	0.517	HDPE	8.31	8.23	225
372	p832	n928	7.04	n929	6.991	14.5	0.34	HDPE	8.23	8.25	225
373	p833	n929	6.991	n930	6.933	17	0.34	HDPE	8.25	8.21	225
374	p834	n930	6.933	n931	6.921	3.6	0.34	HDPE	8.21	8.17	225
375	p835	n931	6.921	n932	6.72	30	0.669	HDPE	8.17	7.91	225
376	p836	n932	6.72	n933	6.618	30	0.34	HDPE	7.91	8.08	225
377	p837	n933	6.618	n934	6.516	30	0.34	HDPE	8.08	8.09	225
378	p839	n935	7.45	n936	7.348	30	0.34	HDPE	8.64	9.28	225
379	p840	n936	7.348	n937	7.246	30	0.34	HDPE	9.28	9.74	225
380	p841	n937	7.246	n938	7.144	30	0.34	HDPE	9.74	9.83	225

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381	p842	n938	7.144	n939	6.94	60	0.34	HDPE	9.83	9.65	225
382	p843	n939	6.94	n940	6.838	30	0.34	HDPE	9.65	9.47	225
383	p844	n940	6.838	n941	6.771	19.8	0.34	HDPE	9.47	9.43	225
384	p845	n942	6.634	n943	6.606	8.3	0.34	HDPE	9.2	9.12	225
385	p846	n943	6.606	n944	6.532	21.7	0.34	HDPE	9.12	8.86	225
386	p847	n944	6.532	n945	6.43	30	0.34	HDPE	8.86	8.14	225
387	p848	n945	6.43	n946	6.328	30	0.34	HDPE	8.14	7.96	225
388	p849	n946	6.328	n947	6.226	30	0.34	HDPE	7.96	7.7	225
389	p850	n947	6.226	n948	6.124	30	0.34	HDPE	7.7	7.51	225
390	p851	n948	6.124	n949	6.022	30	0.34	HDPE	7.51	7.4	225
391	p852	n950	3.374	n951	3.272	30	0.34	HDPE	7.37	7.27	225
392	p853	n951	3.272	n952	3.17	30	0.34	HDPE	7.27	6.93	225
393	p854	n952	3.17	n953	3.068	30	0.34	HDPE	6.93	6.77	225
394	p855	n954	2.966	LS 24	2.864	30	0.34	HDPE	6.78	6.96	225
396	p857	n956	5.691	n957	5.589	30	0.34	HDPE	7.11	7.16	225
397	p858	n957	5.589	n958	5.514	22	0.34	HDPE	7.16	7.14	225
398	p859	n959	5.374	n960	5.272	30	0.34	HDPE	7.18	7.17	225
399	p860	n960	5.272	n961	5.17	30	0.34	HDPE	7.17	7.21	225
400	p861	n961	5.17	n962	5.068	30	0.34	HDPE	7.21	7.27	225
401	p862	n962	5.068	n963	4.966	30	0.34	HDPE	7.27	7.31	225
402	p863	n963	4.966	n964	4.864	30	0.34	HDPE	7.31	7.4	225
403	p1640	n1845	5.851	n1846	5.976	36.8	0.34	HDPE	7.37	7.45	225
404	p1641	n1846	5.976	n1847	6.078	30	0.34	HDPE	7.45	7.5	225
405	p1642	n1847	6.078	n1848	6.18	30	0.34	HDPE	7.5	7.55	225
406	p1643	n1849	6.282	n1850	6.384	30	0.34	HDPE	7.64	7.72	225
407	p1644	n1850	6.384	n1851	6.486	30	0.34	HDPE	7.72	7.78	225
408	p1645	n1852	6.588	n1853	6.69	30	0.34	HDPE	7.88	7.88	225
409	p1654	n1864	4.203	n1865	4.305	30	0.34	HDPE	7.31	7.22	225
410	p1655	n1865	4.305	n1866	4.407	30	0.34	HDPE	7.22	7.2	225
411	p1656	n1866	4.407	n1867	4.509	30	0.34	HDPE	7.2	7.22	225
412	p1657	n1867	4.509	n1868	4.611	30	0.34	HDPE	7.22	7.19	225
413	p1658	n1868	4.611	n1869	4.713	30	0.34	HDPE	7.19	7.28	225
414	p1659	n1869	4.713	n1870	4.815	30	0.34	HDPE	7.28	7.34	225
415	p1660	n1871	4.917	n1872	5.019	30	0.34	HDPE	7.37	7.35	225
416	p1661	n1872	5.019	n1863	5.146	37.5	0.34	HDPE	7.35	7.4	225
417	p1663	n1874	5.248	n1875	5.35	30	0.34	HDPE	7.42	7.43	225
418	p1664	n1875	5.35	n1876	5.452	30	0.34	HDPE	7.43	7.48	225
419	p1665	n1876	5.452	n1877	5.554	30	0.34	HDPE	7.48	7.51	225
420	p1666	n1877	5.554	n1878	5.656	30	0.34	HDPE	7.51	7.5	225
421	p1667	n1879	5.758	n1845	5.851	27.4	0.34	HDPE	7.49	7.37	225
422	p1751	n1972	4.762	n1974	4.158	34.9	1.732	HDPE	7.6	7.97	225
423	p1752	n1974	4.158	n1975	4.272	33.6	0.34	HDPE	7.97	7.27	225
424	p1753	n1976	4.374	n1977	4.476	30	0.34	HDPE	7.21	7.28	225
425	p1754	n1978	4.578	n1979	4.68	30	0.34	HDPE	7.51	7.68	225
426	p1755	n1979	4.68	n1980	4.725	13	0.34	HDPE	7.68	7.66	225
427	p1756	n1980	4.725	n1981	4.782	17	0.34	HDPE	7.66	7.93	225
428	p1757	n1982	4.884	n1983	4.93	13.4	0.34	HDPE	8.19	8.23	225
429	p1758	n1984	4.986	n1985	5.088	30	0.34	HDPE	8.13	7.93	225
430	p1759	n1985	5.088	n1986	5.129	11.8	0.34	HDPE	7.93	7.71	225
431	p1760	n1987	5.19	n1988	5.292	30	0.34	HDPE	7.77	7.94	225
432	p1761	n1988	5.292	n1989	5.394	30	0.34	HDPE	7.94	8.2	225
433	p1762	n1989	5.394	n1990	5.496	30	0.34	HDPE	8.2	8.68	225
434	p1763	n1990	5.496	n1991	5.598	30	0.34	HDPE	8.68	9.06	225
435	p1764	n1991	5.598	n1992	5.7	30	0.34	HDPE	9.06	9.41	225
436	p1765	n1992	5.7	n1993	5.802	30	0.34	HDPE	9.41	9.59	225

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437	p1766	n1993	5.802	n1994	5.904	30	0.34	HDPE	9.59	9.3	225
438	p1767	n1994	5.904	n1995	6.006	30	0.34	HDPE	9.3	9.07	225
439	p1768	n1995	6.006	n1996	6.108	30	0.34	HDPE	9.07	8.84	225
440	p1769	n1996	6.108	n1997	6.21	30	0.34	HDPE	8.84	8.63	225
441	p1770	n1997	6.21	n1998	6.312	30	0.34	HDPE	8.63	8.6	225
442	p1771	n1999	6.414	n934	6.516	30	0.34	HDPE	8.37	8.09	225
443	p1772	n2000	4.057	n2001	3.955	30	0.34	HDPE	8.18	8.06	225
444	p1773	n2001	3.955	n2002	3.853	30	0.34	HDPE	8.06	7.89	225
445	p1774	n2002	3.853	n2003	3.751	30	0.34	HDPE	7.89	7.75	225
446	p1775	n2003	3.751	n2004	3.649	30	0.34	HDPE	7.75	7.62	225
447	p1776	n2004	3.649	n5414	3.514	39.9	0.34	HDPE	7.62	7.47	225
448	p1780	n2009	4.04	n2010	3.995	30	0.15	HDPE	7.34	7.26	450
449	p1781	n2011	3.95	n2012	3.905	30	0.15	HDPE	7.3	7.39	450
450	p1782	n2012	3.905	n2013	3.873	21.4	0.15	HDPE	7.39	7.74	450
451	p1783	n2014	3.404	n2015	3.302	30	0.34	HDPE	7.65	7.79	225
452	p1784	n2015	3.302	n2016	3.288	4.1	0.34	HDPE	7.79	7.81	225
453	p1785	n2016	3.288	n2017	3.192	28.2	0.34	HDPE	7.81	7.74	225
454	p1788	n2019	3.828	n2017	3.192	15.2	4.181	HDPE	7.71	7.74	450
455	p1789	n2020	4.01	n2021	3.76	30	0.833	HDPE	5.43	5.18	500
456	p1790	n2021	3.76	n2022	3.68	30	0.267	HDPE	5.18	5.1	500
457	p1791	n2022	3.68	n2023	3.636	30	0.146	HDPE	5.1	5.06	500
458	p1792	n2023	3.636	n2024	3.55	30	0.287	HDPE	5.06	4.97	500
459	p1793	n2024	3.55	n2025	3.45	30	0.333	HDPE	4.97	4.87	500
460	p1794	n2026	12.4	n908	11.25	30	3.836	HDPE	13.59	12.44	225
461	p1795	n930	6.933	n2027	7.49	25.6	2.178	HDPE	8.21	8.68	225
462	p1796	n2027	7.49	n2028	7.95	30	1.533	HDPE	8.68	9.14	225
463	p1797	n2028	7.95	n2029	8.44	30	1.633	HDPE	9.14	9.63	225
464	p1798	n2029	8.44	n2030	9.31	30	2.901	HDPE	9.63	10.5	225
465	p1799	n2030	9.31	n2031	10.79	30	4.94	HDPE	10.5	11.98	225
466	p1800	n2031	10.79	n56	12.287	29.9	5	HDPE	11.98	13.85	225
467	p1801	n2025	3.45	n2032	3.406	30	0.147	HDPE	4.87	4.92	500
468	p1802	n2033	3.362	n2034	3.318	30	0.147	HDPE	4.95	4.89	500
469	p1803	n2034	3.318	n2035	2.666	30	2.173	HDPE	4.89	4.82	500
470	p1804	n2035	2.666	n2036	2.706	30	0.132	HDPE	4.82	5.05	500
471	p1805	n2036	2.706	n2037	2.745	30	0.132	HDPE	5.05	5.21	500
472	p1806	n2037	2.745	n2038	2.785	30	0.132	HDPE	5.21	5.37	500
473	p1807	n2038	2.785	n2039	2.824	30	0.132	HDPE	5.37	5.61	500
474	p1808	n2039	2.824	n2040	2.864	30	0.132	HDPE	5.61	6.03	500
475	p1809	n2040	2.864	n2041	2.904	30	0.132	HDPE	6.03	6.39	500
476	p1810	n2041	2.904	n2042	2.943	30	0.132	HDPE	6.39	6.78	500
477	p1811	n2042	2.943	n2043	2.983	30	0.132	HDPE	6.78	7.01	500
478	p1812	n2043	2.983	n2044	3.062	60	0.132	HDPE	7.01	7.42	500
479	p1813	n2044	3.062	n2045	3.102	30	0.132	HDPE	7.42	7.52	500
480	p1814	n2045	3.102	n2046	3.141	30	0.132	HDPE	7.52	7.6	500
481	p1815	n2046	3.141	n2017	3.192	38.9	0.132	HDPE	7.6	7.74	500
482	p1899	n891	10.61	n2135	10.712	30	0.34	HDPE	13.95	13.55	225
483	p1900	n2135	10.712	n2136	10.814	30	0.34	HDPE	13.55	13.25	225
484	p1901	n2136	10.814	n2137	10.916	30	0.34	HDPE	13.25	12.85	225
485	p1902	n2137	10.916	n2138	11.018	30	0.34	HDPE	12.85	12.55	225
487	p1904	n2140	8.266	n2141	8.368	30	0.34	HDPE	11.97	11.76	225
488	p1905	n2141	8.368	n2142	8.47	30	0.34	HDPE	11.76	11.8	225
489	p1906	n2142	8.47	n2143	8.572	30	0.34	HDPE	11.8	11.94	225
490	p1907	n2143	8.572	n2144	8.674	30	0.34	HDPE	11.94	12.52	225
491	p1908	n2144	8.674	n2145	8.776	30	0.34	HDPE	12.52	12.94	225
492	p1909	n2145	8.776	n2146	8.878	30	0.34	HDPE	12.94	12.64	225

ID	Label	Start Node	Invert (Start) (m)	Stop Node	Invert (Stop) (m)	Length (Scaled) (m)	Slope (Calculated) (%)	Material	Elevation Ground (Start) (m)	Elevation Ground (Stop) (m)	Diameter (mm)
493	p1910	n2146	8.878	n2147	8.98	30	0.34	HDPE	12.64	12.12	225
494	p1911	n2147	8.98	n2148	9.082	30	0.34	HDPE	12.12	11.55	225
495	p1912	n2149	9.184	n2150	9.286	30	0.34	HDPE	11.01	10.69	225
496	p1913	n2150	9.286	n2151	9.388	30	0.34	HDPE	10.69	10.58	225
497	p1914	n2151	9.388	n2152	9.49	30	0.34	HDPE	10.58	10.68	225
498	p1915	n2152	9.49	n2153	9.76	30	0.9	HDPE	10.68	10.95	225
499	p1916	n2153	9.76	n2154	10.33	30	1.901	HDPE	10.95	11.52	225
500	p1917	n2154	10.33	n2155	11.41	30	3.602	HDPE	11.52	12.6	225
501	p1918	n2155	11.41	n2156	12.2	30	2.634	HDPE	12.6	13.39	225
502	p1919	n2156	12.2	n2157	12.91	30	2.367	HDPE	13.39	14.1	225
503	p1920	n2157	12.91	n2158	13.51	30	2.001	HDPE	14.1	14.7	225
504	p1921	n2158	13.51	n2159	14.23	30	2.401	HDPE	14.7	15.42	225
505	p1922	n2159	14.23	n2160	15.46	30	4.104	HDPE	15.42	16.65	225
506	p1923	n2160	15.46	n2161	16.958	30	5	HDPE	16.65	18.2	225
507	p1924	n2161	17.01	n2162	18.47	30	4.873	HDPE	18.2	19.66	225
508	p1925	n2162	18.47	n2163	19.63	30	3.869	HDPE	19.66	20.82	225
509	p1946	n895	12.85	n2187	11.81	58.3	1.783	HDPE	14.04	13	225
510	p1947	n2188	11.12	n2189	10.94	30	0.6	HDPE	12.31	12.13	225
511	p1948	n2189	10.94	n2190	10.82	30	0.4	HDPE	12.13	12.01	225
512	p1949	n2191	10.67	n2192	10.568	30	0.34	HDPE	12.14	12.42	225
513	p1950	n2193	10.466	n2194	10.364	30	0.34	HDPE	12.92	13.55	225
514	p1951	n2194	10.364	n2195	10.262	30	0.34	HDPE	13.55	14.29	225
515	p1952	n2195	10.262	n2196	10.16	30	0.34	HDPE	14.29	14.4	225
516	p1953	n2196	10.16	n2197	10.058	30.1	0.34	HDPE	14.4	13.47	225
517	p1954	n2197	10.058	n2198	9.957	29.9	0.34	HDPE	13.47	12.17	225
518	p1955	n2198	9.957	n2199	9.855	30	0.34	HDPE	12.17	11.37	225
519	p1956	n2199	9.855	n2200	9.52	60	0.557	HDPE	11.37	10.71	225
520	p1957	n2200	9.52	n2201	9.3	30	0.733	HDPE	10.71	10.49	225
521	p1958	n2201	9.3	n2202	9.11	30	0.633	HDPE	10.49	10.3	225
522	p1959	n2203	8.82	n2204	8.23	60	0.983	HDPE	10.01	9.42	225
523	p1960	n2204	8.23	n2205	7.65	30	1.934	HDPE	9.42	8.84	225
524	p1961	n2205	7.65	n2206	7.23	30	1.4	HDPE	8.84	8.42	225
525	p1962	n2206	7.23	n2207	6.94	30	0.967	HDPE	8.42	8.13	225
526	p1963	n2208	3.625	n2209	3.727	30	0.34	HDPE	7.29	7.16	225
527	p1964	n2209	3.727	n2210	3.829	30	0.34	HDPE	7.16	6.94	225
528	p1965	n2210	3.829	n2211	3.931	30	0.34	HDPE	6.94	6.88	225
529	p1966	n2212	4.033	n2213	4.135	30	0.34	HDPE	7.11	7.38	225
530	p1967	n2213	4.135	n2214	4.237	30	0.34	HDPE	7.38	7.63	225
531	p1968	n2214	4.237	n2215	4.339	30	0.34	HDPE	7.63	7.74	225
532	p1969	n2215	4.339	n2216	4.441	30	0.34	HDPE	7.74	7.59	225
533	p1970	n2216	4.441	n2217	4.543	30	0.34	HDPE	7.59	7.51	225
534	p1971	n2217	4.543	n2218	4.645	30	0.34	HDPE	7.51	7.5	225
535	p1972	n2219	4.747	n2220	4.849	30	0.34	HDPE	7.62	7.75	225
536	p1973	n2220	4.849	n2221	4.951	30	0.34	HDPE	7.75	7.92	225
537	p1974	n2222	5.1	n2207	5.202	30	0.34	HDPE	8.14	8.13	225
538	p1980	n2207	5.202	n2229	5.304	30	0.34	HDPE	8.13	7.78	225
539	p1981	n2230	5.406	n2231	5.508	30	0.34	HDPE	7.54	7.23	225
540	p1982	n2231	5.508	n2232	5.558	14.6	0.34	HDPE	7.23	7.08	225
541	p1983	n2233	5.81	n2234	5.98	30	0.567	HDPE	7	7.17	225
542	p1984	n2234	5.98	n2235	6.15	19.4	0.877	HDPE	7.17	7.34	225
543	p1985	n2236	6.41	n2237	7.09	30	2.267	HDPE	7.6	8.28	225
544	p1986	n2238	7.73	n2239	8.61	30	2.934	HDPE	8.92	9.8	225
545	p1987	n2239	8.61	n2240	10.1	30	4.973	HDPE	9.8	11.29	225
546	p1988	n2240	10.1	n2241	11.314	24.3	5	HDPE	11.29	12.58	225
547	p1989	n2242	11.898	n2243	11.97	21.1	0.34	HDPE	13.48	14.22	225

ID	Label	Start Node	Invert (Start) (m)	Stop Node	Invert (Stop) (m)	Length (Scaled) (m)	Slope (Calculated) (%)	Material	Elevation Ground (Start) (m)	Elevation Ground (Stop) (m)	Diameter (mm)
548	p1990	n2243	11.97	n2244	12.072	30	0.34	HDPE	14.22	14.87	225
549	p1991	n2244	12.072	n2245	12.175	30.3	0.34	HDPE	14.87	14.73	225
550	p1992	n2246	12.248	n2247	12.35	30.1	0.34	HDPE	14.33	13.54	225
552	p1994	n2248	9.192	n2249	9.294	30	0.34	HDPE	12.32	11.43	225
553	p1995	n2249	9.294	n2250	9.396	30	0.34	HDPE	11.43	10.9	225
554	p1996	n2250	9.396	n2251	9.498	30	0.34	HDPE	10.9	10.73	225
555	p1997	n2251	9.498	n2252	9.6	30	0.34	HDPE	10.73	10.79	225
556	p1998	n2252	9.6	n2253	9.84	30	0.8	HDPE	10.79	11.03	225
557	p1999	n2253	9.84	n2254	10.61	30	2.568	HDPE	11.03	11.8	225
558	p2000	n2254	10.61	n2255	11.93	30	4.404	HDPE	11.8	13.12	225
559	p2001	n2255	11.93	n2256	12.376	30	1.486	HDPE	13.12	14.34	225
560	p2002	n2256	12.376	n2257	12.478	30	0.34	HDPE	14.34	14.4	225
561	p2003	n2257	12.478	n2258	12.566	26.1	0.34	HDPE	14.4	14.12	225
562	p2004	n2258	12.566	n2259	12.668	30	0.34	HDPE	14.12	13.92	225
563	p2005	n2260	12.77	n2261	13.28	30	1.7	HDPE	13.96	14.47	225
564	p2337	n2164	20.25	n2619	21.748	29.9	5	HDPE	21.44	23.13	225
565	p2338	n2619	21.94	n2620	23.438	29.9	5	HDPE	23.13	24.89	225
566	p2339	n2620	23.7	n2621	25.198	30	5	HDPE	24.89	26.51	225
567	p4372	n1864	4.203	n4839	4.152	22.6	0.223	HDPE	7.31	7.36	400
568	p4373	n4839	4.152	n4840	4.085	30	0.224	HDPE	7.36	7.35	400
569	p4715	n5203	5.62	n958	5.514	12.9	0.823	HDPE	6.81	7.14	225
570	p5064	n2163	19.63	n2164	20.25	19.2	3.227	HDPE	20.82	21.44	225
571	p5077	n2202	9.11	n2203	8.82	60	0.483	HDPE	10.3	10.01	225
572	p5078	n2193	10.466	n2192	10.568	30	0.34	HDPE	12.92	12.42	225
573	p5079	n2191	10.67	n2223	10.718	14.1	0.34	HDPE	12.14	12.02	225
574	p5080	n2223	10.718	n2190	10.82	30	0.34	HDPE	12.02	12.01	225
575	p5081	n895	12.85	n892	13.066	30	0.72	HDPE	14.04	14.6	225
576	p5082	n893	13.168	n894	13.27	30	0.34	HDPE	14.69	14.46	225
577	p5085	n2139	11.12	n2138	11.018	30	0.34	HDPE	12.31	12.55	225
578	p5086	n922	7.84	n923	7.738	30	0.34	HDPE	10.46	8.94	225
579	p5087	n904	13.561	n903	13.459	30	0.34	HDPE	15.06	14.94	225
580	p5088	n912	8.84	n911	8.95	4.2	2.64	HDPE	10.03	10.14	225
581	p5091	n58	12.408	n59	10.91	30	5	HDPE	13.83	12.33	500
582	p5092	n64	4.41	n2020	4.01	30	1.333	HDPE	5.83	5.43	500
583	p5093	n1999	6.414	n1998	6.312	30	0.34	HDPE	8.37	8.6	225
584	p5094	n942	6.634	n941	6.771	40.2	0.34	HDPE	9.2	9.43	225
585	p5095	n51	12.789	n52	12.755	10.2	0.34	HDPE	15.9	16.05	225
586	p5107	n1975	4.272	n1976	4.374	30	0.34	HDPE	7.27	7.21	225
587	p5108	n1977	4.476	n1978	4.578	30	0.34	HDPE	7.28	7.51	225
588	p5109	n1981	4.782	n1982	4.884	30	0.34	HDPE	7.93	8.19	225
589	p5110	n1983	4.93	n1984	4.986	16.6	0.34	HDPE	8.23	8.13	225
590	p5111	n1986	5.129	n1987	5.19	18.2	0.34	HDPE	7.71	7.77	225
591	p5112	n2033	3.362	n2032	3.406	30	0.147	HDPE	4.95	4.92	500
592	p5113	n5111	3.523	n2208	3.625	29.9	0.34	HDPE	7.4	7.29	225
593	p5121	n2238	7.73	n2237	7.09	30	2.134	HDPE	8.92	8.28	225
594	p5122	n2236	6.41	n2235	6.15	28.6	0.909	HDPE	7.6	7.34	225
595	p5124	n2233	5.81	n5388	5.66	29.8	0.503	HDPE	7	6.85	225
596	p5125	n5388	5.66	n2232	5.558	30.2	0.34	HDPE	6.85	7.08	225
597	p5126	n2230	5.406	n2229	5.304	30	0.34	HDPE	7.54	7.78	225
598	p5127	n2222	5.1	n5128	5.034	19.5	0.34	HDPE	8.14	8.09	225
599	p5128	n5128	5.034	n2221	4.951	24.4	0.34	HDPE	8.09	7.92	225
600	p5129	n2219	4.747	n2218	4.645	30	0.34	HDPE	7.62	7.5	225
601	p5130	n2212	4.033	n2211	3.931	30	0.34	HDPE	7.11	6.88	225
602	p5131	n5111	3.523	n949	3.476	14	0.34	HDPE	7.4	7.4	225
603	p5132	n949	3.476	n950	3.374	30	0.34	HDPE	7.4	7.37	225

ID	Label	Start Node	Invert (Start) (m)	Stop Node	Invert (Stop) (m)	Length (Scaled) (m)	Slope (Calculated) (%)	Material	Elevation Ground (Start) (m)	Elevation Ground (Stop) (m)	Diameter (mm)
604	p5135	n953	3.068	n954	2.966	30	0.34	HDPE	6.77	6.78	225
605	p5138	n958	5.514	n959	5.374	41.2	0.34	HDPE	7.14	7.18	225
606	p5142	n964	4.864	n1972	4.762	30	0.34	HDPE	7.4	7.6	225
607	p5144	n1974	4.158	n2000	4.057	29.6	0.34	HDPE	7.97	8.18	225
608	p5154	n2149	9.184	n2148	9.082	30	0.34	HDPE	11.01	11.55	225
609	p5188	n2246	12.248	n2245	12.175	21.5	0.34	HDPE	14.33	14.73	225
610	p5244	n1851	6.486	n1852	6.588	30	0.34	HDPE	7.78	7.88	225
611	p5245	n1848	6.18	n1849	6.282	30	0.34	HDPE	7.55	7.64	225
612	p5248	n1878	5.656	n1879	5.758	30	0.34	HDPE	7.5	7.49	225
613	p5249	n1863	5.146	n1874	5.248	30	0.34	HDPE	7.4	7.42	225
614	p5260	n1870	4.815	n1871	4.917	30	0.34	HDPE	7.34	7.37	225
615	p5325	n5414	3.514	n2014	3.404	32.2	0.34	HDPE	7.47	7.65	225
616	p5327	n2019	3.828	n2013	3.873	30	0.15	HDPE	7.71	7.74	450
617	p5329	n2011	3.95	n2010	3.995	30	0.15	HDPE	7.3	7.26	450
618	p5330	n2009	4.04	n4840	4.085	30	0.15	HDPE	7.34	7.35	450
619	p5373	n2188	11.12	n2187	11.81	60	1.15	HDPE	12.31	13	225
620	p5513	n2260	12.77	n2259	12.668	30	0.34	HDPE	13.96	13.92	225
621	p5529	n5025	11.868	n2241	11.314	11.2	4.951	HDPE	13.06	12.58	225
622	p5530	n2242	11.898	n5025	11.868	8.9	0.34	HDPE	13.48	13.06	225
625	CO-2	n2035	2.666	STP	2.28	50.7	0.763	HDPE	4.82	3.75	560
637	p1903(2)	LS 21	8.177	n2140	8.266	26.3	0.34	HDPE	12.267	11.97	225
641	p39(2)	MH-2	12.977	n50	12.891	25.4	0.34	HDPE	14.167	14.92	225
645	p1993(2)	LS 23	9.102	n2248	9.192	26.7	0.34	HDPE	13.405	12.32	225
648	p856(2)	MH-3	5.784	n956	5.691	27.3	0.34	HDPE	6.973	7.11	225

APPENDIX-VI
FLEX TABLE- MANHOLES

ID	Label	Elevation (Ground) (m)	Elevation (Rim) (m)	Elevation (Invert) (m)	Flow (Total In) (L/s)	Flow (Total Out) (L/s)	Hydraulic Grade Line (Out) (m)	Hydraulic Grade Line (In) (m)	Depth (Structure) (m)
30	n949	7.4	7.4	6.21	0	0.075	6.219	6.219	1.19
31	n950	7.37	7.37	6.108	0.075	0.15	6.121	6.121	1.26
32	n951	7.27	7.27	6.006	0.15	0.225	6.019	6.019	1.26
33	n952	6.93	6.93	5.74	0.225	0.3	5.756	5.756	1.19
34	n953	6.77	6.77	5.58	0.3	0.375	5.599	5.599	1.19
35	n954	6.78	6.78	5.478	0.375	0.45	5.499	5.499	1.3
36	n955	6.96	6.96	5.376	0.45	0.525	5.399	5.399	1.58
37	n956	7.11	7.11	5.274	0.525	0.6	5.298	5.298	1.84
38	n957	7.16	7.16	5.172	0.6	0.675	5.197	5.197	1.99
39	n958	7.14	7.14	5.097	1.125	1.2	5.131	5.131	2.04
40	n959	7.18	7.18	5.7	0.375	0.45	5.718	5.718	1.48
41	n960	7.17	7.17	5.802	0.3	0.375	5.821	5.821	1.37
42	n961	7.21	7.21	5.904	0.225	0.3	5.921	5.921	1.31
43	n962	7.27	7.27	6.006	0.15	0.225	6.021	6.021	1.26
44	n963	7.31	7.31	6.108	0.075	0.15	6.121	6.121	1.2
45	n964	7.4	7.4	6.21	0	0.075	6.219	6.219	1.19
46	n1712	6.01	6.01	4.82	0	0.075	4.829	4.829	1.19
47	n1713	6.07	6.07	4.718	0.075	0.15	4.731	4.731	1.35
48	n1714	6.08	6.08	4.616	0.15	0.225	4.631	4.631	1.46
49	n1715	5.99	5.99	4.514	0.6	0.675	4.539	4.539	1.48
50	n1716	6.01	6.01	4.674	0.3	0.375	4.69	4.69	1.34
51	n1717	5.98	5.98	4.748	0.225	0.3	4.765	4.765	1.23
52	n1718	6.16	6.16	4.85	0.15	0.225	4.865	4.865	1.31
53	n1719	6.25	6.25	4.952	0.075	0.15	4.964	4.964	1.3
54	n1720	6.2	6.2	5.01	0	0.075	5.019	5.019	1.19
55	n1721	6.06	6.06	4.265	0.975	1.05	4.297	4.297	1.79
56	n1722	6.01	6.01	4.31	0.75	0.825	4.338	4.338	1.7
57	n1723	5.98	5.98	4.412	0.675	0.75	4.439	4.439	1.57
58	n1724	6.06	6.06	4.018	1.5	1.575	4.056	4.056	2.04
59	n1725	6.18	6.18	4.12	1.125	1.2	4.153	4.153	2.06
60	n1726	6.18	6.18	4.202	1.05	1.125	4.234	4.234	1.98
61	n1727	6.07	6.07	3.861	1.875	1.95	3.903	3.903	2.21
62	n1728	6.11	6.11	3.916	1.575	1.65	3.955	3.955	2.19
63	n1729	6.04	6.04	4.56	0.225	0.3	4.574	4.574	1.48
64	n1730	6.04	6.04	4.662	0.15	0.225	4.676	4.676	1.38
65	n1731	6.1	6.1	4.764	0.075	0.15	4.776	4.776	1.34
66	n1732	6.05	6.05	4.86	0	0.075	4.869	4.869	1.19
67	n1733	6.1	6.1	4.91	0	0.075	4.919	4.919	1.19
68	n1734	6.19	6.19	4.845	0.075	0.15	4.857	4.857	1.35
69	n1735	6.17	6.17	4.743	0.15	0.225	4.755	4.755	1.43
70	n1736	6.15	6.15	4.948	0.075	0.15	4.958	4.958	1.2
71	n1737	6.24	6.24	5.05	0	0.075	5.059	5.059	1.19
72	n1795	6.27	6.27	3.055	10.575	10.65	3.16	3.16	3.22
73	n1797	6.33	6.33	3.186	9.15	9.225	3.282	3.282	3.14
74	n1798	6.41	6.41	3.288	9.075	9.15	3.384	3.384	3.12
75	n1803	5.97	5.97	3.39	9	9.075	3.485	3.485	2.58

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76	n1804	5.85	5.85	3.492	8.925	9	3.587	3.587	2.36
77	n1805	5.88	5.88	3.594	8.85	8.925	3.688	3.688	2.29
78	n1806	6.11	6.11	3.694	8.775	8.85	3.788	3.788	2.42
79	n1807	6.2	6.2	4.501	0.6	0.675	4.522	4.522	1.7
80	n1808	6.3	6.3	4.603	0.525	0.6	4.626	4.626	1.7
81	n1809	6.2	6.2	4.667	0.45	0.525	4.69	4.69	1.53
82	n1810	6.26	6.26	4.705	0.375	0.45	4.725	4.725	1.56
83	n1811	6.27	6.27	4.807	0.3	0.375	4.826	4.826	1.46
84	n1812	6.25	6.25	4.909	0.225	0.3	4.926	4.926	1.34
85	n1813	6.37	6.37	5.011	0.15	0.225	5.025	5.025	1.36
86	n1814	6.35	6.35	5.066	0.075	0.15	5.079	5.079	1.28
87	n1815	6.3	6.3	5.11	0	0.075	5.119	5.119	1.19
88	n1816	6.05	6.05	3.725	8.025	8.1	3.814	3.814	2.33
89	n1817	5.92	5.92	3.827	7.95	8.025	3.915	3.915	2.09
90	n1819	5.93	5.93	3.929	7.875	7.95	4.017	4.017	2
91	n1820	6.12	6.12	4.031	7.8	7.875	4.118	4.118	2.09
92	n1821	5.99	5.99	4.098	7.725	7.8	4.185	4.185	1.89
93	n1823	6.01	6.01	4.2	7.65	7.725	4.286	4.286	1.81
94	n1824	5.96	5.96	4.299	7.575	7.65	4.385	4.385	1.66
95	n1826	6.02	6.02	4.411	1.275	1.35	4.446	4.446	1.61
96	n1827	6.22	6.22	4.513	1.2	1.275	4.547	4.547	1.71
97	n1828	6.26	6.26	4.615	1.125	1.2	4.648	4.648	1.65
98	n1829	6.29	6.29	4.717	1.05	1.125	4.749	4.749	1.57
99	n1830	6.32	6.32	5.13	0	0.075	5.139	5.139	1.19
100	n1831	6.21	6.21	5.02	0.075	0.15	5.033	5.033	1.19
101	n1832	6.26	6.26	4.918	0.15	0.225	4.933	4.933	1.34
102	n1833	6.21	6.21	4.816	0.225	0.3	4.833	4.833	1.39
103	n1834	6.22	6.22	4.714	0.3	0.375	4.733	4.733	1.51
104	n1835	6.22	6.22	4.612	0.375	0.45	4.633	4.633	1.61
105	n1836	6.22	6.22	4.532	1.875	1.95	4.574	4.574	1.69
106	n1837	6.22	6.22	4.804	1.35	1.425	4.836	4.836	1.42
107	n1838	6.28	6.28	4.906	1.275	1.35	4.941	4.941	1.37
108	n1839	6.33	6.33	4.972	1.2	1.275	5.007	5.007	1.36
109	n1840	6.34	6.34	5.008	1.125	1.2	5.042	5.042	1.33
110	n1841	6.31	6.31	5.052	1.05	1.125	5.085	5.085	1.26
111	n1842	6.3	6.3	5.11	0.975	1.05	5.141	5.141	1.19
112	n1843	6.54	6.54	5.35	0.9	0.975	5.376	5.376	1.19
113	n1844	6.83	6.83	5.64	0.825	0.9	5.665	5.665	1.19
114	n1845	7.37	7.37	5.851	0.75	0.825	5.875	5.875	1.52
115	n1846	7.45	7.45	5.976	0.525	0.6	6	6	1.47
116	n1847	7.5	7.5	6.078	0.45	0.525	6.101	6.101	1.42
117	n1848	7.55	7.55	6.18	0.375	0.45	6.201	6.201	1.37
118	n1849	7.64	7.64	6.282	0.3	0.375	6.301	6.301	1.36
119	n1850	7.72	7.72	6.384	0.225	0.3	6.401	6.401	1.34
120	n1851	7.78	7.78	6.486	0.15	0.225	6.501	6.501	1.29
121	n1852	7.88	7.88	6.588	0.075	0.15	6.601	6.601	1.29
122	n1853	7.88	7.88	6.69	0	0.075	6.699	6.699	1.19
123	n1855	6.23	6.23	5.002	0.075	0.15	5.012	5.012	1.23

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124	n1856	6.31	6.31	4.75	0.975	1.05	4.781	4.781	1.56
125	n1857	6.43	6.43	4.852	0.75	0.825	4.88	4.88	1.58
126	n1858	6.54	6.54	4.954	0.675	0.75	4.981	4.981	1.59
127	n1859	6.56	6.56	5.056	0.6	0.675	5.081	5.081	1.5
128	n1860	6.58	6.58	5.158	0.525	0.6	5.182	5.182	1.42
129	n1861	6.45	6.45	5.26	0.45	0.525	5.283	5.283	1.19
130	n1862	6.9	6.9	5.71	0.375	0.45	5.728	5.728	1.19
131	n1863	7.4	7.4	5.912	0.3	0.375	5.928	5.928	1.49
132	n1864	7.31	7.31	5.292	0.675	0.75	5.319	5.319	2.02
133	n1865	7.22	7.22	5.394	0.6	0.675	5.419	5.419	1.83
134	n1866	7.2	7.2	5.496	0.525	0.6	5.52	5.52	1.7
135	n1867	7.22	7.22	5.598	0.45	0.525	5.621	5.621	1.62
136	n1868	7.19	7.19	5.7	0.375	0.45	5.721	5.721	1.49
137	n1869	7.28	7.28	5.802	0.3	0.375	5.821	5.821	1.48
138	n1870	7.34	7.34	5.904	0.225	0.3	5.921	5.921	1.44
139	n1871	7.37	7.37	6.006	0.15	0.225	6.021	6.021	1.36
140	n1872	7.35	7.35	6.108	0.075	0.15	6.121	6.121	1.24
141	n1873	7.4	7.4	6.21	0	0.075	6.219	6.219	1.19
142	n1874	7.42	7.42	6.014	0.225	0.3	6.031	6.031	1.41
143	n1875	7.43	7.43	6.116	0.15	0.225	6.131	6.131	1.31
144	n1876	7.48	7.48	6.218	0.075	0.15	6.231	6.231	1.26
145	n1877	7.51	7.51	6.32	0	0.075	6.329	6.329	1.19
146	n1878	7.5	7.5	6.31	0	0.075	6.319	6.319	1.19
147	n1879	7.49	7.49	6.208	0.075	0.15	6.218	6.218	1.28
148	n1880	6.03	6.03	4.84	0	6.225	4.907	4.907	1.19
149	n1881	5.92	5.92	1.914	6.075	6.15	1.99	1.99	4.01
150	n1882	5.92	5.92	2.016	6	6.075	2.092	2.092	3.9
151	n1883	6.12	6.12	2.118	5.925	6	2.193	2.193	4
152	n1884	6.06	6.06	2.22	5.85	5.925	2.295	2.295	3.84
153	n1885	6.19	6.19	2.322	5.775	5.85	2.396	2.396	3.87
154	n1886	6.21	6.21	4.124	2.175	2.25	4.169	4.169	2.09
155	n1887	6.26	6.26	4.226	2.1	2.175	4.27	4.27	2.03
156	n1888	6.32	6.32	4.328	2.025	2.1	4.372	4.372	1.99
157	n1889	6.32	6.32	4.43	1.95	2.025	4.473	4.473	1.89
158	n1890	6.2	6.2	2.34	3.45	3.525	2.402	2.402	3.86
159	n1891	5.93	5.93	2.442	3.375	3.45	2.498	2.498	3.49
160	n1892	5.88	5.88	2.544	3.3	3.375	2.599	2.599	3.34
161	n1893	5.84	5.84	4.65	0.15	0.225	4.665	4.665	1.19
162	n1894	6	6	4.81	0.075	0.15	4.821	4.821	1.19
163	n1895	6.1	6.1	4.91	0	0.075	4.918	4.918	1.19
164	n1896	5.91	5.91	2.584	3	3.075	2.637	2.637	3.33
165	n1897	5.98	5.98	2.646	2.925	3	2.699	2.699	3.33
166	n1898	6.56	6.56	2.686	2.85	2.925	2.738	2.738	3.87
167	n1899	5.97	5.97	2.788	2.775	2.85	2.839	2.839	3.18
168	n1900	6	6	2.89	2.7	2.775	2.94	2.94	3.11
169	n1901	5.97	5.97	2.992	2.625	2.7	3.042	3.042	2.98
170	n1902	5.98	5.98	3.094	2.55	2.625	3.143	3.143	2.89
171	n1905	6.06	6.06	3.196	2.475	2.55	3.244	3.244	2.86

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172	n1906	6.22	6.22	3.298	2.4	2.475	3.345	3.345	2.92
173	n1907	6.21	6.21	3.4	2.325	2.4	3.447	3.447	2.81
174	n1908	6.12	6.12	3.452	2.25	2.325	3.498	3.498	2.67
175	n1909	6.11	6.11	3.502	2.175	2.25	3.547	3.547	2.61
176	n1910	6.02	6.02	3.604	2.1	2.175	3.648	3.648	2.42
177	n1911	6.1	6.1	3.706	2.025	2.1	3.75	3.75	2.39
178	n1912	6.16	6.16	3.808	1.95	2.025	3.851	3.851	2.35
179	n1972	7.6	7.6	6.41	0	0.075	6.419	6.419	1.19
180	n1973	7.91	7.91	6.308	0.075	0.15	6.321	6.321	1.6
181	n1974	7.97	7.97	6.292	0.15	0.225	6.307	6.307	1.68
182	n2000	8.18	8.18	6.191	0.225	0.3	6.205	6.205	1.99
183	n2001	8.06	8.06	6.87	0	0.075	6.878	6.878	1.19
184	n2002	7.89	7.89	6.7	0.075	0.15	6.712	6.712	1.19
185	n2003	7.75	7.75	6.56	0.15	0.225	6.574	6.574	1.19
186	n2004	7.62	7.62	6.43	0.225	0.3	6.447	6.447	1.19
187	n2005	7.5	7.5	6.31	0.3	0.375	6.329	6.329	1.19
188	n2006	7.44	7.44	6.102	0.45	0.525	6.121	6.121	1.34
189	n2007	7.18	7.18	5.661	0.825	0.9	5.686	5.686	1.52
190	n2008	7.25	7.25	5.762	0.225	0.3	5.779	5.779	1.49
191	n2009	7.34	7.34	5.966	0.15	0.225	5.981	5.981	1.37
192	n2207	8.13	8.13	5.652	0.525	0.6	5.676	5.676	2.48
193	n2208	7.29	7.29	5.29	0.975	1.05	5.321	5.321	2
194	n2209	7.16	7.16	5.392	0.9	0.975	5.422	5.422	1.77
195	n2210	6.94	6.94	5.494	0.825	0.9	5.523	5.523	1.45
196	n2211	6.88	6.88	5.596	0.75	0.825	5.624	5.624	1.28
197	n2212	7.11	7.11	5.698	0.675	0.75	5.725	5.725	1.41
198	n2213	7.38	7.38	5.8	0.6	0.675	5.825	5.825	1.58
199	n2214	7.63	7.63	5.902	0.525	0.6	5.926	5.926	1.73
200	n2215	7.74	7.74	6.004	0.45	0.525	6.027	6.027	1.74
201	n2216	7.59	7.59	6.106	0.375	0.45	6.127	6.127	1.48
202	n2217	7.51	7.51	6.208	0.3	0.375	6.227	6.227	1.3
203	n2218	7.5	7.5	6.31	0.225	0.3	6.327	6.327	1.19
204	n2219	7.62	7.62	6.43	0.15	0.225	6.445	6.445	1.19
205	n2220	7.75	7.75	6.56	0.075	0.15	6.572	6.572	1.19
206	n2221	7.92	7.92	6.73	0	0.075	6.738	6.738	1.19
207	n2222	8.14	8.14	5.754	0.45	0.525	5.776	5.776	2.39
208	n2229	7.78	7.78	5.55	0.6	0.675	5.575	5.575	2.23
209	n2230	7.54	7.54	5.448	0.675	0.75	5.474	5.474	2.09
210	n2231	7.23	7.23	5.346	0.75	0.825	5.374	5.374	1.88
211	n2232	7.08	7.08	3.714	3.3	3.375	3.769	3.769	3.37
212	n2233	7	7	3.918	2.325	2.4	3.965	3.965	3.08
213	n2234	7.17	7.17	4.02	2.25	2.325	4.066	4.066	3.15
214	n2235	7.34	7.34	4.086	2.175	2.25	4.131	4.131	3.25
215	n2236	7.6	7.6	4.183	2.025	2.1	4.227	4.227	3.42
216	n2237	8.28	8.28	7.09	1.425	1.5	7.123	7.123	1.19
217	n2238	8.92	8.92	7.73	1.35	1.425	7.762	7.762	1.19
218	n2239	9.8	9.8	8.61	1.275	1.35	8.641	8.641	1.19
219	n2240	11.29	11.29	10.1	1.2	1.275	10.13	10.13	1.19

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220	n2241	12.58	12.58	11.314	1.125	1.2	11.343	11.343	1.27
221	n2245	14.73	14.73	13.067	0.3	0.375	13.086	13.086	1.66
222	n2246	14.33	14.33	13.14	0.225	0.3	13.157	13.157	1.19
223	n2247	13.54	13.54	12.35	0	0.075	12.357	12.357	1.19
224	n2248	12.32	12.32	11.13	0.075	0.15	11.14	11.14	1.19
225	n2249	11.43	11.43	10.24	0.15	0.225	10.253	10.253	1.19
226	n2250	10.9	10.9	9.71	0.225	0.3	9.725	9.725	1.19
227	n2251	10.73	10.73	9.54	0.3	0.375	9.559	9.559	1.19
228	n2252	10.79	10.79	9.438	0.375	0.45	9.459	9.459	1.35
229	n2253	11.03	11.03	9.336	0.45	0.525	9.359	9.359	1.69
230	n2254	11.8	11.8	9.234	0.525	0.6	9.258	9.258	2.57
232	n2256	14.34	14.34	11.883	0.6	0.675	11.908	11.908	2.46
233	n2257	14.4	14.4	11.781	1.05	1.125	11.814	11.814	2.62
234	n2258	14.12	14.12	11.693	1.125	1.2	11.726	11.726	2.43
235	n2259	13.92	13.92	11.591	1.2	1.275	11.625	11.625	2.33
236	n2260	13.96	13.96	11.489	1.275	1.35	11.524	11.524	2.47
237	n2261	14.47	14.47	11.387	1.35	1.425	11.423	11.423	3.08
238	n2262	14.86	14.86	11.285	1.425	1.5	11.322	11.322	3.58
239	n2263	14.91	14.91	11.226	1.5	1.575	11.264	11.264	3.68
240	n2264	14.49	14.49	11.124	1.575	1.65	11.163	11.163	3.37
241	n2265	13.72	13.72	11.022	1.65	1.725	11.062	11.062	2.7
242	n2266	13.06	13.06	10.922	1.725	1.8	10.962	10.962	2.14
243	n2308	12.79	12.79	10.82	1.8	1.875	10.861	10.861	1.97
244	n2309	12.62	12.62	10.718	1.875	1.95	10.76	10.76	1.9
245	n2310	12.47	12.47	10.616	1.95	2.025	10.659	10.659	1.85
246	n2311	12.14	12.14	10.514	2.025	2.1	10.557	10.557	1.63
247	n2312	11.81	11.81	10.412	2.1	2.175	10.454	10.454	1.4
248	n2313	11.48	11.48	10.29	2.175	2.25	10.33	10.33	1.19
249	n2314	11.3	11.3	10.11	2.25	2.325	10.156	10.156	1.19
250	n2315	11.29	11.29	10.074	2.325	2.4	10.12	10.12	1.22
251	n2316	11.31	11.31	9.972	2.4	2.475	10.019	10.019	1.34
252	n2317	11.47	11.47	9.87	2.475	2.55	9.918	9.918	1.6
253	n2318	11.78	11.78	9.768	2.55	2.625	9.817	9.817	2.01
254	n2319	12.09	12.09	9.666	2.625	2.7	9.715	9.715	2.42
255	n2320	12.14	12.14	9.564	2.7	2.775	9.614	9.614	2.58
256	n2321	12.07	12.07	9.462	2.775	2.85	9.513	9.513	2.61
257	n2322	11.96	11.96	9.36	2.85	2.925	9.411	9.411	2.6
258	n2323	11.93	11.93	9.338	2.925	3	9.39	9.39	2.59
259	n2324	11.85	11.85	9.258	3	3.075	9.311	9.311	2.59
260	n2325	11.86	11.86	9.19	3.075	3.15	9.243	9.243	2.67
261	n2326	11.89	11.89	9.088	3.15	3.225	9.142	9.142	2.8
262	n2327	11.91	11.91	9.038	3.225	3.3	9.093	9.093	2.87
263	n3946	10.28	10.28	7.316	0.9	0.975	7.346	7.346	2.96
264	n3947	9.32	9.32	8.13	0	0.075	8.137	8.137	1.19
265	n3948	8.36	8.36	7.17	0.075	0.15	7.18	7.18	1.19
266	n3949	7.55	7.55	5.468	0.375	0.45	5.489	5.489	2.08
267	n3950	6.86	6.86	5.366	0.45	0.525	5.388	5.388	1.49
268	n3951	6.6	6.6	5.264	0.525	0.6	5.288	5.288	1.34

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269	n3952	6.5	6.5	5.162	0.6	0.675	5.184	5.184	1.34
270	n3953	6.3	6.3	5.11	0.675	0.75	5.135	5.135	1.19
271	n3969	6.2	6.2	5.01	0.75	0.825	5.038	5.038	1.19
272	n3970	6.34	6.34	4.908	0.825	0.9	4.937	4.937	1.43
273	n3971	6.32	6.32	4.806	0.9	0.975	4.836	4.836	1.51
274	n3972	6.25	6.25	4.704	0.975	1.05	4.736	4.736	1.55
275	n3973	6.18	6.18	4.602	1.05	1.125	4.635	4.635	1.58
276	n3974	6.3	6.3	4.5	1.125	1.2	4.534	4.534	1.8
277	n3975	6.2	6.2	4.398	1.2	1.275	4.433	4.433	1.8
278	n3976	6.18	6.18	4.296	1.275	1.35	4.332	4.332	1.88
279	n3977	6.15	6.15	4.194	1.35	1.425	4.23	4.23	1.96
280	n3978	6.2	6.2	4.092	1.425	1.5	4.129	4.129	2.11
281	n3979	6.48	6.48	3.99	1.5	1.575	4.028	4.028	2.49
282	n3980	7.42	7.42	5.536	0.15	0.225	5.551	5.551	1.88
283	n3981	7.25	7.25	5.638	0.075	0.15	5.651	5.651	1.61
284	n3982	6.93	6.93	5.74	0	0.075	5.749	5.749	1.19
285	n3983	6.26	6.26	3.719	1.575	1.65	3.758	3.758	2.54
286	n3984	5.75	5.75	3.636	1.65	1.725	3.676	3.676	2.11
287	n3985	5.87	5.87	3.534	1.725	1.8	3.575	3.575	2.34
288	n3986	5.88	5.88	3.432	1.8	1.875	3.474	3.474	2.45
289	n3987	5.62	5.62	3.33	1.875	1.95	3.372	3.372	2.29
290	n3988	5.59	5.59	3.228	1.95	2.025	3.271	3.271	2.36
291	n3989	5.63	5.63	3.126	2.475	2.55	3.175	3.175	2.5
292	n3990	6.16	6.16	4.97	0.375	0.45	4.988	4.988	1.19
293	n3991	6.49	6.49	5.3	0.3	0.375	5.316	5.316	1.19
294	n3992	6.82	6.82	5.63	0.225	0.3	5.645	5.645	1.19
295	n3993	7.33	7.33	6.14	0.15	0.225	6.153	6.153	1.19
296	n3994	8.15	8.15	6.96	0.075	0.15	6.97	6.97	1.19
297	n3995	9.53	9.53	8.34	0	0.075	8.347	8.347	1.19
298	n3997	5.63	5.63	3.086	2.55	2.625	3.135	3.135	2.54
299	n3998	5.69	5.69	2.984	2.625	2.7	3.034	3.034	2.71
300	n3999	5.6	5.6	2.882	2.7	2.775	2.933	2.933	2.72
301	n4000	5.81	5.81	2.78	2.775	2.85	2.831	2.831	3.03
302	n4001	5.89	5.89	2.678	2.85	2.925	2.73	2.73	3.21
303	n4002	5.63	5.63	2.576	6.675	6.75	2.657	2.657	3.05
304	n4003	5.71	5.71	4.52	3.675	3.75	4.572	4.572	1.19
305	n4004	6.05	6.05	4.86	3.6	3.675	4.911	4.911	1.19
306	n4005	6.31	6.31	5.12	3.525	3.6	5.171	5.171	1.19
307	n4006	6.8	6.8	5.61	3.45	3.525	5.66	5.66	1.19
308	n4007	6.98	6.98	5.79	0	0.075	5.798	5.798	1.19
309	n4008	7.61	7.61	6.42	3.3	3.375	6.469	6.469	1.19
310	n4009	9.09	9.09	7.448	3.225	3.3	7.497	7.497	1.64
311	n4010	9.91	9.91	7.499	3.075	3.15	7.553	7.553	2.41
312	n4011	10.78	10.78	7.55	3	3.075	7.603	7.603	3.23
313	n4012	11.66	11.66	7.652	2.925	3	7.704	7.704	4.01
314	n4013	11.88	11.88	7.724	2.85	2.925	7.776	7.776	4.16
315	n4014	9.58	9.58	8.39	0	0.075	8.397	8.397	1.19
316	n4021	5.79	5.79	2.568	6.75	6.825	2.649	2.649	3.22

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317	n4023	5.86	5.86	2.466	6.825	6.9	2.548	2.548	3.39
318	n4024	5.9	5.9	2.364	6.9	6.975	2.446	2.446	3.54
319	n4025	5.84	5.84	2.262	6.975	7.05	2.345	2.345	3.58
320	n4026	5.99	5.99	2.16	7.05	7.125	2.243	2.243	3.83
321	n4027	5.7	5.7	2.058	7.125	7.2	2.142	2.142	3.64
322	n4028	5.71	5.71	1.933	13.275	13.35	2.055	2.055	3.78
323	n4029	5.86	5.86	4.67	6	6.075	4.738	4.738	1.19
324	n4030	6.48	6.48	5.29	5.925	6	5.356	5.356	1.19
325	n4031	7.03	7.03	5.84	5.85	5.925	5.906	5.906	1.19
326	n4032	7.77	7.77	6.58	5.775	5.85	6.645	6.645	1.19
327	n4033	8.89	8.89	7.7	5.7	5.775	7.765	7.765	1.19
328	n4034	9.99	9.99	8.431	5.625	5.7	8.495	8.495	1.56
329	n4035	11.03	11.03	8.532	5.55	5.625	8.605	8.605	2.5
330	n4036	11.58	11.58	8.634	5.475	5.55	8.707	8.707	2.95
331	n4037	11.58	11.58	8.736	3.675	3.75	8.795	8.795	2.84
332	n4038	11.78	11.78	8.797	3.525	3.6	8.854	8.854	2.98
333	n4039	11.68	11.68	8.899	3.45	3.525	8.956	8.956	2.78
334	n4040	11.86	11.86	9.001	3.375	3.45	9.057	9.057	2.86
335	n4041	11.89	11.89	10.7	0	0.075	10.709	10.709	1.19
336	n4042	11.93	11.93	10.74	0	0.075	10.749	10.749	1.19
337	n4043	11.69	11.69	10.5	1.65	1.725	10.54	10.54	1.19
338	n4044	12.05	12.05	10.86	1.575	1.65	10.894	10.894	1.19
339	n4045	12.24	12.24	11.05	1.5	1.575	11.083	11.083	1.19
340	n4046	12.4	12.4	11.21	1.425	1.5	11.243	11.243	1.19
341	n4047	12.72	12.72	11.53	1.35	1.425	11.562	11.562	1.19
342	n4048	12.91	12.91	11.698	1.275	1.35	11.729	11.729	1.21
343	n4049	12.99	12.99	11.8	1.2	1.275	11.834	11.834	1.19
344	n4050	13.21	13.21	12.02	1.125	1.2	12.049	12.049	1.19
345	n4051	13.57	13.57	12.38	1.05	1.125	12.408	12.408	1.19
346	n4052	14.12	14.12	12.698	0.975	1.05	12.725	12.725	1.42
347	n4053	14.47	14.47	12.8	0.9	0.975	12.83	12.83	1.67
348	n4054	14.78	14.78	12.902	0.825	0.9	12.931	12.931	1.88
349	n4055	15.14	15.14	13.004	0.75	0.825	13.032	13.032	2.14
350	n4056	15.53	15.53	13.106	0.675	0.75	13.132	13.132	2.42
351	n4057	15.84	15.84	13.194	0.6	0.675	13.219	13.219	2.65
352	n4058	15.97	15.97	14.78	0	0.075	14.789	14.789	1.19
353	n4059	16.79	16.79	14.678	0.15	0.225	14.693	14.693	2.11
354	n4060	15.91	15.91	13.296	0.525	0.6	13.32	13.32	2.61
355	n4061	15.94	15.94	13.339	0.45	0.525	13.361	13.361	2.6
356	n4062	16.25	16.25	15.06	0	0.075	15.067	15.067	1.19
357	n4063	15.67	15.67	13.441	0.375	0.45	13.462	13.462	2.23
358	n4064	15.52	15.52	13.543	0.3	0.375	13.562	13.562	1.98
359	n4065	15.54	15.54	13.645	0.225	0.3	13.662	13.662	1.89
360	n4066	15.4	15.4	13.747	0.15	0.225	13.762	13.762	1.65
361	n4067	15.27	15.27	13.849	0.075	0.15	13.861	13.861	1.42
362	n4068	15.11	15.11	13.92	0	0.075	13.929	13.929	1.19
363	n4672	9.73	9.73	8.54	0	0.075	8.549	8.549	1.19
364	n4673	9.77	9.77	8.438	0.075	0.15	8.451	8.451	1.33

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365	n4674	9.75	9.75	8.336	0.15	0.225	8.351	8.351	1.41
366	n4675	9.67	9.67	8.234	0.225	0.3	8.251	8.251	1.44
367	n4676	9.65	9.65	8.132	0.3	0.375	8.151	8.151	1.52
368	n4677	9.76	9.76	8.03	0.375	0.45	8.051	8.051	1.73
369	n4678	9.84	9.84	7.928	0.45	0.525	7.951	7.951	1.91
370	n4679	9.89	9.89	7.826	0.525	0.6	7.85	7.85	2.06
371	n4680	9.9	9.9	7.724	0.6	0.675	7.749	7.749	2.18
372	n4681	10.02	10.02	7.622	0.675	0.75	7.649	7.649	2.4
373	n4682	10.25	10.25	7.52	0.75	0.825	7.548	7.548	2.73
374	n4683	10.29	10.29	7.418	0.825	0.9	7.447	7.447	2.87
375	n4684	10.35	10.35	7.214	0.975	1.05	7.245	7.245	3.14
376	n4685	10.58	10.58	7.112	1.05	1.125	7.144	7.144	3.47
377	n4686	10.67	10.67	7.01	1.125	1.2	7.043	7.043	3.66
378	n4687	10.72	10.72	6.908	1.2	1.275	6.942	6.942	3.81
379	n4688	10.77	10.77	6.806	1.275	1.35	6.841	6.841	3.96
380	n4689	10.78	10.78	6.704	1.35	1.425	6.74	6.74	4.08
381	n4690	10.73	10.73	9.54	0	1.5	9.577	9.577	1.19
382	n4691	10.66	10.66	9.438	1.5	1.575	9.476	9.476	1.22
383	n4692	10.64	10.64	9.336	1.575	1.65	9.375	9.375	1.3
384	n4693	10.76	10.76	9.234	1.65	1.725	9.274	9.274	1.53
385	n4694	11.47	11.47	9.132	1.725	1.8	9.173	9.173	2.34
386	n4695	11.19	11.19	9.03	1.8	1.875	9.072	9.072	2.16
387	n4696	10.97	10.97	8.928	1.875	1.95	8.971	8.971	2.04
388	n4697	11.04	11.04	8.826	1.95	2.025	8.869	8.869	2.21
389	n4698	11.13	11.13	8.724	2.025	2.1	8.768	8.768	2.41
390	n4699	11.23	11.23	8.622	2.1	2.175	8.667	8.667	2.61
391	n4700	11.32	11.32	8.52	2.175	2.25	8.566	8.566	2.8
392	n4701	11.45	11.45	8.418	2.25	2.325	8.464	8.464	3.03
393	n4702	11.53	11.53	8.316	2.325	2.4	8.363	8.363	3.21
394	n4703	11.67	11.67	8.186	2.4	2.475	8.233	8.233	3.48
395	n4704	11.73	11.73	8.084	2.475	2.55	8.132	8.132	3.65
396	n4705	11.73	11.73	7.982	2.55	2.625	8.031	8.031	3.75
397	n4706	11.84	11.84	7.88	2.625	2.7	7.929	7.929	3.96
398	n4707	11.89	11.89	7.778	2.7	2.775	7.828	7.828	4.11
399	n4708	5.7	5.7	1.831	13.35	13.425	1.953	1.953	3.87
400	n4709	5.59	5.59	1.729	13.425	13.5	1.852	1.852	3.86
401	n4710	5.53	5.53	1.627	13.5	13.575	1.75	1.75	3.9
402	n4711	5.51	5.51	1.525	13.575	13.65	1.649	1.649	3.98
403	n4712	5.55	5.55	4.36	0	13.725	4.484	4.484	1.19
404	n4713	5.62	5.62	4.258	13.725	13.8	4.383	4.383	1.36
405	n4714	5.59	5.59	4.156	13.8	13.875	4.281	4.281	1.43
406	n4715	5.5	5.5	4.054	13.875	13.95	4.18	4.18	1.45
407	n4716	5.34	5.34	3.952	13.95	14.025	4.078	4.078	1.39
408	n4718	5.62	5.62	3.813	14.55	14.625	3.943	3.943	1.81
409	n4719	5.55	5.55	4.336	0.45	0.525	4.355	4.355	1.21
410	n4720	5.73	5.73	4.438	0.375	0.45	4.459	4.459	1.29
411	n4721	5.79	5.79	4.495	0.3	0.375	4.514	4.514	1.29
412	n4722	5.73	5.73	4.54	0.225	0.3	4.557	4.557	1.19

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413	n4723	5.96	5.96	4.77	0.15	0.225	4.783	4.783	1.19
414	n4724	7.12	7.12	5.93	0.075	0.15	5.94	5.94	1.19
415	n4725	9.27	9.27	6.817	0	0.075	6.824	6.824	2.45
416	n4731	5.69	5.69	3.711	14.625	14.7	3.841	3.841	1.98
417	n4732	5.65	5.65	3.609	14.7	14.775	3.74	3.74	2.04
418	n4733	5.67	5.67	3.507	14.775	14.85	3.638	3.638	2.16
419	n4734	5.72	5.72	3.405	14.85	14.925	3.537	3.537	2.32
420	n4735	5.77	5.77	3.303	14.925	15	3.435	3.435	2.47
421	n4736	5.87	5.87	3.195	15	15.075	3.317	3.317	2.67
422	n4740	5.81	5.81	3.093	15.075	15.15	3.215	3.215	2.72
423	n4741	5.72	5.72	2.991	15.15	15.225	3.114	3.114	2.73
424	n4742	5.71	5.71	2.889	15.225	15.3	3.012	3.012	2.82
425	n4743	5.62	5.62	2.787	15.3	15.375	2.911	2.911	2.83
426	n4744	5.7	5.7	2.685	15.375	15.45	2.809	2.809	3.01
427	n4745	5.82	5.82	2.583	15.45	15.525	2.707	2.707	3.24
428	n4746	5.95	5.95	2.481	15.525	15.6	2.606	2.606	3.47
429	n4747	6.11	6.11	2.427	15.6	15.675	2.552	2.552	3.68
430	n4772	16.92	16.92	14.61	0.225	0.3	14.624	14.624	2.31
431	n4773	15.21	15.21	13.848	0.3	0.375	13.864	13.864	1.36
432	n4774	13.54	13.54	12.138	0.375	0.45	12.155	12.155	1.4
433	n4775	11.83	11.83	9.414	0.45	0.525	9.433	9.433	2.42
434	n4776	9.11	9.11	4.748	16.65	16.725	4.871	4.871	4.36
436	n4778	9.38	9.38	7.824	16.725	16.8	7.955	7.955	1.56
437	n4779	9.76	9.76	7.722	16.8	16.875	7.853	7.853	2.04
438	n4780	9.75	9.75	7.62	16.875	16.95	7.752	7.752	2.13
439	n4781	10.09	10.09	7.518	16.95	17.025	7.65	7.65	2.57
440	n4782	9.99	9.99	7.416	17.025	17.1	7.548	7.548	2.57
441	n4783	14.99	14.99	13.8	0.3	0.375	13.816	13.816	1.19
442	n4784	15.38	15.38	14.19	0.225	0.3	14.205	14.205	1.19
443	n4785	15.57	15.57	14.38	0.15	0.225	14.393	14.393	1.19
444	n4786	15.99	15.99	14.8	0.075	0.15	14.81	14.81	1.19
445	n4787	16.62	16.62	15.43	0	0.075	15.437	15.437	1.19
446	n4788	17.26	17.26	16.07	0	0.075	16.079	16.079	1.19
447	n4789	17.55	17.55	15.968	0.075	0.15	15.981	15.981	1.58
448	n4790	17.91	17.91	15.866	0.15	0.225	15.881	15.881	2.04
449	n4791	18.07	18.07	15.83	0.225	0.3	15.847	15.847	2.24
450	n4797	6.27	6.27	2.325	15.675	15.75	2.451	2.451	3.94
451	n4798	6.46	6.46	5.249	0	15.825	5.375	5.375	1.21
452	n4799	6.87	6.87	5.147	15.825	15.9	5.273	5.273	1.72
453	n4800	7.01	7.01	5.045	15.9	15.975	5.172	5.172	1.96
454	n4801	7.3	7.3	4.943	15.975	16.05	5.07	5.07	2.36
455	n4802	8.08	8.08	4.841	16.05	16.125	4.968	4.968	3.24
456	n4824	6.19	6.19	5	0	0.075	5.009	5.009	1.19
457	n4825	6.36	6.36	4.898	0.075	0.15	4.911	4.911	1.46
458	n4826	6.21	6.21	2.556	12.6	12.675	2.673	2.673	3.65
459	n4827	6.19	6.19	2.647	10.875	10.95	2.754	2.754	3.54
460	n4828	6.23	6.23	2.749	10.8	10.875	2.855	2.855	3.48
461	n4829	6.27	6.27	2.851	10.725	10.8	2.957	2.957	3.42

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462	n4830	6.31	6.31	2.953	10.65	10.725	3.058	3.058	3.36
463	n4831	6.37	6.37	4.476	1.275	1.35	4.511	4.511	1.89
464	n4832	6.37	6.37	4.578	1.2	1.275	4.613	4.613	1.79
465	n4833	6.36	6.36	4.68	1.125	1.2	4.714	4.714	1.68
466	n4834	6.45	6.45	4.782	1.05	1.125	4.814	4.814	1.67
467	n4835	6.52	6.52	4.884	0.975	1.05	4.915	4.915	1.64
468	n4836	6.59	6.59	4.986	0.9	0.975	5.016	5.016	1.6
469	n4837	6.68	6.68	5.088	0.825	0.9	5.117	5.117	1.59
470	n4838	6.92	6.92	5.19	0.75	0.825	5.218	5.218	1.73
471	n4839	7.36	7.36	6.17	0	0.075	6.179	6.179	1.19
472	n4840	7.35	7.35	6.068	0.075	0.15	6.081	6.081	1.28
473	n4841	6.32	6.32	4.558	1.425	1.5	4.595	4.595	1.76
474	n4842	6.29	6.29	4.66	1.35	1.425	4.696	4.696	1.63
475	n4843	6.16	6.16	4.762	1.275	1.35	4.797	4.797	1.4
476	n4844	6.13	6.13	4.864	1.2	1.275	4.898	4.898	1.27
477	n4845	6.24	6.24	4.966	1.125	1.2	4.999	4.999	1.27
478	n4846	6.26	6.26	5.068	1.05	1.125	5.1	5.1	1.19
479	n4847	6.36	6.36	5.17	0.975	1.05	5.201	5.201	1.19
480	n4848	6.48	6.48	5.29	0.9	0.975	5.319	5.319	1.19
481	n4849	9.36	9.36	7.314	17.1	17.175	7.447	7.447	2.05
482	n4850	9.37	9.37	7.212	17.175	17.25	7.345	7.345	2.16
483	n4851	9.63	9.63	7.11	17.25	17.325	7.244	7.244	2.52
484	n4852	10.23	10.23	7.008	17.325	17.4	7.142	7.142	3.22
485	n4853	10.84	10.84	6.906	17.4	17.475	7.04	7.04	3.93
486	n4854	10.22	10.22	6.804	17.475	17.55	6.939	6.939	3.42
487	n4855	9.55	9.55	6.702	17.55	17.625	6.837	6.837	2.85
488	n4856	8.92	8.92	6.6	17.625	17.7	6.733	6.733	2.32
489	n4857	8.47	8.47	6.57	17.7	17.775	6.682	6.682	1.9
490	n4858	7.4	7.4	6.189	17.775	17.85	6.309	6.309	1.21
491	n4859	7.25	7.25	6.039	17.85	17.925	6.176	6.176	1.21
492	n4860	7.74	7.74	5.937	20.4	20.475	6.058	6.058	1.8
493	n4861	6.06	6.06	4.849	20.475	20.55	4.971	4.971	1.21
494	n4862	5.76	5.76	4.549	20.55	20.625	4.671	4.671	1.21
495	n4863	5.66	5.66	4.358	26.25	26.325	4.522	4.522	1.3
496	n4979	18.09	18.09	15.766	0.3	0.375	15.785	15.785	2.32
497	n4980	17.57	17.57	15.664	0.375	0.45	15.684	15.684	1.91
498	n4981	16.81	16.81	15.62	0.45	0.525	15.639	15.639	1.19
499	n4982	16.58	16.58	15.39	0.525	0.6	15.411	15.411	1.19
500	n4983	16.22	16.22	15.03	0.6	0.675	15.052	15.052	1.19
501	n4984	15.87	15.87	14.68	0.675	0.75	14.703	14.703	1.19
502	n4985	15.46	15.46	14.27	0.75	0.825	14.294	14.294	1.19
503	n4986	14.97	14.97	13.78	0.825	0.9	13.805	13.805	1.19
504	n4987	13.61	13.61	11.776	0.9	0.975	11.802	11.802	1.83
505	n4988	11.47	11.47	10.28	1.425	1.5	10.313	10.313	1.19
506	n4989	14.02	14.02	11.775	0.375	0.45	11.792	11.792	2.25
507	n4990	15.44	15.44	14.25	0.3	0.375	14.266	14.266	1.19
508	n4991	16.67	16.67	15.48	0.225	0.3	15.495	15.495	1.19
509	n4992	17.36	17.36	15.736	0.15	0.225	15.749	15.749	1.62

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510	n4993	17.75	17.75	15.838	0.075	0.15	15.851	15.851	1.91
511	n4994	17.13	17.13	15.94	0	0.075	15.949	15.949	1.19
512	n4999	18.49	18.49	17.049	0	0.075	17.056	17.056	1.44
513	n5000	17.25	17.25	14.924	0.075	0.15	14.934	14.934	2.33
514	n5001	14.62	14.62	13.43	0.15	0.225	13.443	13.443	1.19
515	n5002	9.99	9.99	8.8	1.5	1.575	8.833	8.833	1.19
516	n5003	10.15	10.15	8.394	1.575	1.65	8.428	8.428	1.76
517	n5004	8.95	8.95	7.121	1.65	1.725	7.156	7.156	1.83
518	n5005	11.92	11.92	8.035	0.675	0.75	8.058	8.058	3.89
519	n5006	15.75	15.75	12.218	0.6	0.675	12.239	12.239	3.53
520	n5007	18.9	18.9	16.052	0.525	0.6	16.072	16.072	2.85
521	n5008	18.8	18.8	17.078	0.45	0.525	17.097	17.097	1.72
522	n5009	18.37	18.37	17.18	0.375	0.45	17.201	17.201	1.19
523	n5010	19.43	19.43	17.406	0.3	0.375	17.423	17.423	2.02
524	n5011	20.06	20.06	17.508	0.225	0.3	17.525	17.525	2.55
525	n5012	18.8	18.8	17.61	0.15	0.225	17.625	17.625	1.19
526	n5013	20.41	20.41	19.108	0.075	0.15	19.118	19.118	1.3
527	n5014	22.06	22.06	20.717	0	0.075	20.724	20.724	1.34
528	n5016	19.26	19.26	16.271	0.075	0.15	16.281	16.281	2.99
529	n5017	23.17	23.17	19.718	0	0.075	19.725	19.725	3.45
530	n5018	15.97	15.97	13.474	0.15	0.225	13.486	13.486	2.5
531	n5019	13.17	13.17	11.905	0.225	0.3	11.92	11.92	1.26
532	n5020	14.86	14.86	12.997	0.525	0.6	13.021	13.021	1.86
533	n5021	20.67	20.67	17.258	0	0.075	17.265	17.265	3.41
534	n5022	16.96	16.96	14.463	0.075	0.15	14.473	14.473	2.5
535	n5023	14.85	14.85	12.945	0.6	0.675	12.97	12.97	1.91
536	n5024	14.23	14.23	12.843	0.675	0.75	12.865	12.865	1.39
537	n5025	13.06	13.06	11.87	0.75	0.825	11.894	11.894	1.19
538	n5026	5.65	5.65	4.46	0	5.625	4.539	4.539	1.19
539	n5027	5.47	5.47	1.654	5.475	5.55	1.726	1.726	3.82
540	n5028	5.44	5.44	1.756	5.4	5.475	1.828	1.828	3.68
541	n5029	5.44	5.44	1.79	5.325	5.4	1.862	1.862	3.65
542	n5030	5.42	5.42	1.858	5.25	5.325	1.929	1.929	3.56
543	n5031	5.59	5.59	1.96	5.175	5.25	2.03	2.03	3.63
544	n5032	5.76	5.76	2.013	5.1	5.175	2.083	2.083	3.75
545	n5033	5.52	5.52	2.062	5.025	5.1	2.131	2.131	3.46
546	n5034	5.59	5.59	2.164	4.95	5.025	2.233	2.233	3.43
547	n5035	5.68	5.68	2.266	4.875	4.95	2.334	2.334	3.41
548	n5036	5.78	5.78	2.317	4.8	4.875	2.384	2.384	3.46
549	n5037	6.12	6.12	4.668	0.3	0.375	4.687	4.687	1.45
550	n5038	5.96	5.96	4.77	0.225	0.3	4.787	4.787	1.19
551	n5039	6.27	6.27	5.08	0.15	0.225	5.093	5.093	1.19
552	n5040	6.47	6.47	5.28	0.075	0.15	5.29	5.29	1.19
553	n5041	7.06	7.06	5.87	0	0.075	5.877	5.877	1.19
554	n5042	6.67	6.67	5.48	0	0.075	5.487	5.487	1.19
555	n5043	6.22	6.22	5.03	0.075	0.15	5.04	5.04	1.19
556	n5044	5.76	5.76	4.57	0.15	0.225	4.585	4.585	1.19
557	n5045	5.68	5.68	4.48	0.225	0.3	4.497	4.497	1.2

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558	n5046	5.81	5.81	4.455	0.3	0.375	4.474	4.474	1.35
559	n5047	6.06	6.06	4.366	0.375	0.45	4.387	4.387	1.69
560	n5048	6.93	6.93	4.264	0.45	0.525	4.287	4.287	2.67
561	n5049	5.72	5.72	2.419	4.35	4.425	2.483	2.483	3.3
562	n5050	5.65	5.65	2.521	4.275	4.35	2.584	2.584	3.13
563	n5051	5.63	5.63	2.623	4.2	4.275	2.686	2.686	3.01
564	n5052	5.66	5.66	2.725	4.125	4.2	2.787	2.787	2.94
565	n5053	5.73	5.73	2.827	4.05	4.125	2.888	2.888	2.9
566	n5054	5.67	5.67	2.929	3.975	4.05	2.99	2.99	2.74
567	n5055	5.8	5.8	2.969	3.9	3.975	3.03	3.03	2.83
568	n5056	6.08	6.08	3.031	3.825	3.9	3.091	3.091	3.05
569	n5057	5.97	5.97	3.133	3.75	3.825	3.192	3.192	2.84
570	n5058	6.07	6.07	3.235	3.675	3.75	3.293	3.293	2.84
571	n5059	6.13	6.13	3.337	3.6	3.675	3.395	3.395	2.79
572	n5060	6.34	6.34	3.439	3.525	3.6	3.496	3.496	2.9
573	n5061	6.5	6.5	3.541	3.45	3.525	3.598	3.598	2.96
574	n5062	6.64	6.64	3.643	3.375	3.45	3.699	3.699	3
575	n5063	5.68	5.68	4.284	26.325	26.4	4.447	4.447	1.4
576	n5064	5.5	5.5	4.209	26.4	26.475	4.373	4.373	1.29
577	n5065	5.43	5.43	4.134	26.475	26.55	4.299	4.299	1.3
578	n5066	5.5	5.5	4.06	26.55	26.625	4.224	4.224	1.44
579	n5067	5.55	5.55	3.985	26.625	26.7	4.149	4.149	1.56
580	n5068	5.51	5.51	1.936	54	54.075	2.153	2.153	3.57
581	n5069	5.56	5.56	2.014	27.225	27.3	2.196	2.196	3.55
582	n5070	5.57	5.57	2.09	27.15	27.225	2.259	2.259	3.48
583	n5071	5.53	5.53	2.16	27.075	27.15	2.327	2.327	3.37
584	n5072	5.58	5.58	2.234	27	27.075	2.401	2.401	3.35
585	n5073	5.63	5.63	2.309	26.925	27	2.475	2.475	3.32
586	n5074	5.61	5.61	2.383	26.85	26.925	2.549	2.549	3.23
587	n5075	5.55	5.55	2.458	26.775	26.85	2.624	2.624	3.09
588	n5076	5.57	5.57	2.533	26.7	26.775	2.698	2.698	3.04
589	n5077	5.69	5.69	2.607	26.625	26.7	2.772	2.772	3.08
590	n5078	5.83	5.83	2.682	26.55	26.625	2.847	2.847	3.15
591	n5079	6.08	6.08	2.757	26.475	26.55	2.921	2.921	3.32
592	n5080	6.12	6.12	2.831	26.4	26.475	2.995	2.995	3.29
593	n5081	6.14	6.14	2.906	26.325	26.4	3.07	3.07	3.23
594	n5082	6.08	6.08	2.981	26.25	26.325	3.144	3.144	3.1
595	n5083	6.1	6.1	3.055	26.175	26.25	3.218	3.218	3.04
596	n5084	6.09	6.09	3.13	26.1	26.175	3.293	3.293	2.96
597	n5085	6.1	6.1	3.205	26.025	26.1	3.367	3.367	2.9
598	n5086	5.97	5.97	3.26	25.95	26.025	3.422	3.422	2.71
599	n5087	6.03	6.03	3.267	25.05	25.125	3.429	3.429	2.76
600	n5088	6.2	6.2	3.361	24.975	25.05	3.523	3.523	2.84
601	n5089	6.18	6.18	4.388	22.275	22.35	4.51	4.51	1.79
602	n5090	6.18	6.18	4.482	22.2	22.275	4.63	4.63	1.7
603	n5091	6.16	6.16	4.576	22.125	22.2	4.724	4.724	1.58
604	n5092	6.1	6.1	4.67	22.05	22.125	4.818	4.818	1.43
605	n5093	6	6	4.764	0	22.05	4.911	4.911	1.24

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606	n5094	5.96	5.96	2.005	21.9	21.975	2.152	2.152	3.96
607	n5095	6.06	6.06	2.016	21.825	21.9	2.163	2.163	4.04
608	n5096	6.18	6.18	3.642	2.175	2.25	3.687	3.687	2.54
609	n5097	6.28	6.28	3.744	2.1	2.175	3.788	3.788	2.54
610	n5098	6.45	6.45	3.846	2.025	2.1	3.889	3.889	2.6
611	n5099	6.43	6.43	3.948	1.95	2.025	3.991	3.991	2.48
612	n5100	6.47	6.47	4.05	1.875	1.95	4.092	4.092	2.42
613	n5101	6.44	6.44	4.152	1.8	1.875	4.193	4.193	2.29
614	n5102	6.39	6.39	4.254	1.725	1.8	4.294	4.294	2.14
615	n5103	6.4	6.4	4.356	1.65	1.725	4.395	4.395	2.04
616	n5104	6.42	6.42	4.458	1.575	1.65	4.496	4.496	1.96
617	n5105	6.41	6.41	4.56	1.5	1.575	4.598	4.598	1.85
618	n5106	6.41	6.41	4.662	1.425	1.5	4.699	4.699	1.75
619	n5107	6.44	6.44	4.764	1.35	1.425	4.8	4.8	1.68
620	n5108	6.44	6.44	4.866	1.275	1.35	4.901	4.901	1.57
621	n5109	6.49	6.49	4.968	1.2	1.275	5.002	5.002	1.52
622	n5110	6.64	6.64	5.07	1.125	1.2	5.103	5.103	1.57
623	n5111	7.4	7.4	5.189	1.05	1.125	5.221	5.221	2.21
624	n5112	6.21	6.21	4.884	0.075	0.15	4.896	4.896	1.33
625	n5113	6.14	6.14	4.867	0.15	0.225	4.882	4.882	1.27
626	n5114	6.06	6.06	4.784	0.225	0.3	4.801	4.801	1.28
627	n5115	5.96	5.96	4.74	0.3	0.375	4.759	4.759	1.22
628	n5116	5.95	5.95	4.678	0.375	0.45	4.699	4.699	1.27
629	n5117	5.98	5.98	4.58	0.45	0.525	4.602	4.602	1.4
630	n5118	6	6	4.508	0.525	0.6	4.532	4.532	1.49
631	n5119	6.04	6.04	4.478	0.6	0.675	4.503	4.503	1.56
632	n5120	5.9	5.9	4.404	0.675	0.75	4.43	4.43	1.5
633	n5121	5.97	5.97	4.376	0.75	0.825	4.4	4.4	1.59
634	n5122	7.21	7.21	6.02	0	0.075	6.027	6.027	1.19
635	n5123	7.52	7.52	6.33	0	0.075	6.339	6.339	1.19
636	n5124	7.5	7.5	6.228	0.075	0.15	6.241	6.241	1.27
637	n5125	7.53	7.53	6.126	0.15	0.225	6.141	6.141	1.4
638	n5126	7.52	7.52	6.024	0.225	0.3	6.041	6.041	1.5
639	n5127	7.53	7.53	5.922	0.3	0.375	5.941	5.941	1.61
640	n5128	8.09	8.09	5.82	0.375	0.45	5.841	5.841	2.27
641	n5129	6.23	6.23	5.04	0.075	0.15	5.052	5.052	1.19
642	n5130	6.08	6.08	4.89	0.15	0.225	4.905	4.905	1.19
643	n5131	6.13	6.13	4.788	0.225	0.3	4.805	4.805	1.34
644	n5132	6.1	6.1	4.686	0.3	0.375	4.705	4.705	1.41
645	n5133	6.11	6.11	4.584	0.375	0.45	4.605	4.605	1.53
646	n5134	6.06	6.06	4.482	0.45	0.525	4.505	4.505	1.58
647	n5135	6.17	6.17	4.38	0.525	0.6	4.404	4.404	1.79
648	n5136	6.12	6.12	4.306	0.6	0.675	4.331	4.331	1.81
649	n5137	6.33	6.33	4.202	0.675	0.75	4.228	4.228	2.13
650	n5138	6.51	6.51	5.32	0	0.075	5.329	5.329	1.19
651	n5139	6.51	6.51	5.218	0.075	0.15	5.231	5.231	1.29
652	n5140	6.48	6.48	5.117	0.15	0.225	5.132	5.132	1.36
653	n5141	6.35	6.35	5.096	0.225	0.3	5.113	5.113	1.25

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654	n5142	6.41	6.41	5.014	0.3	0.375	5.033	5.033	1.4
655	n5143	6.42	6.42	4.977	0.375	0.45	4.998	4.998	1.44
656	n5144	6.39	6.39	4.94	0.45	0.525	4.962	4.962	1.45
657	n5145	6.39	6.39	4.912	0.525	0.6	4.936	4.936	1.48
658	n5146	6.44	6.44	4.81	0.6	0.675	4.835	4.835	1.63
659	n5147	6.4	6.4	4.708	0.675	0.75	4.735	4.735	1.69
660	n5148	6.59	6.59	4.606	0.75	0.825	4.634	4.634	1.98
661	n5149	6.72	6.72	4.501	0.825	0.9	4.529	4.529	2.22
662	n5150	6.62	6.62	4.402	0.9	0.975	4.432	4.432	2.22
663	n5151	6.58	6.58	4.3	0.975	1.05	4.331	4.331	2.28
664	n5152	6.48	6.48	4.231	1.05	1.125	4.263	4.263	2.25
665	n5153	6.43	6.43	4.198	1.125	1.2	4.231	4.231	2.23
666	n5154	6.26	6.26	4.096	1.2	1.275	4.13	4.13	2.16
667	n5155	6.41	6.41	3.692	2.325	2.4	3.739	3.739	2.72
668	n5156	6.37	6.37	3.463	2.55	2.625	3.528	3.528	2.91
669	n5157	6.25	6.25	3.565	2.475	2.55	3.614	3.614	2.68
670	n5158	6.2	6.2	3.667	2.4	2.475	3.715	3.715	2.53
671	n5159	6.39	6.39	3.794	0.975	1.05	3.825	3.825	2.6
672	n5160	6.31	6.31	3.897	0.9	0.975	3.927	3.927	2.41
673	n5161	6.39	6.39	3.998	0.825	0.9	4.027	4.027	2.39
674	n5162	6.26	6.26	4.1	0.75	0.825	4.128	4.128	2.16
675	n5163	6.03	6.03	2.08	19.5	19.575	2.225	2.225	3.95
676	n5164	6.02	6.02	2.182	19.425	19.5	2.327	2.327	3.84
677	n5165	6.15	6.15	2.284	19.35	19.425	2.428	2.428	3.87
678	n5166	6.06	6.06	2.386	19.275	19.35	2.53	2.53	3.67
679	n5167	6.06	6.06	2.488	19.2	19.275	2.632	2.632	3.57
680	n5168	6.12	6.12	2.59	19.125	19.2	2.733	2.733	3.53
681	n5169	6.19	6.19	2.692	19.05	19.125	2.835	2.835	3.5
682	n5170	6.24	6.24	2.794	18.975	19.05	2.936	2.936	3.45
683	n5171	6.27	6.27	2.871	18.9	18.975	3.013	3.013	3.4
684	n5172	6.28	6.28	2.896	18.825	18.9	3.038	3.038	3.38
685	n5173	6.28	6.28	2.998	18.75	18.825	3.139	3.139	3.28
686	n5174	6.46	6.46	3.1	18.675	18.75	3.241	3.241	3.36
687	n5175	6.19	6.19	3.203	18.6	18.675	3.344	3.344	2.99
688	n5180	6.29	6.29	5.1	0	0.075	5.109	5.109	1.19
689	n5181	6.3	6.3	4.998	0.075	0.15	5.011	5.011	1.3
690	n5182	6.23	6.23	3.406	18.45	18.525	3.545	3.545	2.82
691	n5183	6.23	6.23	3.304	18.525	18.6	3.444	3.444	2.93
692	n5184	6.24	6.24	3.478	16.2	16.275	3.606	3.606	2.76
693	n5185	6.29	6.29	3.58	16.125	16.2	3.708	3.708	2.71
694	n5186	6.23	6.23	3.682	16.05	16.125	3.809	3.809	2.55
695	n5187	6.19	6.19	3.784	15.975	16.05	3.911	3.911	2.41
696	n5188	6.25	6.25	3.886	15.9	15.975	4.012	4.012	2.36
697	n5189	6.25	6.25	4.904	0.225	0.3	4.921	4.921	1.35
698	n5190	6.26	6.26	5.006	0.15	0.225	5.021	5.021	1.25
699	n5191	6.31	6.31	5.108	0.075	0.15	5.121	5.121	1.2
700	n5192	6.4	6.4	5.21	0	0.075	5.219	5.219	1.19
701	n5193	6.33	6.33	4.033	1.95	2.025	4.071	4.071	2.3

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702	n5194	6.29	6.29	4.135	1.875	1.95	4.178	4.178	2.15
703	n5195	6.54	6.54	4.237	1.8	1.875	4.279	4.279	2.3
704	n5196	6.68	6.68	4.339	1.725	1.8	4.38	4.38	2.34
705	n5197	6.59	6.59	4.441	1.65	1.725	4.481	4.481	2.15
706	n5198	6.51	6.51	4.543	1.575	1.65	4.582	4.582	1.97
707	n5199	6.4	6.4	4.645	1.5	1.575	4.683	4.683	1.75
708	n5200	6.48	6.48	4.747	1.425	1.5	4.784	4.784	1.73
709	n5201	6.49	6.49	4.849	1.35	1.425	4.885	4.885	1.64
710	n5202	6.55	6.55	4.951	1.275	1.35	4.987	4.987	1.6
711	n5203	6.81	6.81	5.053	1.2	1.275	5.088	5.088	1.76
712	n5204	6.27	6.27	4.125	15.525	15.6	4.249	4.249	2.15
713	n5205	6.3	6.3	4.902	0.675	0.75	4.925	4.925	1.4
714	n5206	6.42	6.42	5.004	0.6	0.675	5.029	5.029	1.42
715	n5207	6.34	6.34	5.106	0.525	0.6	5.13	5.13	1.23
716	n5208	6.66	6.66	5.208	0.45	0.525	5.231	5.231	1.45
717	n5209	6.75	6.75	5.31	0.375	0.45	5.331	5.331	1.44
718	n5210	6.77	6.77	5.412	0.3	0.375	5.431	5.431	1.36
719	n5211	6.87	6.87	5.514	0.225	0.3	5.531	5.531	1.36
720	n5212	6.96	6.96	5.616	0.15	0.225	5.631	5.631	1.34
721	n5213	6.96	6.96	5.718	0.075	0.15	5.731	5.731	1.24
722	n5214	7.01	7.01	5.82	0	0.075	5.829	5.829	1.19
723	n5215	6.21	6.21	4.228	14.7	14.775	4.359	4.359	1.98
724	n5216	6.22	6.22	4.329	14.625	14.7	4.459	4.459	1.89
725	n5217	6.23	6.23	4.405	14.55	14.625	4.535	4.535	1.83
726	n5218	6.2	6.2	4.554	0.975	1.05	4.583	4.583	1.65
727	n5219	6.26	6.26	4.656	0.9	0.975	4.686	4.686	1.6
728	n5220	6.57	6.57	4.758	0.825	0.9	4.787	4.787	1.81
729	n5221	6.79	6.79	4.86	0.75	0.825	4.888	4.888	1.93
730	n5222	6.78	6.78	4.962	0.675	0.75	4.989	4.989	1.82
731	n5223	6.74	6.74	5.064	0.6	0.675	5.089	5.089	1.68
732	n5224	6.57	6.57	5.166	0.525	0.6	5.19	5.19	1.4
733	n5225	6.49	6.49	5.268	0.45	0.525	5.291	5.291	1.22
734	n5226	6.56	6.56	5.37	0.375	0.45	5.391	5.391	1.19
735	n5227	7.12	7.12	5.93	0.3	0.375	5.946	5.946	1.19
736	n5228	6.36	6.36	4.507	13.425	13.5	4.629	4.629	1.85
737	n5229	6.35	6.35	4.609	13.35	13.425	4.731	4.731	1.74
738	n5230	6.31	6.31	4.711	13.275	13.35	4.832	4.832	1.6
739	n5231	6.29	6.29	4.813	13.2	13.275	4.934	4.934	1.48
740	n5232	6.21	6.21	4.915	13.125	13.2	5.036	5.036	1.3
741	n5233	6.15	6.15	4.96	0	13.125	5.081	5.081	1.19
742	n5234	6.19	6.19	2.113	12.975	13.05	2.231	2.231	4.08
743	n5235	6.23	6.23	2.215	12.9	12.975	2.334	2.334	4.01
744	n5236	6.2	6.2	2.302	12.825	12.9	2.42	2.42	3.9
745	n5237	6.28	6.28	5.008	0.075	0.15	5.021	5.021	1.27
746	n5238	6.3	6.3	5.11	0	0.075	5.119	5.119	1.19
747	n5386	6.14	6.14	4.95	0	0.075	4.959	4.959	1.19
748	n5387	7.34	7.34	6.15	0	0.075	6.159	6.159	1.19
749	n5388	6.85	6.85	3.816	2.4	2.475	3.864	3.864	3.03

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750	n5403	6.28	6.28	5.09	0	0.075	5.099	5.099	1.19
751	n5414	7.47	7.47	6.277	0.375	0.45	6.297	6.297	1.19
753	n5431	11.8	11.8	8.781	3.6	3.675	8.839	8.839	3.02
1524	MH-11	13.171	13.171	11.981	0	0.6	12.005	12.005	1.19
1552	MH-16	9.132	9.132	7.921	0	16.725	8.052	8.052	1.21
30	n2258	14.12	14.12	12.93	0	0.075	12.938	12.938	1.19
31	n2259	13.92	13.92	12.73	0.075	0.15	12.743	12.743	1.19
32	n2260	13.96	13.96	12.628	0.15	0.225	12.643	12.643	1.33
33	n2261	14.47	14.47	12.526	0.225	0.3	12.543	12.543	1.94
34	n2262	14.86	14.86	12.424	0.3	0.375	12.443	12.443	2.44
35	n2263	14.91	14.91	12.366	0.375	0.45	12.387	12.387	2.54
36	n2264	14.49	14.49	12.264	0.45	0.525	12.286	12.286	2.23
37	n2265	13.72	13.72	12.162	0.525	0.6	12.182	12.182	1.56
38	n2266	13.06	13.06	11.87	0.6	0.675	11.892	11.892	1.19
39	n2308	12.79	12.79	11.6	0.675	0.75	11.624	11.624	1.19
40	n2309	12.62	12.62	11.43	0.75	0.825	11.455	11.455	1.19
41	n2310	12.47	12.47	11.28	0.825	0.9	11.305	11.305	1.19
42	n2311	12.14	12.14	10.95	0.9	0.975	10.976	10.976	1.19
43	n2312	11.81	11.81	10.62	0.975	1.05	10.647	10.647	1.19
44	n2313	11.48	11.48	10.29	1.05	1.125	10.318	10.318	1.19
45	n2314	11.3	11.3	7.037	3.675	3.75	7.096	7.096	4.26
46	n2315	11.29	11.29	7	3.75	3.825	7.06	7.06	4.29
47	n2316	11.31	11.31	6.898	3.825	3.9	6.958	6.958	4.41
48	n2317	11.47	11.47	10.28	0	3.975	10.341	10.341	1.19
49	n2318	11.78	11.78	10.178	3.975	4.05	10.239	10.239	1.6
50	n2319	12.09	12.09	10.076	4.05	4.125	10.138	10.138	2.01
51	n2320	12.14	12.14	9.974	4.125	4.2	10.037	10.037	2.17
52	n2321	12.07	12.07	9.872	4.2	4.275	9.935	9.935	2.2
53	n2322	11.96	11.96	9.77	4.275	4.35	9.834	9.834	2.19
54	n2323	11.93	11.93	9.749	4.35	4.425	9.813	9.813	2.18
55	n2324	11.85	11.85	9.668	4.425	4.5	9.733	9.733	2.18
56	n2325	11.86	11.86	9.6	4.8	4.875	9.668	9.668	2.26
57	n2326	11.89	11.89	9.498	4.875	4.95	9.566	9.566	2.39
58	n2327	11.91	11.91	9.449	4.95	5.025	9.517	9.517	2.46
59	n2328	11.92	11.92	9.347	5.025	5.1	9.416	9.416	2.57
60	n2329	11.92	11.92	9.245	5.1	5.175	9.314	9.314	2.68
61	n2330	11.98	11.98	9.143	5.175	5.25	9.213	9.213	2.84
62	n2331	12	12	9.041	5.25	5.325	9.112	9.112	2.96
63	n2332	11.93	11.93	8.939	5.325	5.4	9.01	9.01	2.99
64	n2333	11.83	11.83	8.837	5.4	5.475	8.909	8.909	2.99
65	n2334	11.71	11.71	8.714	7.05	7.125	8.796	8.796	3
66	n2335	11.66	11.66	8.612	7.125	7.2	8.695	8.695	3.05
67	n2336	11.58	11.58	8.51	7.2	7.275	8.593	8.593	3.07
68	n2337	11.48	11.48	8.408	7.275	7.35	8.481	8.481	3.07
69	n2338	11.4	11.4	8.25	8.925	9	8.345	8.345	3.15
70	n2339	11.33	11.33	8.148	9	9.075	8.243	8.243	3.18
71	n2340	11.23	11.23	8.046	9.075	9.15	8.142	8.142	3.18
72	n2341	11.18	11.18	7.944	9.15	9.225	8.04	8.04	3.24

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73	n2342	11.16	11.16	7.842	9.225	9.3	7.939	7.939	3.32
74	n2343	11.08	11.08	7.74	9.3	9.375	7.837	7.837	3.34
75	n2344	11.01	11.01	7.638	9.375	9.45	7.736	7.736	3.37
76	n2345	10.97	10.97	7.536	9.45	9.525	7.634	7.634	3.43
77	n2346	10.95	10.95	7.434	9.525	9.6	7.532	7.532	3.52
78	n2347	10.93	10.93	7.357	11.7	11.775	7.469	7.469	3.57
79	n2348	10.89	10.89	7.238	11.775	11.85	7.35	7.35	3.65
80	n2349	10.88	10.88	7.136	11.85	11.925	7.248	7.248	3.74
81	n2350	10.87	10.87	7.034	11.925	12	7.147	7.147	3.84
82	n2351	10.85	10.85	6.932	12	12.075	7.045	7.045	3.92
83	n2352	10.8	10.8	6.83	12.075	12.15	6.944	6.944	3.97
84	n2353	10.65	10.65	6.728	12.15	12.225	6.842	6.842	3.92
85	n2354	10.46	10.46	6.626	12.225	12.3	6.741	6.741	3.83
86	n2355	10.46	10.46	6.524	13.275	13.35	6.645	6.645	3.94
87	n2356	9.98	9.98	7.31	0.9	0.975	7.34	7.34	2.67
88	n2357	10.37	10.37	6.422	13.35	13.425	6.544	6.544	3.95
89	n2358	10.28	10.28	6.32	13.425	13.5	6.442	6.442	3.96
90	n2359	10.07	10.07	6.217	13.5	13.575	6.34	6.34	3.85
91	n2360	9.96	9.96	6.116	13.575	13.65	6.239	6.239	3.84
92	n2361	9.98	9.98	6.014	13.65	13.725	6.138	6.138	3.97
93	n2362	9.94	9.94	5.912	13.725	13.8	6.036	6.036	4.03
94	n2363	9.78	9.78	5.81	13.8	13.875	5.935	5.935	3.97
95	n2364	9.73	9.73	5.708	13.875	13.95	5.833	5.833	4.02
96	n2365	9.75	9.75	5.606	13.95	14.025	5.732	5.732	4.14
97	n2366	9.78	9.78	5.504	14.025	14.1	5.63	5.63	4.28
98	n2367	9.76	9.76	5.402	14.1	14.175	5.529	5.529	4.36
100	n2380	10.97	10.97	8.924	1.95	2.025	8.967	8.967	2.05
101	n2381	11.34	11.34	9.026	1.875	1.95	9.069	9.069	2.31
102	n2382	10.98	10.98	9.095	1.8	1.875	9.136	9.136	1.88
103	n2383	10.65	10.65	9.14	1.725	1.8	9.18	9.18	1.51
104	n2384	10.42	10.42	9.23	0	1.725	9.27	9.27	1.19
105	n2385	10.29	10.29	6.326	1.575	1.65	6.365	6.365	3.96
106	n2386	10.14	10.14	6.428	1.5	1.575	6.466	6.466	3.71
107	n2387	9.8	9.8	6.53	1.425	1.5	6.567	6.567	3.27
108	n2388	9.47	9.47	6.632	1.35	1.425	6.668	6.668	2.84
109	n2389	9.24	9.24	6.694	1.275	1.35	6.729	6.729	2.55
110	n2390	8.94	8.94	6.796	0.6	0.675	6.821	6.821	2.14
111	n2391	8.48	8.48	6.898	0.525	0.6	6.922	6.922	1.58
112	n2392	8.27	8.27	6.941	0.45	0.525	6.964	6.964	1.33
113	n2393	8.19	8.19	7	0.375	0.45	7.021	7.021	1.19
114	n2394	8.31	8.31	7.12	0.3	0.375	7.139	7.139	1.19
115	n2395	8.73	8.73	7.54	0.225	0.3	7.555	7.555	1.19
116	n2396	9.1	9.1	7.91	0.15	0.225	7.923	7.923	1.19
117	n2397	9.33	9.33	8.14	0.075	0.15	8.15	8.15	1.19
118	n2398	9.75	9.75	8.56	0	0.075	8.567	8.567	1.19
119	n2399	10.27	10.27	9.08	0.675	0.75	9.107	9.107	1.19
120	n2400	10.53	10.53	9.05	0.975	1.05	9.081	9.081	1.48
121	n2401	10.68	10.68	8.948	1.05	1.125	8.98	8.98	1.73

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122	n2402	10.67	10.67	8.846	1.125	1.2	8.879	8.879	1.82
123	n2403	10.81	10.81	8.744	1.2	1.275	8.778	8.778	2.07
124	n2404	10.91	10.91	8.642	1.275	1.35	8.677	8.677	2.27
125	n2405	11.05	11.05	8.54	1.35	1.425	8.576	8.576	2.51
126	n2406	11.06	11.06	8.438	1.425	1.5	8.475	8.475	2.62
127	n2407	11.17	11.17	8.336	1.5	1.575	8.374	8.374	2.83
128	n2408	11.36	11.36	10.17	0.15	0.225	10.183	10.183	1.19
129	n2409	12.27	12.27	11.08	0.075	0.15	11.09	11.09	1.19
130	n2410	12.55	12.55	11.36	0	0.075	11.367	11.367	1.19
131	n2411	13.08	13.08	11.89	1.05	1.125	11.922	11.922	1.19
132	n2412	13.02	13.02	11.788	1.125	1.2	11.817	11.817	1.23
133	n2413	12.79	12.79	11.6	1.2	1.275	11.63	11.63	1.19
134	n2414	12.51	12.51	11.32	1.275	1.35	11.351	11.351	1.19
135	n2415	12.23	12.23	11.04	1.35	1.425	11.072	11.072	1.19
136	n2416	11.98	11.98	10.79	1.425	1.5	10.823	10.823	1.19
137	n2417	11.59	11.59	10.4	1.5	1.575	10.438	10.438	1.19
138	n2418	13.17	13.17	11.98	0	0.075	11.989	11.989	1.19
139	n2419	12.93	12.93	11.74	0.15	0.225	11.754	11.754	1.19
140	n2420	12.8	12.8	11.61	0.225	0.3	11.625	11.625	1.19
141	n2421	12.63	12.63	11.44	0.3	0.375	11.456	11.456	1.19
142	n2422	12.42	12.42	11.23	0.375	0.45	11.248	11.248	1.19
143	n2423	12.19	12.19	11	0.45	0.525	11.02	11.02	1.19
144	n2424	12.01	12.01	10.82	0.525	0.6	10.843	10.843	1.19
145	n2425	11.89	11.89	7.91	1.8	1.875	7.951	7.951	3.98
146	n2426	12.1	12.1	10.454	0.225	0.3	10.469	10.469	1.65
147	n2427	12.13	12.13	10.556	0.15	0.225	10.571	10.571	1.57
148	n2428	12.16	12.16	10.658	0.075	0.15	10.671	10.671	1.5
149	n2429	11.95	11.95	10.76	0	0.075	10.769	10.769	1.19
150	n2430	11.71	11.71	7.808	1.875	1.95	7.85	7.85	3.9
151	n2431	11.53	11.53	7.706	1.95	2.025	7.749	7.749	3.82
152	n2432	11.33	11.33	7.604	2.025	2.1	7.648	7.648	3.73
153	n2433	11.23	11.23	7.502	2.1	2.175	7.546	7.546	3.73
154	n2434	11.31	11.31	7.4	2.175	2.25	7.445	7.445	3.91
155	n2435	11.17	11.17	7.298	2.25	2.325	7.344	7.344	3.87
156	n2436	11.1	11.1	7.196	2.325	2.4	7.243	7.243	3.9
157	n2437	11.15	11.15	7.094	2.4	2.475	7.142	7.142	4.06
158	n2438	11.19	11.19	7.05	2.475	2.55	7.101	7.101	4.14
159	n2466	17.06	17.06	15.87	0	0.075	15.877	15.877	1.19
160	n2467	16.47	16.47	15.28	0.075	0.15	15.29	15.29	1.19
161	n2468	15.88	15.88	14.69	0.15	0.225	14.703	14.703	1.19
162	n2469	15.43	15.43	14.24	0.225	0.3	14.255	14.255	1.19
163	n2470	14.93	14.93	13.74	0.3	0.375	13.756	13.756	1.19
164	n2471	14.53	14.53	13.34	0.375	0.45	13.358	13.358	1.19
165	n2473	13.28	13.28	12.09	0.975	1.05	12.117	12.117	1.19
166	n2474	13.52	13.52	12.33	0.9	0.975	12.356	12.356	1.19
167	n2476	13.75	13.75	12.539	0.825	0.9	12.564	12.564	1.21
168	n2477	13.82	13.82	12.578	0.6	0.675	12.603	12.603	1.24
169	n2478	13.87	13.87	12.68	0.525	0.6	12.704	12.704	1.19

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170	n2479	14.31	14.31	13.12	0.45	0.525	13.139	13.139	1.19
171	n2483	14.19	14.19	12.898	0.075	0.15	12.908	12.908	1.29
172	n2484	14.22	14.22	13.03	0	0.075	13.039	13.039	1.19
173	n2485	11.86	11.86	7.942	1.125	1.2	7.975	7.975	3.92
174	n2486	11.48	11.48	8.044	1.05	1.125	8.076	8.076	3.44
175	n2487	10.57	10.57	8.168	0.975	1.05	8.2	8.2	2.4
176	n2488	10.38	10.38	8.209	0.9	0.975	8.239	8.239	2.17
177	n2489	10.2	10.2	8.248	0.825	0.9	8.277	8.277	1.95
178	n2490	9.61	9.61	8.35	0.75	0.825	8.378	8.378	1.26
179	n2491	9.57	9.57	8.38	0.675	0.75	8.407	8.407	1.19
180	n2492	9.78	9.78	8.59	0.6	0.675	8.612	8.612	1.19
181	n2493	10.24	10.24	9.05	0.525	0.6	9.071	9.071	1.19
182	n2494	10.73	10.73	9.54	0.45	0.525	9.559	9.559	1.19
183	n2495	10.84	10.84	9.581	0.375	0.45	9.598	9.598	1.26
184	n2496	10.81	10.81	9.62	0.3	0.375	9.639	9.639	1.19
185	n2497	11.38	11.38	10.19	0.225	0.3	10.205	10.205	1.19
186	n2498	12.51	12.51	11.32	0.15	0.225	11.333	11.333	1.19
187	n2499	13.72	13.72	12.53	0.075	0.15	12.54	12.54	1.19
188	n2500	14.22	14.22	13.03	0	0.075	13.037	13.037	1.19
189	n2552	17.03	17.03	15.84	0	0.075	15.849	15.849	1.19
190	n2553	16.98	16.98	15.738	0.075	0.15	15.75	15.75	1.24
191	n2554	16.85	16.85	15.66	0.15	0.225	15.673	15.673	1.19
192	n2555	16.52	16.52	15.33	0.225	0.3	15.345	15.345	1.19
193	n2556	16.3	16.3	15.11	0.3	0.375	15.126	15.126	1.19
194	n2557	15.8	15.8	14.61	0.375	0.45	14.628	14.628	1.19
195	n2558	15.13	15.13	13.94	0.45	0.525	13.959	13.959	1.19
196	n2559	13.92	13.92	12.73	0.525	0.6	12.754	12.754	1.19
197	n2560	14	14	12.81	0	0.075	12.817	12.817	1.19
198	n2561	13.09	13.09	11.9	0.075	0.15	11.91	11.91	1.19
199	n2562	12.27	12.27	11.08	0.15	0.225	11.093	11.093	1.19
200	n2563	11.83	11.83	10.64	0.225	0.3	10.655	10.655	1.19
201	n2564	11.45	11.45	10.26	0.3	0.375	10.276	10.276	1.19
202	n2565	11.14	11.14	9.95	0.375	0.45	9.968	9.968	1.19
203	n2566	10.92	10.92	9.73	0.45	0.525	9.749	9.749	1.19
204	n2567	10.72	10.72	9.53	0.525	0.6	9.554	9.554	1.19
205	n2568	10.73	10.73	9.428	0.6	0.675	9.45	9.45	1.3
206	n2569	15.75	15.75	14.56	0	0.075	14.567	14.567	1.19
207	n2570	14.96	14.96	13.77	0.075	0.15	13.78	13.78	1.19
208	n2571	13.94	13.94	12.75	0.15	0.225	12.763	12.763	1.19
209	n2572	12.89	12.89	11.7	0.225	0.3	11.715	11.715	1.19
210	n2573	12.12	12.12	10.93	0.3	0.375	10.946	10.946	1.19
211	n2574	11.3	11.3	10.11	0.375	0.45	10.128	10.128	1.19
212	n2575	10.5	10.5	9.31	0.45	0.525	9.329	9.329	1.19
213	n2576	9.72	9.72	8.53	0.525	0.6	8.551	8.551	1.19
214	n2577	8.65	8.65	7.46	0.6	0.675	7.482	7.482	1.19
215	n2578	7.9	7.9	6.71	0.75	0.825	6.734	6.734	1.19
216	n2579	7.36	7.36	6.17	2.25	2.325	6.211	6.211	1.19
217	n2580	9.68	9.68	8.49	0.525	0.6	8.511	8.511	1.19

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218	n2581	10.53	10.53	9.34	0.45	0.525	9.359	9.359	1.19
219	n2582	11.85	11.85	10.66	0.375	0.45	10.678	10.678	1.19
220	n2583	13.33	13.33	12.14	0.3	0.375	12.156	12.156	1.19
221	n2584	13.87	13.87	12.68	0.225	0.3	12.695	12.695	1.19
222	n2585	14.27	14.27	13.08	0.15	0.225	13.093	13.093	1.19
223	n2586	14.45	14.45	13.26	0	0.075	13.269	13.269	1.19
224	n2587	14.48	14.48	12.266	3.9	3.975	12.327	12.327	2.21
227	n2597	7.55	7.55	4.254	3.75	3.825	4.314	4.314	3.3
228	n2598	6.32	6.32	4.356	3.675	3.75	4.415	4.415	1.96
229	n2599	5.81	5.81	4.458	3.6	3.675	4.516	4.516	1.35
230	n2600	5.75	5.75	4.56	3.525	3.6	4.618	4.618	1.19
231	n2601	5.99	5.99	4.8	3.45	3.525	4.85	4.85	1.19
232	n2602	6.29	6.29	5.1	3.375	3.45	5.15	5.15	1.19
233	n2603	6.44	6.44	5.218	3.3	3.375	5.272	5.272	1.22
234	n2604	7.02	7.02	5.83	2.325	2.4	5.871	5.871	1.19
235	n2605	7.87	7.87	6.68	1.35	1.425	6.712	6.712	1.19
236	n2606	8.49	8.49	7.3	1.275	1.35	7.331	7.331	1.19
237	n2607	9.54	9.54	8.35	1.2	1.275	8.38	8.38	1.19
238	n2608	10.61	10.61	9.415	1.125	1.2	9.444	9.444	1.2
239	n2609	10.95	10.95	9.76	1.05	1.125	9.788	9.788	1.19
240	n2610	12.01	12.01	10.82	0.975	1.05	10.847	10.847	1.19
241	n2611	12.36	12.36	11.17	0.9	0.975	11.196	11.196	1.19
242	n2612	12.94	12.94	11.672	0.825	0.9	11.697	11.697	1.27
243	n2613	13.45	13.45	12.26	0.75	0.825	12.284	12.284	1.19
244	n2614	13.57	13.57	12.38	0.675	0.75	12.406	12.406	1.19
245	n2615	14.09	14.09	12.628	0.6	0.675	12.65	12.65	1.46
246	n3129	17.68	17.68	16.49	0	0.075	16.497	16.497	1.19
247	n3130	17.44	17.44	16.25	0.075	0.15	16.26	16.26	1.19
248	n3131	16.41	16.41	15.22	0.15	0.225	15.233	15.233	1.19
249	n3132	15.55	15.55	14.36	0.225	0.3	14.375	14.375	1.19
250	n3133	14.76	14.76	13.57	0.3	0.375	13.586	13.586	1.19
251	n3134	14.13	14.13	12.94	0.375	0.45	12.958	12.958	1.19
252	n3135	12.76	12.76	11.57	0.45	0.525	11.589	11.589	1.19
253	n3136	11.3	11.3	9.577	0.525	0.6	9.597	9.597	1.72
254	n3137	9.27	9.27	7.867	0.6	0.675	7.889	7.889	1.4
255	n3138	7.56	7.56	6.37	0.675	0.75	6.393	6.393	1.19
256	n3139	7.36	7.36	6.17	0.75	0.825	6.194	6.194	1.19
257	n3140	6.51	6.51	5.32	0.825	0.9	5.349	5.349	1.19
258	n5367	8.33	8.33	7.14	0.675	0.75	7.163	7.163	1.19
259	n5368	14.42	14.42	13.207	0.075	0.15	13.217	13.217	1.21
260	n5428	13.05	13.05	11.86	0.075	0.15	11.872	11.872	1.19
261	n5451	9.52	9.52	7.412	0.825	0.9	7.441	7.441	2.11
262	n5452	9.28	9.28	7.514	0.75	0.825	7.542	7.542	1.77
263	n5453	9.03	9.03	7.616	0.675	0.75	7.643	7.643	1.41
264	n5454	9.09	9.09	7.718	0.6	0.675	7.743	7.743	1.37
265	n5455	9.01	9.01	7.82	0.525	0.6	7.844	7.844	1.19
266	n5456	9.28	9.28	8.09	0.45	0.525	8.109	8.109	1.19
267	n5457	9.89	9.89	8.7	0.375	0.45	8.718	8.718	1.19

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268	n5458	10.63	10.63	9.44	0.3	0.375	9.456	9.456	1.19
270	n5460	13.92	13.92	12.73	0.075	0.15	12.74	12.74	1.19
271	n5461	14.25	14.25	13.06	0	0.075	13.067	13.067	1.19
273	n5463	13.95	13.95	12.028	4.125	4.2	12.09	12.09	1.92
274	n5464	14.53	14.53	12.232	3.975	4.05	12.293	12.293	2.3
275	n5465	14.21	14.21	12.13	4.05	4.125	12.192	12.192	2.08
276	n5466	5.66	5.66	3.491	0.525	0.6	3.515	3.515	2.17
278	n5468	6.11	6.11	3.899	0.225	0.3	3.916	3.916	2.21
280	n5470	5.41	5.41	4.008	0.15	0.225	4.023	4.023	1.4
281	n5471	5.3	5.3	4.11	0.075	0.15	4.123	4.123	1.19
282	n5472	5.44	5.44	4.25	0	0.075	4.259	4.259	1.19
284	n5474	5.46	5.46	3.369	5.925	6	3.445	3.445	2.09
285	n5475	5.5	5.5	4.31	5.1	5.175	4.38	4.38	1.19
286	n5476	5.47	5.47	4.208	5.175	5.25	4.278	4.278	1.26
287	n5477	7.85	7.85	5.805	5.025	5.1	5.865	5.865	2.05
288	n5478	8.42	8.42	7.046	4.95	5.025	7.106	7.106	1.37
289	n5479	8.37	8.37	7.148	4.875	4.95	7.216	7.216	1.22
290	n5480	8.44	8.44	7.25	4.8	4.875	7.318	7.318	1.19
291	n5481	9.13	9.13	7.94	4.725	4.8	7.999	7.999	1.19
292	n5482	9.9	9.9	8.71	4.65	4.725	8.769	8.769	1.19
293	n5483	10.59	10.59	9.4	4.575	4.65	9.458	9.458	1.19
294	n5484	11.31	11.31	10.12	4.5	4.575	10.178	10.178	1.19
297	n5487	12.24	12.24	11.05	4.35	4.425	11.107	11.107	1.19
298	n5488	13.94	13.94	12.007	4.2	4.275	12.07	12.07	1.93
299	n5489	13.21	13.21	11.905	4.275	4.35	11.961	11.961	1.31
300	n5490	9.78	9.78	5.28	14.175	14.25	5.407	5.407	4.5
301	n5491	9.26	9.26	5.246	14.25	14.325	5.374	5.374	4.01
302	n5492	7.95	7.95	5.144	14.325	14.4	5.272	5.272	2.81
303	n5493	7.19	7.19	5.042	14.4	14.475	5.171	5.171	2.15
306	n5496	6.24	6.24	4.841	14.7	14.775	4.946	4.946	1.4
307	n5497	5.77	5.77	4.58	14.775	14.85	4.686	4.686	1.19
308	n5498	5.05	5.05	3.86	14.85	14.925	3.966	3.966	1.19
309	n5499	4.52	4.52	3.33	14.925	15	3.437	3.437	1.19
310	n5500	4.25	4.25	3.039	15	15.075	3.161	3.161	1.21
311	n5501	4.35	4.35	2.937	15.075	15.15	3.059	3.059	1.41
313	n5503	4.28	4.28	2.835	15.15	15.225	2.939	2.939	1.44
314	n5504	4.18	4.18	1.839	22.425	22.5	1.988	1.988	2.34
315	n5505	4.38	4.38	1.941	7.125	7.2	2.025	2.025	2.44
317	n5507	4.44	4.44	2.043	7.05	7.125	2.126	2.126	2.4
318	n5508	4.53	4.53	2.145	6.975	7.05	2.228	2.228	2.38
319	n5509	4.61	4.61	2.247	6.9	6.975	2.329	2.329	2.36
320	n5510	4.71	4.71	2.349	6.825	6.9	2.431	2.431	2.36
321	n5511	4.72	4.72	2.451	6.75	6.825	2.532	2.532	2.27
322	n5512	4.75	4.75	2.553	6.675	6.75	2.634	2.634	2.2
323	n5513	4.75	4.75	2.655	6.6	6.675	2.735	2.735	2.09
325	n5515	4.69	4.69	2.757	6.45	6.525	2.836	2.836	1.93
326	n5516	4.66	4.66	2.859	6.3	6.375	2.937	2.937	1.8
327	n5517	4.72	4.72	2.961	6.225	6.3	3.039	3.039	1.76

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328	n5518	4.78	4.78	3.063	6.15	6.225	3.14	3.14	1.72
329	n5519	4.97	4.97	3.165	6.075	6.15	3.242	3.242	1.8
330	n5520	5.18	5.18	3.267	6	6.075	3.343	3.343	1.91
331	n5521	5.86	5.86	3.777	0.3	0.375	3.796	3.796	2.08
332	n5522	5.8	5.8	3.695	0.375	0.45	3.716	3.716	2.1
333	n5523	5.73	5.73	3.593	0.45	0.525	3.616	3.616	2.14
334	n5524	12.04	12.04	10.85	0.225	0.3	10.865	10.865	1.19
335	n5525	13.35	13.35	12.16	0.15	0.225	12.173	12.173	1.19
634	MH-1	6.922	6.922	4.925	14.55	14.625	5.055	5.055	2
637	MH-2	7.054	7.054	4.949	14.475	14.55	5.079	5.079	2.1
641	MH-4	6.61	6.61	4.886	14.625	14.7	5.015	5.015	1.72
650	MH-6	4.726	4.726	2.697	6.525	6.6	2.776	2.776	2.03
653	MH-7	4.678	4.678	2.8	6.375	6.45	2.878	2.878	1.88
659	MH-8	5.463	5.463	4.134	5.25	5.325	4.204	4.204	1.33
663	MH-9	12	12	10.811	4.425	4.5	10.868	10.868	1.19
739	MH-32	13.513	13.513	12.323	0	3.9	12.383	12.383	1.19
764	MH-39	10.94	10.94	8.888	2.025	2.1	8.931	8.931	2.05
30	n2169	22.82	22.82	21.63	0	0.075	21.637	21.637	1.19
31	n2170	22.36	22.36	21.17	0.075	0.15	21.183	21.183	1.19
32	n2268	13.49	13.49	12.3	0.825	0.9	12.325	12.325	1.19
33	n2269	14.47	14.47	13.28	0.75	0.825	13.304	13.304	1.19
34	n2270	14.98	14.98	13.586	0.675	0.75	13.609	13.609	1.39
35	n2271	15.63	15.63	13.688	0.6	0.675	13.714	13.714	1.94
36	n2272	15.32	15.32	13.737	0.525	0.6	13.761	13.761	1.58
37	n2273	15.3	15.3	13.79	0.45	0.525	13.813	13.813	1.51
38	n2274	15.43	15.43	13.892	0.375	0.45	13.913	13.913	1.54
39	n2275	15.58	15.58	13.994	0.3	0.375	14.013	14.013	1.59
40	n2276	15.99	15.99	14.096	0.225	0.3	14.113	14.113	1.89
41	n2277	16.41	16.41	14.198	0.15	0.225	14.213	14.213	2.21
42	n2278	16.19	16.19	14.264	0.075	0.15	14.276	14.276	1.93
43	n2279	15.49	15.49	14.3	0	0.075	14.309	14.309	1.19
44	n2281	8.63	8.63	7.44	0.15	0.225	7.455	7.455	1.19
45	n2282	8.64	8.64	7.368	0.225	0.3	7.385	7.385	1.27
46	n2283	8.61	8.61	7.266	0.3	0.375	7.285	7.285	1.34
47	n2284	8.65	8.65	7.241	0.375	0.45	7.261	7.261	1.41
48	n2285	8.73	8.73	7.164	0.45	0.525	7.186	7.186	1.57
49	n2286	8.72	8.72	7.144	0.525	0.6	7.167	7.167	1.58
50	n2287	8.76	8.76	7.062	0.6	0.675	7.087	7.087	1.7
51	n2288	8.66	8.66	6.96	0.675	0.75	6.986	6.986	1.7
52	n2289	8.45	8.45	6.858	0.75	0.825	6.886	6.886	1.59
53	n2290	8.7	8.7	6.78	0.825	0.9	6.808	6.808	1.92
54	n2291	8.72	8.72	6.761	0.9	0.975	6.791	6.791	1.96
55	n2292	9.24	9.24	6.654	1.425	1.5	6.691	6.691	2.59
56	n2293	10.38	10.38	9.19	0.375	0.45	9.208	9.208	1.19
57	n2294	12.9	12.9	11.71	0.3	0.375	11.726	11.726	1.19
58	n2295	14.41	14.41	13.22	0.225	0.3	13.235	13.235	1.19
59	n2296	15.26	15.26	14.07	0.15	0.225	14.083	14.083	1.19
60	n2297	16.34	16.34	15.15	0.075	0.15	15.16	15.16	1.19

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61	n2298	17.52	17.52	16.33	0	0.075	16.337	16.337	1.19
62	n2299	17.85	17.85	16.66	0	0.075	16.667	16.667	1.19
63	n2300	17.53	17.53	16.34	0.075	0.15	16.35	16.35	1.19
64	n2301	17.05	17.05	15.86	0.15	0.225	15.875	15.875	1.19
65	n2302	17.74	17.74	15.758	0.225	0.3	15.773	15.773	1.98
66	n2303	16.54	16.54	15.35	0.3	0.375	15.366	15.366	1.19
67	n2304	15.4	15.4	11.891	1.5	1.575	11.929	11.929	3.51
68	n2305	13.27	13.27	12.08	0.9	0.975	12.11	12.11	1.19
69	n2306	13.33	13.33	12.051	0.975	1.05	12.082	12.082	1.28
70	n2307	14.1	14.1	11.978	1.05	1.125	12.01	12.01	2.12
71	n2439	13.93	13.93	11.771	1.575	1.65	11.81	11.81	2.16
72	n2440	14.09	14.09	11.688	1.65	1.725	11.727	11.727	2.4
73	n2441	13.8	13.8	11.586	1.725	1.8	11.621	11.621	2.21
74	n2442	11.71	11.71	10.52	1.8	1.875	10.556	10.556	1.19
75	n2443	10.5	10.5	9.31	1.875	1.95	9.347	9.347	1.19
76	n2444	9.01	9.01	7.82	1.95	2.025	7.858	7.858	1.19
77	n2445	8.8	8.8	7.61	2.025	2.1	7.654	7.654	1.19
78	n2446	8.82	8.82	7.508	2.1	2.175	7.553	7.553	1.31
79	n2447	8.91	8.91	7.406	2.175	2.25	7.446	7.446	1.5
80	n2448	8.69	8.69	7.044	2.55	2.625	7.093	7.093	1.65
81	n2449	8.61	8.61	7.146	0.225	0.3	7.163	7.163	1.46
82	n2450	8.51	8.51	7.248	0.15	0.225	7.263	7.263	1.26
83	n2451	8.54	8.54	7.35	0.075	0.15	7.363	7.363	1.19
84	n2452	8.68	8.68	7.49	0	0.075	7.498	7.498	1.19
85	n2453	8.68	8.68	6.959	3.525	3.6	7.016	7.016	1.72
86	n2454	8.78	8.78	7.59	0.825	0.9	7.615	7.615	1.19
87	n2455	9.04	9.04	7.85	0.75	0.825	7.874	7.874	1.19
88	n2456	9.35	9.35	8.16	0.675	0.75	8.183	8.183	1.19
89	n2457	9.59	9.59	8.4	0.6	0.675	8.422	8.422	1.19
90	n2458	9.86	9.86	8.67	0.525	0.6	8.691	8.691	1.19
91	n2459	10.04	10.04	8.85	0.45	0.525	8.869	8.869	1.19
92	n2460	11.17	11.17	9.98	0.375	0.45	9.998	9.998	1.19
93	n2461	12.45	12.45	11.26	0.3	0.375	11.276	11.276	1.19
94	n2462	13.4	13.4	12.21	0.225	0.3	12.225	12.225	1.19
95	n2463	14.4	14.4	13.21	0.15	0.225	13.223	13.223	1.19
96	n2464	16.02	16.02	14.83	0.075	0.15	14.84	14.84	1.19
97	n2465	16.99	16.99	15.8	0	0.075	15.807	15.807	1.19
98	n2501	9.04	9.04	6.552	1.5	1.575	6.59	6.59	2.49
99	n2502	8.89	8.89	6.45	1.575	1.65	6.489	6.489	2.44
100	n2503	8.8	8.8	6.348	1.65	1.725	6.383	6.383	2.45
101	n2505	8.73	8.73	5.409	8.7	8.775	5.503	5.503	3.32
102	n2506	8.69	8.69	5.511	6.9	6.975	5.593	5.593	3.18
103	n2507	8.75	8.75	5.614	6.825	6.9	5.695	5.695	3.14
104	n2508	8.96	8.96	5.644	6.75	6.825	5.725	5.725	3.32
105	n2509	8.84	8.84	5.746	4.575	4.65	5.812	5.812	3.09
106	n2510	8.64	8.64	5.848	4.5	4.575	5.913	5.913	2.79
107	n2511	8.61	8.61	5.95	4.425	4.5	6.015	6.015	2.66
108	n2512	8.63	8.63	6.052	4.35	4.425	6.116	6.116	2.58

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109	n2513	8.49	8.49	6.154	4.275	4.35	6.217	6.217	2.34
110	n2514	8.37	8.37	6.204	4.2	4.275	6.267	6.267	2.17
111	n2515	8.36	8.36	6.256	4.125	4.2	6.318	6.318	2.1
112	n2516	8.29	8.29	6.358	4.05	4.125	6.42	6.42	1.93
113	n2517	8.33	8.33	6.402	3.975	4.05	6.463	6.463	1.93
114	n2518	8.3	8.3	6.46	3.9	3.975	6.52	6.52	1.84
115	n2519	8.47	8.47	6.562	3.825	3.9	6.622	6.622	1.91
116	n2520	8.47	8.47	6.664	3.75	3.825	6.723	6.723	1.81
117	n2521	8.43	8.43	6.766	3.675	3.75	6.825	6.825	1.66
118	n2522	8.56	8.56	6.868	3.6	3.675	6.926	6.926	1.69
119	n2523	9.08	9.08	7.89	2.025	2.1	7.929	7.929	1.19
120	n2524	9.19	9.19	8	1.95	2.025	8.042	8.042	1.19
121	n2525	10.24	10.24	9.05	1.875	1.95	9.087	9.087	1.19
122	n2526	12.47	12.47	11.28	1.8	1.875	11.316	11.316	1.19
123	n2527	13.02	13.02	11.83	1.725	1.8	11.866	11.866	1.19
124	n2528	13.29	13.29	12.1	1.575	1.65	12.134	12.134	1.19
125	n2529	13.56	13.56	12.323	1.5	1.575	12.356	12.356	1.24
126	n2530	13.91	13.91	12.664	1.35	1.425	12.695	12.695	1.25
127	n2531	14.72	14.72	12.761	1.275	1.35	12.796	12.796	1.96
128	n2532	15.61	15.61	14.42	0.45	0.525	14.439	14.439	1.19
129	n2533	15.84	15.84	14.65	0.375	0.45	14.668	14.668	1.19
130	n2534	16.17	16.17	14.832	0.3	0.375	14.849	14.849	1.34
131	n2535	16.53	16.53	14.934	0.225	0.3	14.951	14.951	1.6
132	n2536	16.62	16.62	15.036	0.15	0.225	15.051	15.051	1.58
133	n2537	16.74	16.74	15.138	0.075	0.15	15.151	15.151	1.6
134	n2538	16.43	16.43	15.24	0	0.075	15.249	15.249	1.19
135	n2622	25.81	25.81	24.62	0	0.075	24.627	24.627	1.19
136	n2623	24.71	24.71	23.52	0.075	0.15	23.53	23.53	1.19
137	n2631	20.23	20.23	18.497	10.275	10.35	18.601	18.601	1.73
138	n2632	21.53	21.53	18.602	10.2	10.275	18.705	18.705	2.93
139	n2633	21.86	21.86	20.67	0.3	0.375	20.686	20.686	1.19
140	n2634	22.01	22.01	20.82	0.225	0.3	20.836	20.836	1.19
141	n2635	22.36	22.36	21.093	0.15	0.225	21.105	21.105	1.27
142	n2636	22.18	22.18	18.682	9.75	9.825	18.782	18.782	3.5
143	n2637	22.82	22.82	18.784	9.675	9.75	18.883	18.883	4.04
144	n2638	23.15	23.15	18.886	9.6	9.675	18.985	18.985	4.26
145	n2639	23.14	23.14	18.988	9.525	9.6	19.086	19.086	4.15
146	n2640	23.12	23.12	19.09	9.45	9.525	19.188	19.188	4.03
147	n2641	23.11	23.11	19.192	9.375	9.45	19.289	19.289	3.92
148	n2642	23.17	23.17	19.294	9.3	9.375	19.391	19.391	3.88
149	n2643	23.63	23.63	19.396	9.225	9.3	19.493	19.493	4.23
150	n2644	23.63	23.63	19.43	9	9.075	19.526	19.526	4.2
151	n2645	22.88	22.88	19.532	8.925	9	19.627	19.627	3.35
152	n2646	22.26	22.26	19.634	8.85	8.925	19.729	19.729	2.63
153	n2647	21.73	21.73	19.736	8.775	8.85	19.83	19.83	1.99
154	n2648	21.35	21.35	19.838	8.7	8.775	19.932	19.932	1.51
155	n2649	21.13	21.13	19.94	8.625	8.7	20.033	20.033	1.19
156	n2650	21.38	21.38	20.19	8.55	8.625	20.27	20.27	1.19

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157	n2651	21.82	21.82	20.63	8.475	8.55	20.71	20.71	1.19
158	n2652	22.34	22.34	21.15	8.4	8.475	21.229	21.229	1.19
159	n2653	22.9	22.9	21.71	8.325	8.4	21.789	21.789	1.19
160	n2654	23.43	23.43	22.24	8.25	8.325	22.318	22.318	1.19
161	n2655	23.91	23.91	22.72	8.175	8.25	22.798	22.798	1.19
162	n2656	24.54	24.54	23.35	8.1	8.175	23.428	23.428	1.19
163	n2657	25.19	25.19	24	8.025	8.1	24.077	24.077	1.19
164	n2658	25.81	25.81	24.232	7.95	8.025	24.309	24.309	1.58
165	n2659	26.32	26.32	24.334	7.875	7.95	24.423	24.423	1.99
166	n2661	25.93	25.93	24.74	0	0.075	24.749	24.749	1.19
167	n2662	26.08	26.08	24.676	0.075	0.15	24.688	24.688	1.4
168	n2663	26.1	26.1	24.595	0.15	0.225	24.61	24.61	1.51
169	n2664	25.98	25.98	24.574	0.225	0.3	24.588	24.588	1.41
170	n2665	25.22	25.22	24.03	0.3	0.375	24.046	24.046	1.19
171	n2666	25.07	25.07	23.686	0.45	0.525	23.708	23.708	1.38
172	n2667	25.01	25.01	23.82	0	0.075	23.829	23.829	1.19
173	n2668	24.85	24.85	23.66	0.525	0.6	23.681	23.681	1.19
174	n2669	24.33	24.33	23.14	0.6	0.675	23.165	23.165	1.19
175	n2670	24.33	24.33	23.11	0.675	0.75	23.132	23.132	1.22
176	n2671	24.07	24.07	22.88	0.75	0.825	22.908	22.908	1.19
177	n2672	24.2	24.2	22.778	0.825	0.9	22.807	22.807	1.42
179	n2679	24.41	24.41	22.675	1.275	1.35	22.71	22.71	1.74
180	n2680	24.92	24.92	23.73	0.3	0.375	23.746	23.746	1.19
181	n2681	25.6	25.6	24.41	0.225	0.3	24.425	24.425	1.19
182	n2682	26.46	26.46	25.27	0.15	0.225	25.283	25.283	1.19
183	n2683	27.55	27.55	26.36	0.075	0.15	26.37	26.37	1.19
184	n2684	28.28	28.28	27.09	0	0.075	27.097	27.097	1.19
185	n2685	28.57	28.57	27.38	0	0.075	27.388	27.388	1.19
186	n2686	28.35	28.35	27.16	0.075	0.15	27.17	27.17	1.19
187	n2687	27.5	27.5	26.31	0.15	0.225	26.323	26.323	1.19
188	n2688	27.32	27.32	26.13	0.225	0.3	26.147	26.147	1.19
189	n2689	27.46	27.46	26.064	0.3	0.375	26.083	26.083	1.4
190	n2690	27.19	27.19	25.981	0.375	0.45	25.998	25.998	1.21
191	n2691	26.51	26.51	24.436	7.8	7.875	24.524	24.524	2.07
192	n2692	26.3	26.3	24.538	7.725	7.8	24.626	24.626	1.76
193	n2693	25.83	25.83	24.64	0	7.725	24.727	24.727	1.19
194	n2694	25.2	25.2	21.318	7.575	7.65	21.405	21.405	3.88
199	n2715	20.77	20.77	18.406	10.35	10.425	18.51	18.51	2.36
200	n2716	20.86	20.86	18.304	10.425	10.5	18.408	18.408	2.56
202	n2718	19.56	19.56	18.1	10.575	10.65	18.189	18.189	1.46
203	n2719	17.28	17.28	14.35	10.65	10.725	14.439	14.439	2.93
204	n2720	12.58	12.58	11.39	10.725	10.8	11.48	11.48	1.19
205	n2721	11.82	11.82	10.63	10.8	10.875	10.737	10.737	1.19
206	n2722	11.94	11.94	10.528	10.875	10.95	10.635	10.635	1.41
207	n2723	11.92	11.92	10.426	10.95	11.025	10.534	10.534	1.49
209	n2725	13.75	13.75	10.223	11.1	11.175	10.329	10.329	3.53
210	n2726	15.24	15.24	14.05	0	11.25	14.159	14.159	1.19
211	n2727	16.31	16.31	13.998	11.25	11.325	14.107	14.107	2.31

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212	n2728	16.26	16.26	13.963	11.325	11.4	14.072	14.072	2.3
213	n2729	16.45	16.45	13.896	11.4	11.475	14.006	14.006	2.55
214	n2730	16.87	16.87	13.794	11.475	11.55	13.904	13.904	3.08
215	n2731	16.78	16.78	13.746	11.55	11.625	13.859	13.859	3.03
216	n2732	17.02	17.02	13.692	15.825	15.9	13.818	13.818	3.33
217	n2733	9	9	5.361	8.775	8.85	5.455	5.455	3.64
218	n2734	8.92	8.92	5.307	8.85	8.925	5.402	5.402	3.61
219	n2735	8.88	8.88	5.205	8.925	9	5.3	5.3	3.67
220	n2736	8.8	8.8	5.103	9	9.075	5.199	5.199	3.7
221	n2737	8.72	8.72	5.001	9.075	9.15	5.097	5.097	3.72
222	n2738	8.68	8.68	4.899	9.15	9.225	4.995	4.995	3.78
223	n2739	8.62	8.62	4.797	9.225	9.3	4.894	4.894	3.82
224	n2740	8.58	8.58	4.695	9.3	9.375	4.807	4.807	3.88
225	n2741	8.53	8.53	4.61	28.875	28.95	4.784	4.784	3.92
226	n2742	8.58	8.58	7.111	19.425	19.5	7.229	7.229	1.47
227	n2743	8.66	8.66	7.213	19.35	19.425	7.358	7.358	1.45
228	n2744	8.82	8.82	7.315	19.275	19.35	7.46	7.46	1.5
229	n2745	8.7	8.7	7.417	19.2	19.275	7.561	7.561	1.28
230	n2746	8.73	8.73	7.519	19.125	19.2	7.663	7.663	1.21
231	n2747	8.92	8.92	7.709	19.05	19.125	7.826	7.826	1.21
232	n2748	9.06	9.06	7.849	18.975	19.05	7.966	7.966	1.21
233	n2749	9.33	9.33	8.119	18.9	18.975	8.236	8.236	1.21
234	n2750	10.77	10.77	9.559	18.825	18.9	9.675	9.675	1.21
235	n2751	12.49	12.49	11.279	18.75	18.825	11.395	11.395	1.21
236	n2752	13.21	13.21	11.847	18.675	18.75	11.963	11.963	1.36
237	n2753	13.16	13.16	11.949	18.6	18.675	12.09	12.09	1.21
238	n2754	13.3	13.3	12.089	18.525	18.6	12.215	12.215	1.21
239	n2755	13.77	13.77	12.559	18.45	18.525	12.674	12.674	1.21
240	n2756	14.78	14.78	13.441	18.375	18.45	13.556	13.556	1.34
241	n2757	16.4	16.4	13.53	18.3	18.375	13.669	13.669	2.87
242	n2758	16.58	16.58	13.571	15.975	16.05	13.7	13.7	3.01
243	n2759	16.78	16.78	13.632	15.9	15.975	13.758	13.758	3.15
244	n2760	17.89	17.89	16.7	4.125	4.2	16.755	16.755	1.19
245	n2761	18.58	18.58	17.39	4.05	4.125	17.445	17.445	1.19
246	n2762	19.04	19.04	17.85	3.975	4.05	17.904	17.904	1.19
247	n2763	19.6	19.6	18.41	3.9	3.975	18.463	18.463	1.19
248	n2764	20.14	20.14	18.95	3.825	3.9	19.003	19.003	1.19
249	n2765	20.75	20.75	19.56	3.75	3.825	19.612	19.612	1.19
250	n2766	21.31	21.31	20.12	3.675	3.75	20.172	20.172	1.19
251	n2767	21.8	21.8	20.61	3.6	3.675	20.661	20.661	1.19
252	n2773	22.16	22.16	20.72	3.525	3.6	20.777	20.777	1.44
253	n2774	22.2	22.2	20.822	3.45	3.525	20.879	20.879	1.38
254	n2775	22.16	22.16	20.924	3.375	3.45	20.981	20.981	1.24
255	n2776	22.15	22.15	20.96	3.3	3.375	21.016	21.016	1.19
256	n2777	22.79	22.79	21.527	3.225	3.3	21.576	21.576	1.26
257	n2778	23.82	23.82	21.629	3.15	3.225	21.683	21.683	2.19
258	n2779	24.06	24.06	21.676	2.775	2.85	21.727	21.727	2.38
259	n2780	24.15	24.15	21.705	2.7	2.775	21.755	21.755	2.45

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260	n2781	24.45	24.45	21.778	2.625	2.7	21.828	21.828	2.67
261	n2782	24.8	24.8	21.88	2.55	2.625	21.929	21.929	2.92
262	n2783	25.22	25.22	21.982	2.475	2.55	22.03	22.03	3.24
263	n2784	24.98	24.98	22.084	1.725	1.8	22.125	22.125	2.9
264	n2785	24.25	24.25	22.186	1.65	1.725	22.226	22.226	2.06
265	n2786	23.9	23.9	22.288	1.575	1.65	22.327	22.327	1.61
266	n2787	23.72	23.72	22.39	1.5	1.575	22.428	22.428	1.33
267	n2788	24.15	24.15	22.492	1.425	1.5	22.529	22.529	1.66
268	n2789	24.53	24.53	22.594	1.35	1.425	22.63	22.63	1.94
269	n2790	25.08	25.08	23.89	0.6	0.675	23.912	23.912	1.19
270	n2791	25.65	25.65	24.46	0.525	0.6	24.481	24.481	1.19
271	n2792	26.61	26.61	25.42	0.45	0.525	25.439	25.439	1.19
272	n2793	28.55	28.55	27.36	0	0.075	27.369	27.369	1.19
273	n2794	28.52	28.52	27.258	0.075	0.15	27.268	27.268	1.26
274	n2795	28.11	28.11	26.92	0.15	0.225	26.933	26.933	1.19
275	n2796	27.52	27.52	26.33	0.225	0.3	26.345	26.345	1.19
276	n2797	27.02	27.02	23.424	0.525	0.6	23.448	23.448	3.6
277	n2798	25.95	25.95	23.322	0.6	0.675	23.344	23.344	2.63
278	n2799	15.84	15.84	13.924	2.175	2.25	13.963	13.963	1.92
279	n2800	15.46	15.46	14.026	2.1	2.175	14.07	14.07	1.43
280	n2801	15.43	15.43	14.128	2.025	2.1	14.171	14.171	1.3
281	n2802	15.57	15.57	14.155	1.95	2.025	14.198	14.198	1.42
282	n2803	16.16	16.16	14.23	1.875	1.95	14.272	14.272	1.93
283	n2804	16.92	16.92	14.332	1.8	1.875	14.373	14.373	2.59
284	n2805	17.26	17.26	14.434	1.725	1.8	14.474	14.474	2.83
285	n2806	17.41	17.41	14.487	1.65	1.725	14.526	14.526	2.92
286	n2807	17.9	17.9	14.536	1.575	1.65	14.574	14.574	3.36
287	n2808	17.61	17.61	14.638	1.5	1.575	14.675	14.675	2.97
289	n2810	15.04	15.04	11.234	1.35	1.425	11.27	11.27	3.81
290	n2811	12.73	12.73	11.54	0	0.075	11.549	11.549	1.19
291	n2812	13.92	13.92	11.438	0.075	0.15	11.451	11.451	2.48
292	n2813	14.5	14.5	11.336	0.15	0.225	11.351	11.351	3.16
293	n2814	15	15	11.251	0.225	0.3	11.272	11.272	3.75
294	n2815	15.09	15.09	13.9	0.975	1.05	13.931	13.931	1.19
295	n2816	15.87	15.87	14.68	0.9	0.975	14.706	14.706	1.19
296	n2817	16.58	16.58	15.39	0.825	0.9	15.415	15.415	1.19
297	n2818	17.56	17.56	16.37	0.75	0.825	16.394	16.394	1.19
298	n2819	18.44	18.44	17.25	0.675	0.75	17.273	17.273	1.19
299	n2820	19.45	19.45	18.26	0.6	0.675	18.282	18.282	1.19
300	n2821	20.4	20.4	19.21	0.525	0.6	19.231	19.231	1.19
301	n2822	21.23	21.23	20.04	0.45	0.525	20.059	20.059	1.19
302	n2823	22.12	22.12	20.93	0.375	0.45	20.948	20.948	1.19
303	n2824	22.28	22.28	21.09	0.3	0.375	21.106	21.106	1.19
304	n2825	22.51	22.51	21.32	0.225	0.3	21.335	21.335	1.19
305	n2826	23.01	23.01	21.698	0.15	0.225	21.711	21.711	1.31
306	n2827	22.99	22.99	21.8	0.075	0.15	21.813	21.813	1.19
307	n2828	24.09	24.09	22.9	0	0.075	22.907	22.907	1.19
308	n2830	24.56	24.56	23.37	0	0.075	23.378	23.378	1.19

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309	n2831	24.34	24.34	23.15	0.075	0.15	23.161	23.161	1.19
310	n2832	24.24	24.24	23.05	0.15	0.225	23.063	23.063	1.19
311	n2833	23.96	23.96	22.77	0.225	0.3	22.785	22.785	1.19
313	n2835	24.63	24.63	21.522	6.825	6.9	21.604	21.604	3.11
314	n2836	24.32	24.32	21.624	6.75	6.825	21.705	21.705	2.7
315	n2837	23.97	23.97	21.726	6.675	6.75	21.807	21.807	2.24
316	n2838	23.58	23.58	21.828	6.6	6.675	21.908	21.908	1.75
317	n2839	23.12	23.12	21.93	0	6.6	22.01	22.01	1.19
318	n2840	22.61	22.61	18.578	6.45	6.525	18.657	18.657	4.03
319	n2841	22.1	22.1	18.68	6.375	6.45	18.759	18.759	3.42
321	n2843	21.48	21.48	18.884	6.225	6.3	18.962	18.962	2.6
322	n2844	21.12	21.12	18.986	6.15	6.225	19.063	19.063	2.13
324	n2846	20.38	20.38	19.19	6	6.075	19.266	19.266	1.19
325	n2847	20.49	20.49	19.3	5.925	6	19.374	19.374	1.19
326	n2848	20.93	20.93	19.74	5.85	5.925	19.806	19.806	1.19
327	n2849	21.8	21.8	20.61	5.775	5.85	20.675	20.675	1.19
328	n2850	22.86	22.86	21.67	5.7	5.775	21.735	21.735	1.19
329	n2851	24.26	24.26	23.07	5.625	5.7	23.134	23.134	1.19
330	n2852	25.56	25.56	24.37	5.55	5.625	24.434	24.434	1.19
331	n2853	26.38	26.38	25.19	5.475	5.55	25.254	25.254	1.19
332	n2854	27.05	27.05	25.86	5.4	5.475	25.923	25.923	1.19
333	n2855	27.78	27.78	26.59	5.325	5.4	26.653	26.653	1.19
334	n2856	28.36	28.36	27.17	5.25	5.325	27.232	27.232	1.19
335	n2857	28.85	28.85	27.66	5.175	5.25	27.722	27.722	1.19
336	n2858	29.4	29.4	28.21	5.1	5.175	28.271	28.271	1.19
337	n2859	30.25	30.25	29.06	5.025	5.1	29.121	29.121	1.19
338	n2860	31.24	31.24	30.05	4.95	5.025	30.11	30.11	1.19
339	n2861	32	32	30.81	4.875	4.95	30.87	30.87	1.19
340	n2863	31.71	31.71	30.52	0	0.075	30.529	30.529	1.19
341	n2864	31.84	31.84	30.418	0.075	0.15	30.431	30.431	1.42
342	n2865	31.88	31.88	30.316	0.15	0.225	30.331	30.331	1.56
343	n2866	31.83	31.83	30.214	0.225	0.3	30.231	30.231	1.62
344	n2867	31.38	31.38	30.112	0.3	0.375	30.128	30.128	1.27
345	n2869	30.59	30.59	29.4	0.375	0.45	29.418	29.418	1.19
346	n2870	29.85	29.85	28.66	0.45	0.525	28.679	28.679	1.19
347	n2874	28.87	28.87	27.68	0.525	0.6	27.701	27.701	1.19
348	n2875	27.75	27.75	26.56	0.6	0.675	26.582	26.582	1.19
349	n2876	26.61	26.61	25.42	0.675	0.75	25.443	25.443	1.19
350	n2877	24.32	24.32	22.793	0.75	0.825	22.817	22.817	1.53
351	n2878	23.3	23.3	22.11	0.825	0.9	22.135	22.135	1.19
352	n2879	21.6	21.6	20.41	0.9	0.975	20.436	20.436	1.19
353	n2880	20.09	20.09	18.9	0.975	1.05	18.927	18.927	1.19
354	n2881	19.18	19.18	17.99	1.05	1.125	18.018	18.018	1.19
355	n2882	18.47	18.47	17.28	1.125	1.2	17.313	17.313	1.19
356	n2883	18.58	18.58	17.178	1.2	1.275	17.212	17.212	1.4
357	n2884	19.34	19.34	17.076	1.275	1.35	17.111	17.111	2.26
358	n2885	20.24	20.24	16.974	1.35	1.425	17.01	17.01	3.27
359	n2899	21.31	21.31	16.885	1.425	1.5	16.922	16.922	4.43

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360	n2900	21.04	21.04	16.865	1.5	1.575	16.898	16.898	4.17
361	n2901	18.34	18.34	16.669	1.575	1.65	16.703	16.703	1.67
362	n2902	14.88	14.88	13.69	1.65	1.725	13.725	13.725	1.19
363	n2903	13.32	13.32	12.13	1.725	1.8	12.166	12.166	1.19
376	n2916	22.37	22.37	21.18	0	1.875	21.216	21.216	1.19
377	n2917	21.52	21.52	20.33	1.875	1.95	20.367	20.367	1.19
378	n2918	20.24	20.24	19.05	1.95	2.025	19.088	19.088	1.19
379	n2919	19.66	19.66	18.47	2.025	2.1	18.509	18.509	1.19
380	n2920	19.33	19.33	18.14	2.1	2.175	18.179	18.179	1.19
381	n2921	18.37	18.37	17.18	2.175	2.25	17.22	17.22	1.19
382	n2922	17.6	17.6	16.41	2.25	2.325	16.456	16.456	1.19
383	n2923	17.61	17.61	16.308	2.55	2.625	16.351	16.351	1.3
384	n2924	20.81	20.81	19.24	0.15	0.225	19.252	19.252	1.57
385	n2925	22.32	22.32	21.13	0.075	0.15	21.14	21.14	1.19
387	n2927	22.61	22.61	18.937	0.375	0.45	18.958	18.958	3.67
388	n2928	22.01	22.01	18.978	0.3	0.375	18.997	18.997	3.03
389	n2929	20.27	20.27	19.08	0.225	0.3	19.097	19.097	1.19
390	n2930	20.66	20.66	19.47	0.15	0.225	19.483	19.483	1.19
391	n2931	22.65	22.65	21.46	0.075	0.15	21.47	21.47	1.19
392	n2932	24.33	24.33	23.14	0	0.075	23.147	23.147	1.19
393	n2933	24.92	24.92	23.73	0	0.075	23.739	23.739	1.19
394	n2934	25.62	25.62	23.628	0.075	0.15	23.641	23.641	1.99
395	n2935	26.51	26.51	23.526	0.15	0.225	23.541	23.541	2.98
396	n2936	32.86	32.86	31.67	4.8	4.875	31.73	31.73	1.19
397	n2937	33.76	33.76	32.57	4.725	4.8	32.629	32.629	1.19
398	n2938	34.8	34.8	33.61	4.65	4.725	33.669	33.669	1.19
399	n2939	35.91	35.91	34.72	4.575	4.65	34.778	34.778	1.19
400	n2940	37.1	37.1	35.91	4.5	4.575	35.968	35.968	1.19
401	n2941	38.02	38.02	36.83	4.425	4.5	36.887	36.887	1.19
402	n2942	39.05	39.05	37.86	3.525	3.6	37.911	37.911	1.19
403	n2943	40.36	40.36	39.17	3.45	3.525	39.22	39.22	1.19
404	n2944	41.94	41.94	40.75	3.375	3.45	40.8	40.8	1.19
405	n2945	43.35	43.35	42.16	3.3	3.375	42.209	42.209	1.19
406	n2946	44.46	44.46	43.27	3.225	3.3	43.319	43.319	1.19
407	n2947	45.81	45.81	44.62	3.15	3.225	44.668	44.668	1.19
408	n2948	47.35	47.35	46.16	3.075	3.15	46.208	46.208	1.19
409	n2949	48.77	48.77	47.58	3	3.075	47.627	47.627	1.19
410	n2950	49.78	49.78	48.59	2.925	3	48.636	48.636	1.19
411	n2951	50.35	50.35	49.16	2.85	2.925	49.206	49.206	1.19
412	n2952	50.64	50.64	49.312	2.775	2.85	49.358	49.358	1.33
413	n2953	50.81	50.81	49.414	2.7	2.775	49.465	49.465	1.4
414	n2954	50.97	50.97	49.516	2.625	2.7	49.566	49.566	1.45
415	n2955	50.91	50.91	49.618	2.55	2.625	49.667	49.667	1.29
416	n2956	50.91	50.91	49.72	2.475	2.55	49.769	49.769	1.19
417	n2957	51.1	51.1	49.91	2.4	2.475	49.952	49.952	1.19
418	n2958	51.74	51.74	50.55	2.325	2.4	50.591	50.591	1.19
419	n2959	53.08	53.08	51.89	2.25	2.325	51.931	51.931	1.19
420	n2960	53.94	53.94	52.75	2.175	2.25	52.79	52.79	1.19

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421	n2961	54.67	54.67	53.48	2.1	2.175	53.519	53.519	1.19
422	n2962	55.39	55.39	54.2	2.025	2.1	54.239	54.239	1.19
423	n2963	56.21	56.21	55.02	1.95	2.025	55.058	55.058	1.19
424	n2964	56.94	56.94	55.75	1.875	1.95	55.787	55.787	1.19
425	n2965	57.7	57.7	56.51	1.8	1.875	56.546	56.546	1.19
426	n2966	58.45	58.45	57.26	1.725	1.8	57.296	57.296	1.19
427	n2967	59.49	59.49	58.3	1.65	1.725	58.335	58.335	1.19
428	n2968	60.73	60.73	59.54	1.575	1.65	59.574	59.574	1.19
429	n2969	61.78	61.78	60.59	1.5	1.575	60.623	60.623	1.19
430	n2970	62.55	62.55	61.36	1.425	1.5	61.393	61.393	1.19
431	n2971	63.39	63.39	62.2	1.35	1.425	62.232	62.232	1.19
432	n2972	64.31	64.31	63.12	1.275	1.35	63.151	63.151	1.19
433	n2973	65.44	65.44	64.25	1.2	1.275	64.28	64.28	1.19
434	n2974	66.75	66.75	65.56	1.125	1.2	65.589	65.589	1.19
435	n2975	68.08	68.08	66.89	1.05	1.125	66.918	66.918	1.19
436	n2976	69.38	69.38	68.19	0.975	1.05	68.217	68.217	1.19
437	n2977	70.66	70.66	69.47	0.9	0.975	69.496	69.496	1.19
438	n2978	71.98	71.98	70.79	0.825	0.9	70.815	70.815	1.19
439	n2979	72.93	72.93	71.252	0.75	0.825	71.276	71.276	1.68
440	n2980	73.12	73.12	71.331	0.675	0.75	71.358	71.358	1.79
441	n2981	73.54	73.54	71.456	0.6	0.675	71.481	71.481	2.08
442	n2982	73.25	73.25	71.558	0.525	0.6	71.582	71.582	1.69
443	n2983	72.85	72.85	71.66	0.45	0.525	71.683	71.683	1.19
444	n2984	73.03	73.03	71.84	0.375	0.45	71.858	71.858	1.19
445	n2985	73.87	73.87	72.68	0.3	0.375	72.696	72.696	1.19
446	n2986	75.87	75.87	74.68	0.225	0.3	74.695	74.695	1.19
447	n2987	77.39	77.39	75.162	0.15	0.225	75.175	75.175	2.23
448	n2988	77.14	77.14	75.264	0.075	0.15	75.276	75.276	1.88
449	n2989	76.53	76.53	75.34	0	0.075	75.349	75.349	1.19
450	n2990	38.59	38.59	37.4	0.75	0.825	37.424	37.424	1.19
451	n2991	38.97	38.97	37.78	0.675	0.75	37.803	37.803	1.19
452	n2992	39.32	39.32	38.13	0.6	0.675	38.152	38.152	1.19
453	n2993	39.54	39.54	38.35	0.525	0.6	38.371	38.371	1.19
454	n2994	39.74	39.74	38.55	0.45	0.525	38.569	38.569	1.19
455	n2995	40.08	40.08	38.89	0.375	0.45	38.908	38.908	1.19
456	n2996	40.65	40.65	39.46	0.3	0.375	39.476	39.476	1.19
457	n2997	41.36	41.36	40.17	0.225	0.3	40.185	40.185	1.19
458	n2998	42.27	42.27	41.08	0.15	0.225	41.093	41.093	1.19
459	n2999	42.95	42.95	41.76	0.075	0.15	41.77	41.77	1.19
460	n3000	43.22	43.22	42.03	0	0.075	42.037	42.037	1.19
461	n3023	30.2	30.2	29.01	0.9	0.975	29.036	29.036	1.19
462	n3024	42.22	42.22	41.03	0	0.075	41.037	41.037	1.19
463	n3025	41.54	41.54	40.35	0.075	0.15	40.36	40.36	1.19
464	n3026	40.68	40.68	39.49	0.15	0.225	39.503	39.503	1.19
465	n3027	39.9	39.9	38.263	0.225	0.3	38.278	38.278	1.64
466	n3028	37.18	37.18	34.741	0.3	0.375	34.757	34.757	2.44
467	n3029	34.16	34.16	32.97	0.375	0.45	32.988	32.988	1.19
468	n3030	33.61	33.61	32.42	0.45	0.525	32.443	32.443	1.19

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469	n3031	34.77	34.77	32.318	0.525	0.6	32.342	32.342	2.45
470	n3032	34.33	34.33	32.217	0.6	0.675	32.238	32.238	2.11
471	n3033	33.18	33.18	31.99	0.675	0.75	32.013	32.013	1.19
472	n3034	32.1	32.1	30.91	0.75	0.825	30.934	30.934	1.19
473	n3035	31.03	31.03	29.84	0.825	0.9	29.865	29.865	1.19
474	n3036	29.27	29.27	28.08	0.975	1.05	28.107	28.107	1.19
475	n3037	28.65	28.65	27.46	1.05	1.125	27.488	27.488	1.19
476	n3038	27.69	27.69	26.5	1.125	1.2	26.529	26.529	1.19
477	n3039	27.17	27.17	25.98	1.2	1.275	26.01	26.01	1.19
478	n3040	26.93	26.93	25.74	1.275	1.35	25.771	25.771	1.19
479	n3041	26.47	26.47	25.28	2.55	2.625	25.323	25.323	1.19
480	n3042	44.55	44.55	43.242	0.075	0.15	43.252	43.252	1.31
481	n3043	41.45	41.45	40.26	0.15	0.225	40.273	40.273	1.19
482	n3044	39.16	39.16	37.97	0.225	0.3	37.985	37.985	1.19
483	n3045	37.2	37.2	36.01	0.3	0.375	36.026	36.026	1.19
484	n3046	35.8	35.8	34.61	0.375	0.45	34.628	34.628	1.19
485	n3047	34.85	34.85	33.66	0.45	0.525	33.679	33.679	1.19
486	n3048	33.91	33.91	32.72	0.525	0.6	32.741	32.741	1.19
487	n3049	32.86	32.86	31.67	0.6	0.675	31.692	31.692	1.19
488	n3050	32.06	32.06	30.87	0.675	0.75	30.893	30.893	1.19
489	n3051	31.68	31.68	30.49	0.75	0.825	30.517	30.517	1.19
490	n3052	31.56	31.56	30.37	0.825	0.9	30.395	30.395	1.19
491	n3053	31.31	31.31	30.12	0.9	0.975	30.146	30.146	1.19
492	n3054	29.93	29.93	28.74	0.975	1.05	28.767	28.767	1.19
493	n3055	27.86	27.86	26.67	1.05	1.125	26.698	26.698	1.19
494	n3056	26.79	26.79	25.6	1.125	1.2	25.629	25.629	1.19
495	n3057	24.86	24.86	23.604	2.625	2.7	23.648	23.648	1.26
496	n3058	21.81	21.81	19.41	2.7	2.775	19.454	19.454	2.4
497	n3059	17.63	17.63	16.44	2.775	2.85	16.485	16.485	1.19
498	n3060	16.22	16.22	15.03	2.85	2.925	15.079	15.079	1.19
499	n3061	16.09	16.09	14.9	2.925	3	14.947	14.947	1.19
500	n3062	15.93	15.93	14.74	4.35	4.425	14.797	14.797	1.19
501	n3063	16.48	16.48	15.29	1.275	1.35	15.321	15.321	1.19
502	n3064	17.93	17.93	16.74	1.2	1.275	16.77	16.77	1.19
503	n3065	18.31	18.31	17.12	0.675	0.75	17.143	17.143	1.19
504	n3066	18.47	18.47	17.28	0.6	0.675	17.303	17.303	1.19
505	n3067	19.3	19.3	18.11	0.525	0.6	18.131	18.131	1.19
506	n3068	20.68	20.68	19.49	0.45	0.525	19.509	19.509	1.19
507	n3069	21.47	21.47	20.28	0.375	0.45	20.298	20.298	1.19
508	n3070	23.87	23.87	22.68	0.3	0.375	22.696	22.696	1.19
509	n3071	24.83	24.83	22.938	0.225	0.3	22.953	22.953	1.89
510	n3072	24.23	24.23	23.024	0.15	0.225	23.038	23.038	1.21
511	n3073	24.23	24.23	23.04	0.075	0.15	23.053	23.053	1.19
512	n3074	24.68	24.68	23.49	0	0.075	23.497	23.497	1.19
513	n3075	18.96	18.96	17.77	0.375	0.45	17.788	17.788	1.19
514	n3076	21.07	21.07	19.88	0.3	0.375	19.896	19.896	1.19
515	n3077	22.48	22.48	20.47	0.225	0.3	20.484	20.484	2.01
516	n3078	23.16	23.16	20.572	0.15	0.225	20.587	20.587	2.59

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517	n3079	21.88	21.88	20.69	0.075	0.15	20.703	20.703	1.19
518	n3080	22.88	22.88	21.69	0	0.075	21.697	21.697	1.19
519	n3081	24.78	24.78	23.59	0.3	0.375	23.606	23.606	1.19
520	n3082	25.33	25.33	24.14	0.225	0.3	24.155	24.155	1.19
521	n3083	26.49	26.49	25.3	0.15	0.225	25.313	25.313	1.19
522	n3084	26.92	26.92	25.73	0.075	0.15	25.74	25.74	1.19
523	n3085	27.47	27.47	26.28	0	0.075	26.287	26.287	1.19
524	n3087	26.88	26.88	25.69	0	4.5	25.747	25.747	1.19
525	n3088	25.91	25.91	24.72	4.5	4.575	24.786	24.786	1.19
526	n3089	25.85	25.85	24.618	4.575	4.65	24.684	24.684	1.23
527	n3090	26.59	26.59	24.516	4.65	4.725	24.583	24.583	2.07
528	n3091	27.34	27.34	24.414	4.725	4.8	24.481	24.481	2.93
529	n3092	27.48	27.48	24.312	4.8	4.875	24.38	24.38	3.17
530	n3093	26.95	26.95	24.21	4.875	4.95	24.278	24.278	2.74
531	n3094	26.28	26.28	24.108	4.95	5.025	24.177	24.177	2.17
532	n3095	25.47	25.47	24.006	5.025	5.1	24.067	24.067	1.46
533	n3096	24.59	24.59	23.4	5.1	5.175	23.461	23.461	1.19
534	n3097	22.43	22.43	21.063	5.175	5.25	21.125	21.125	1.37
535	n3098	19.27	19.27	17.114	5.25	5.325	17.176	17.176	2.16
536	n3099	15.33	15.33	13.316	5.325	5.4	13.379	13.379	2.01
537	n3100	11.53	11.53	9.997	5.4	5.475	10.06	10.06	1.53
538	n3101	8.62	8.62	7.43	5.475	5.55	7.494	7.494	1.19
540	n3103	7.19	7.19	6	5.55	5.625	6.064	6.064	1.19
541	n3104	6.51	6.51	5.32	5.625	5.7	5.384	5.384	1.19
542	n3105	6.07	6.07	4.88	5.7	5.775	4.945	4.945	1.19
543	n3106	5.85	5.85	4.66	5.775	5.85	4.735	4.735	1.19
544	n3107	6.12	6.12	4.559	5.85	5.925	4.634	4.634	1.56
545	n3108	5.99	5.99	4.456	5.925	6	4.532	4.532	1.53
546	n3109	5.97	5.97	4.369	6	6.075	4.445	4.445	1.6
547	n3110	6.08	6.08	4.252	6.15	6.225	4.329	4.329	1.83
548	n3111	6.26	6.26	4.15	6.225	6.3	4.228	4.228	2.11
549	n3112	6.38	6.38	4.048	6.3	6.375	4.126	4.126	2.33
550	n3113	6.51	6.51	3.946	7.8	7.875	4.034	4.034	2.56
551	n3114	6.79	6.79	4.75	1.35	1.425	4.782	4.782	2.04
552	n3115	7.01	7.01	4.852	1.275	1.35	4.887	4.887	2.16
553	n3116	7.01	7.01	4.954	1.2	1.275	4.988	4.988	2.06
554	n3117	6.84	6.84	5.056	1.125	1.2	5.089	5.089	1.78
555	n3118	6.6	6.6	5.158	1.05	1.125	5.19	5.19	1.44
556	n3119	6.52	6.52	5.229	0.975	1.05	5.26	5.26	1.29
557	n3120	6.45	6.45	5.26	0.9	0.975	5.29	5.29	1.19
558	n3121	6.78	6.78	5.59	0.825	0.9	5.615	5.615	1.19
559	n3122	7.86	7.86	6.67	0.6	0.675	6.692	6.692	1.19
560	n3123	8.41	8.41	7.22	0.525	0.6	7.241	7.241	1.19
561	n3124	10.27	10.27	9.08	0.45	0.525	9.099	9.099	1.19
562	n3125	12.91	12.91	11.42	0.375	0.45	11.438	11.438	1.49
563	n3126	15.64	15.64	14.45	0.3	0.375	14.466	14.466	1.19
564	n3127	17.39	17.39	16.2	0.225	0.3	16.215	16.215	1.19
565	n3128	18.02	18.02	16.83	0.15	0.225	16.843	16.843	1.19

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566	n3129	18.27	18.27	17.08	0.075	0.15	17.09	17.09	1.19
567	n3130	18.31	18.31	17.12	0	0.075	17.128	17.128	1.19
568	n3168	17.45	17.45	15.619	3.15	3.225	15.673	15.673	1.83
569	n3169	17.88	17.88	15.721	3.075	3.15	15.775	15.775	2.16
570	n3170	17.7	17.7	15.823	3	3.075	15.876	15.876	1.88
571	n3171	19.49	19.49	15.925	2.925	3	15.977	15.977	3.57
572	n3172	19.63	19.63	15.983	2.85	2.925	16.034	16.034	3.65
573	n3173	18.6	18.6	16.026	2.775	2.85	16.077	16.077	2.57
574	n3174	17.32	17.32	16.074	2.7	2.775	16.124	16.124	1.25
576	n3176	23.39	23.39	18.835	0.45	0.525	18.857	18.857	4.55
577	n3177	23.26	23.26	18.733	0.525	0.6	18.757	18.757	4.53
578	n3178	22.66	22.66	18.631	0.6	0.675	18.656	18.656	4.03
579	n3179	21.25	21.25	18.529	0.675	0.75	18.556	18.556	2.72
580	n3180	20.23	20.23	18.427	0.75	0.825	18.452	18.452	1.8
581	n3181	19.45	19.45	18.26	0.825	0.9	18.285	18.285	1.19
582	n3182	18.35	18.35	17.16	0.9	0.975	17.186	17.186	1.19
583	n3183	17.95	17.95	16.76	0.975	5.025	16.82	16.82	1.19
589	n3189	11.03	11.03	7.414	3.9	3.975	7.475	7.475	3.62
590	n3190	9.98	9.98	7.516	3.825	3.9	7.576	7.576	2.46
592	n3192	8.91	8.91	7.72	3.675	3.75	7.779	7.779	1.19
593	n3193	9.37	9.37	8.18	3.6	3.675	8.231	8.231	1.19
594	n3194	10.65	10.65	9.46	3.525	3.6	9.511	9.511	1.19
595	n3195	12.64	12.64	11.45	3.45	3.525	11.5	11.5	1.19
596	n3196	13.6	13.6	12.244	3.375	3.45	12.294	12.294	1.36
597	n3197	16.02	16.02	14.597	3.3	3.375	14.646	14.646	1.42
598	n3198	17.55	17.55	15.583	3.225	3.3	15.632	15.632	1.97
599	n3199	8.36	8.36	4.535	28.95	29.025	4.71	4.71	3.82
600	n3200	8.31	8.31	4.514	29.025	29.1	4.689	4.689	3.8
601	n3201	8.23	8.23	4.46	29.1	29.175	4.636	4.636	3.77
602	n3202	8.02	8.02	4.386	29.175	29.25	4.561	4.561	3.63
603	n3203	7.95	7.95	4.311	29.25	29.325	4.487	4.487	3.64
604	n3204	7.91	7.91	4.272	29.325	29.4	4.448	4.448	3.64
605	n3205	7.73	7.73	4.258	29.4	29.475	4.435	4.435	3.47
606	n3206	7.68	7.68	4.237	29.475	29.55	4.414	4.414	3.44
607	n3207	7.72	7.72	4.162	29.55	29.625	4.339	4.339	3.56
608	n3208	7.55	7.55	4.087	29.7	29.775	4.265	4.265	3.46
609	n3209	7.71	7.71	4.013	29.775	29.85	4.192	4.192	3.7
610	n3210	7.65	7.65	3.97	29.925	30	4.15	4.15	3.68
611	n3211	7.64	7.64	3.938	30.525	30.6	4.119	4.119	3.7
612	n3213	7.47	7.47	3.862	30.6	30.675	4.043	4.043	3.61
613	n3215	7.53	7.53	3.809	30.675	30.75	3.987	3.987	3.72
614	n3216	7.51	7.51	3.796	30.75	30.825	3.972	3.972	3.71
615	n3217	7.69	7.69	6.424	0	30.9	6.607	6.607	1.27
616	n3218	7.66	7.66	6.35	30.9	30.975	6.53	6.53	1.31
617	n3219	7.62	7.62	6.275	30.975	31.05	6.427	6.427	1.34
618	n3220	7.41	7.41	6.144	31.05	31.125	6.317	6.317	1.27
619	n3221	7.32	7.32	6.054	31.125	31.2	6.235	6.235	1.27
620	n3222	7.24	7.24	5.974	31.2	31.275	6.159	6.159	1.27

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621	n3223	7.35	7.35	5.9	31.275	31.35	6.085	6.085	1.45
623	n3225	7.41	7.41	5.796	31.425	31.5	5.982	5.982	1.61
624	n3226	7.5	7.5	5.751	31.5	31.575	5.935	5.935	1.75
625	n3227	7.73	7.73	5.676	31.575	31.65	5.855	5.855	2.05
626	n3228	8.06	8.06	5.656	31.65	31.725	5.835	5.835	2.4
627	n3229	8.08	8.08	5.613	31.725	31.8	5.793	5.793	2.47
628	n3230	7.88	7.88	5.551	31.875	31.95	5.73	5.73	2.33
629	n3231	8.01	8.01	5.516	31.95	32.025	5.696	5.696	2.49
630	n3232	7.96	7.96	5.488	32.025	32.1	5.668	5.668	2.47
631	n3233	7.88	7.88	5.451	32.1	32.175	5.631	5.631	2.43
632	n3234	8	8	5.408	32.175	32.25	5.589	5.589	2.59
633	n3235	8.1	8.1	5.363	32.25	32.325	5.545	5.545	2.74
634	n3236	8.36	8.36	5.3	32.325	32.4	5.485	5.485	3.06
636	n3238	8.88	8.88	5.235	37.95	38.025	5.432	5.432	3.64
637	n3239	9.07	9.07	7.88	5.4	5.475	7.943	7.943	1.19
638	n3240	10.43	10.43	9.24	5.325	5.4	9.303	9.303	1.19
639	n3241	13.3	13.3	12.11	5.25	5.325	12.172	12.172	1.19
640	n3242	14.78	14.78	13.59	5.175	5.25	13.652	13.652	1.19
641	n3243	16.54	16.54	15.35	5.1	5.175	15.411	15.411	1.19
642	n3244	17.09	17.09	15.9	5.025	5.1	15.961	15.961	1.19
643	n3245	8.79	8.79	7.6	0	0.075	7.607	7.607	1.19
644	n3246	8.37	8.37	7.18	0.075	0.15	7.193	7.193	1.19
645	n3247	8.32	8.32	7.078	0.15	0.225	7.091	7.091	1.24
646	n3248	8.17	8.17	6.98	0.225	0.3	6.997	6.997	1.19
647	n3249	8.17	8.17	6.972	0.3	0.375	6.988	6.988	1.2
648	n3250	7.99	7.99	6.8	0.375	0.45	6.818	6.818	1.19
649	n3251	7.76	7.76	6.57	0.45	0.525	6.589	6.589	1.19
650	n3253	14.77	14.77	12.863	0.675	0.75	12.89	12.89	1.91
651	n3254	14.36	14.36	12.965	0.6	0.675	12.99	12.99	1.39
652	n3255	14.23	14.23	13.03	0.525	0.6	13.054	13.054	1.2
653	n3257	14.27	14.27	13.08	0.45	0.525	13.103	13.103	1.19
659	n3263	14.72	14.72	13.53	0.375	0.45	13.548	13.548	1.19
660	n3264	14.95	14.95	13.76	0.3	0.375	13.776	13.776	1.19
664	n3268	15.23	15.23	14.04	0.225	0.3	14.055	14.055	1.19
665	n3269	15.84	15.84	14.216	0.15	0.225	14.229	14.229	1.62
666	n3270	15.69	15.69	14.287	0.075	0.15	14.299	14.299	1.4
667	n3272	15.59	15.59	14.4	0	0.075	14.409	14.409	1.19
668	n3282	8.56	8.56	5.172	38.025	38.1	5.323	5.323	3.39
669	n3283	8.45	8.45	4.814	39.675	39.75	5.023	5.023	3.64
670	n3284	8.19	8.19	4.916	1.5	1.575	5.024	5.024	3.27
671	n3285	8.08	8.08	5.018	1.425	1.5	5.055	5.055	3.06
672	n3286	7.87	7.87	5.12	1.35	1.425	5.156	5.156	2.75
673	n3287	7.73	7.73	5.222	1.275	1.35	5.257	5.257	2.51
674	n3288	7.65	7.65	5.324	1.2	1.275	5.358	5.358	2.33
675	n3289	7.53	7.53	5.426	1.125	1.2	5.459	5.459	2.1
676	n3290	7.57	7.57	5.528	1.05	1.125	5.56	5.56	2.04
677	n3291	7.85	7.85	5.63	0.975	1.05	5.661	5.661	2.22
678	n3292	7.37	7.37	5.732	0.9	0.975	5.762	5.762	1.64

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679	n3293	7.25	7.25	5.834	0.825	0.9	5.863	5.863	1.42
680	n3294	7.22	7.22	5.936	0.75	0.825	5.964	5.964	1.28
681	n3295	7.23	7.23	6.038	0.675	0.75	6.065	6.065	1.19
682	n3296	7.33	7.33	6.14	0.6	0.675	6.165	6.165	1.19
683	n3297	7.49	7.49	6.3	0.525	0.6	6.322	6.322	1.19
684	n3298	8.29	8.29	7.1	0.45	0.525	7.119	7.119	1.19
685	n3299	9.4	9.4	8.21	0.375	0.45	8.228	8.228	1.19
686	n3300	10.2	10.2	9.01	0.3	0.375	9.026	9.026	1.19
687	n3301	11.08	11.08	9.89	0.225	0.3	9.905	9.905	1.19
688	n3302	12.06	12.06	10.87	0.15	0.225	10.883	10.883	1.19
689	n3303	13.49	13.49	12.3	0.075	0.15	12.31	12.31	1.19
690	n3304	14.23	14.23	13.04	0	0.075	13.047	13.047	1.19
691	n3305	8.46	8.46	4.752	39.75	39.825	4.96	4.96	3.71
692	n3306	8.45	8.45	4.689	39.825	39.9	4.896	4.896	3.76
693	n3307	8.35	8.35	4.626	39.9	39.975	4.827	4.827	3.72
694	n3308	8.27	8.27	4.573	39.975	40.05	4.774	4.774	3.7
695	n3309	8.23	8.23	4.508	40.05	40.125	4.709	4.709	3.72
696	n3310	7.99	7.99	4.476	40.125	40.2	4.678	4.678	3.51
697	n3311	8	8	4.422	40.2	40.275	4.624	4.624	3.58
698	n3312	8.2	8.2	4.369	40.275	40.35	4.571	4.571	3.83
699	n3313	7.95	7.95	4.338	40.35	40.425	4.541	4.541	3.61
700	n3314	8	8	4.315	40.425	40.5	4.517	4.517	3.69
701	n3315	7.84	7.84	4.261	40.5	40.575	4.464	4.464	3.58
702	n3316	7.65	7.65	4.207	40.575	40.65	4.41	4.41	3.44
703	n3317	7.43	7.43	4.1	40.8	40.875	4.304	4.304	3.33
704	n3318	7.4	7.4	4.046	40.875	40.95	4.25	4.25	3.35
705	n3319	7.09	7.09	3.995	40.95	41.025	4.199	4.199	3.1
706	n3320	7.11	7.11	3.983	41.025	41.1	4.187	4.187	3.13
707	n3321	6.98	6.98	3.939	41.1	41.175	4.144	4.144	3.04
708	n3322	6.89	6.89	3.885	41.175	41.25	4.09	4.09	3
709	n3323	7.06	7.06	3.831	41.25	41.325	4.038	4.038	3.23
710	n3324	6.98	6.98	3.813	41.325	41.4	4.021	4.021	3.17
711	n3325	6.71	6.71	3.778	41.4	41.475	3.987	3.987	2.93
712	n3326	6.74	6.74	3.724	44.925	45	3.941	3.941	3.02
713	n3327	8.12	8.12	6.93	0	0.075	6.939	6.939	1.19
714	n3328	8.06	8.06	6.828	0.075	0.15	6.838	6.838	1.23
715	n3329	7.54	7.54	6.35	0.15	0.225	6.363	6.363	1.19
716	n3330	7.46	7.46	6.27	0.225	0.3	6.285	6.285	1.19
717	n3331	7.28	7.28	6.09	2.475	2.55	6.135	6.135	1.19
718	n3332	7.67	7.67	6.48	2.1	2.175	6.519	6.519	1.19
719	n3333	7.82	7.82	6.63	2.025	2.1	6.669	6.669	1.19
720	n3334	8.11	8.11	6.92	1.95	2.025	6.958	6.958	1.19
721	n3335	8.69	8.69	7.5	1.875	1.95	7.537	7.537	1.19
722	n3336	9.11	9.11	7.92	1.8	1.875	7.956	7.956	1.19
723	n3337	9.23	9.23	8.04	1.725	1.8	8.076	8.076	1.19
724	n3338	9.82	9.82	8.63	1.65	1.725	8.665	8.665	1.19
725	n3339	11.08	11.08	9.89	1.575	1.65	9.924	9.924	1.19
726	n3340	12.18	12.18	10.99	1.5	1.575	11.023	11.023	1.19

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727	n3341	12.56	12.56	11.37	1.425	1.5	11.403	11.403	1.19
728	n3342	13.48	13.48	12.29	1.35	1.425	12.322	12.322	1.19
729	n3343	15.67	15.67	14.48	1.275	1.35	14.511	14.511	1.19
730	n3344	17.54	17.54	16.35	1.2	1.275	16.38	16.38	1.19
731	n3345	18.61	18.61	17.08	1.125	1.2	17.109	17.109	1.53
732	n3346	19.46	19.46	17.182	1.05	1.125	17.215	17.215	2.28
733	n3347	19.73	19.73	17.284	0.975	1.05	17.315	17.315	2.45
734	n3348	19.65	19.65	17.369	0.9	0.975	17.399	17.399	2.28
735	n3349	19.25	19.25	17.488	0.825	0.9	17.517	17.517	1.76
736	n3350	18.78	18.78	17.59	0.75	0.825	17.618	17.618	1.19
737	n3351	19.49	19.49	18.3	0.675	0.75	18.323	18.323	1.19
744	n3358	20.63	20.63	19.44	0.6	0.675	19.462	19.462	1.19
745	n3359	21.43	21.43	20.24	0.525	0.6	20.261	20.261	1.19
746	n3360	22.23	22.23	21.04	0.45	0.525	21.059	21.059	1.19
747	n3361	23.15	23.15	21.96	0.375	0.45	21.978	21.978	1.19
748	n3362	18.33	18.33	17.094	0	22.575	17.244	17.244	1.24
749	n3363	18.9	18.9	17	22.575	22.65	17.15	17.15	1.9
750	n3364	7.32	7.32	5.987	2.625	2.7	6.036	6.036	1.33
751	n3365	7.51	7.51	5.885	2.7	2.775	5.935	5.935	1.63
752	n3366	7.58	7.58	5.783	2.775	2.85	5.834	5.834	1.8
753	n3367	7.75	7.75	5.681	2.85	2.925	5.732	5.732	2.07
754	n3368	7.86	7.86	5.601	2.925	3	5.653	5.653	2.26
755	n3369	7.79	7.79	5.579	3	3.075	5.632	5.632	2.21
756	n3370	7.75	7.75	5.477	3.075	3.15	5.53	5.53	2.27
757	n3371	7.55	7.55	5.375	3.15	3.225	5.429	5.429	2.18
758	n3372	7.52	7.52	5.3	3.225	3.3	5.355	5.355	2.22
759	n3373	7.41	7.41	5.273	3.3	3.375	5.328	5.328	2.14
760	n3374	7.08	7.08	5.171	3.375	3.45	5.22	5.22	1.91
761	n3375	6.4	6.4	3.678	45.6	45.675	3.895	3.895	2.72
762	n3376	6.47	6.47	5.28	0.525	0.6	5.301	5.301	1.19
763	n3377	6.69	6.69	5.5	0.45	0.525	5.519	5.519	1.19
764	n3378	7.39	7.39	6.2	0.375	0.45	6.218	6.218	1.19
765	n3379	8.69	8.69	7.5	0.3	0.375	7.516	7.516	1.19
766	n3380	11.11	11.11	9.92	0.225	0.3	9.935	9.935	1.19
767	n3381	14.23	14.23	12.904	0.15	0.225	12.917	12.917	1.33
768	n3382	16.98	16.98	15.79	0.075	0.15	15.8	15.8	1.19
769	n3383	18.5	18.5	17.31	0	0.075	17.317	17.317	1.19
770	n3384	18.78	18.78	16.906	22.65	22.725	17.029	17.029	1.87
771	n3385	17.46	17.46	16.224	22.725	22.8	16.348	16.348	1.24
772	n3386	15.94	15.94	14.704	22.8	22.875	14.828	14.828	1.24
773	n3387	14.88	14.88	13.548	22.875	22.95	13.672	13.672	1.33
774	n3388	13.58	13.58	12.344	22.95	23.025	12.468	12.468	1.24
775	n3389	11.06	11.06	9.824	23.025	23.1	9.948	9.948	1.24
776	n3391	8.57	8.57	7.334	23.175	23.25	7.459	7.459	1.24
777	n3392	7.31	7.31	6.019	23.475	23.55	6.145	6.145	1.29
778	n3393	7.07	7.07	5.834	23.55	23.625	5.96	5.96	1.24
779	n3394	7	7	3.538	31.8	31.875	3.719	3.719	3.46
780	n3395	6.84	6.84	3.64	8.1	8.175	3.742	3.742	3.2

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781	n3396	6.62	6.62	3.742	8.025	8.1	3.832	3.832	2.88
782	n3397	6.57	6.57	3.776	7.95	8.025	3.865	3.865	2.79
783	n3398	6.55	6.55	3.844	7.875	7.95	3.933	3.933	2.71
784	n5351	45.52	45.52	44.33	0	0.075	44.337	44.337	1.19
785	n5359	7.91	7.91	5.563	31.8	31.875	5.742	5.742	2.35
786	n5361	6.08	6.08	4.316	6.075	6.15	4.392	4.392	1.76
787	n5362	7.05	7.05	5.86	0.75	0.825	5.884	5.884	1.19
788	n5363	7.4	7.4	6.21	0.675	0.75	6.233	6.233	1.19
789	n5364	9.64	9.64	8.404	23.1	23.175	8.529	8.529	1.24
790	n5365	7.29	7.29	6.054	23.4	23.475	6.204	6.204	1.24
791	n5366	7.6	7.6	6.364	23.325	23.4	6.489	6.489	1.24
792	n5367	8.04	8.04	6.804	23.25	23.325	6.929	6.929	1.24
793	n5368	7.23	7.23	6.04	2.55	2.625	6.089	6.089	1.19
794	n5369	7.47	7.47	4.166	40.65	40.725	4.369	4.369	3.3
795	n5370	7.32	7.32	4.138	40.725	40.8	4.341	4.341	3.18
796	n5390	20.58	20.58	18.203	10.5	10.575	18.308	18.308	2.38
797	n5391	21.8	21.8	18.778	6.3	6.375	18.856	18.856	3.02
798	n5392	7.75	7.75	3.993	29.85	29.925	4.173	4.173	3.76
799	n5393	7.52	7.52	4.109	29.625	29.7	4.286	4.286	3.41
801	n5397	13.56	13.56	12.37	0	0.075	12.379	12.379	1.19
802	n5398	13.1	13.1	11.91	1.65	1.725	11.945	11.945	1.19
803	n5399	8.85	8.85	7.66	0.075	0.15	7.67	7.67	1.19
805	n5441	9.1	9.1	7.91	0	0.075	7.917	7.917	1.19
1581	MH-1	6.5	6.5	3.407	31.875	31.95	3.614	3.614	3.09
1583	MH-2	6	6	3.288	77.7	77.775	3.563	3.563	2.71
1585	MH-3	6	6	3.58	45.675	45.75	3.739	3.739	2.42
1650	MH-10	22.45	22.45	21.26	0	0.075	21.267	21.267	1.19
1657	MH-11	20.647	20.647	19.103	6.075	6.15	19.179	19.179	1.54
1662	MH-12	12.314	12.314	10.333	11.025	11.1	10.441	10.441	1.98
1666	MH-13	15.938	15.938	14.749	0	1.5	14.786	14.786	1.19
1670	MH-14	7.407	7.407	5.829	31.35	31.425	6.014	6.014	1.58
1685	MH-19	17.322	17.322	16.132	2.625	2.7	16.182	16.182	1.19
1689	MH-20	9.111	9.111	7.627	3.75	3.825	7.687	7.687	1.48
1697	MH-22	8.552	8.552	5.284	32.4	32.475	5.47	5.47	3.27
30	n47	13.66	13.66	10.281	2.7	2.775	10.331	10.331	3.38
31	n48	13.72	13.72	10.208	2.775	2.85	10.259	10.259	3.51
33	n50	14.92	14.92	12.891	2.85	2.925	13.044	13.044	2.03
34	n51	15.9	15.9	12.789	3.15	3.225	13.042	13.042	3.11
35	n52	16.05	16.05	12.755	3.225	81.075	13.041	13.041	3.3
36	n53	16.11	16.11	12.712	81.075	81.15	12.992	12.992	3.4
37	n54	15.78	15.78	12.669	81.15	81.225	12.937	12.937	3.11
38	n55	15.18	15.18	12.626	81.225	81.3	12.828	12.828	2.55
39	n56	13.85	13.85	12.287	0.375	0.45	12.305	12.305	1.56
40	n57	14.55	14.55	13.36	0	0.075	13.367	13.367	1.19
41	n58	13.83	13.83	12.408	81.3	81.375	12.609	12.609	1.42
42	n59	12.33	12.33	10.818	81.375	81.45	11.02	11.02	1.51
43	n60	10.74	10.74	9.098	81.45	81.525	9.299	9.299	1.64
44	n61	9.02	9.02	7.6	81.525	81.6	7.802	7.802	1.42

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45	n62	7.56	7.56	6.14	81.6	81.675	6.342	6.342	1.42
46	n63	6.6	6.6	5.18	81.675	81.75	5.382	5.382	1.42
47	n64	5.83	5.83	4.41	81.75	81.825	4.612	4.612	1.42
48	n888	13.95	13.95	10.383	2.625	2.7	10.433	10.433	3.57
49	n889	14.36	14.36	10.485	2.55	2.625	10.534	10.534	3.87
50	n891	13.95	13.95	10.61	2.475	2.55	10.659	10.659	3.34
51	n892	14.6	14.6	13.066	0.15	0.225	13.079	13.079	1.53
52	n893	14.69	14.69	13.168	0.075	0.15	13.181	13.181	1.52
53	n894	14.46	14.46	13.27	0	0.075	13.279	13.279	1.19
54	n895	14.04	14.04	12.85	0.45	0.525	12.869	12.869	1.19
55	n896	14.2	14.2	13.01	0.15	0.225	13.024	13.024	1.19
56	n897	14.94	14.94	13.75	0.075	0.15	13.76	13.76	1.19
57	n898	15.51	15.51	14.32	0	0.075	14.327	14.327	1.19
58	n899	16.02	16.02	14.83	0	0.075	14.839	14.839	1.19
59	n900	16.09	16.09	14.728	0.075	0.15	14.741	14.741	1.36
60	n901	15.92	15.92	14.626	0.15	0.225	14.641	14.641	1.29
61	n902	14.55	14.55	13.357	0.225	0.3	13.371	13.371	1.19
62	n903	14.94	14.94	13.459	0.15	0.225	13.474	13.474	1.48
63	n904	15.06	15.06	13.561	0.075	0.15	13.573	13.573	1.5
64	n905	14.84	14.84	13.65	0	0.075	13.659	13.659	1.19
65	n906	14.59	14.59	12.843	0	0.075	12.85	12.85	1.75
66	n908	12.44	12.44	11.25	0.15	0.225	11.263	11.263	1.19
67	n909	11.65	11.65	10.46	0.225	0.3	10.475	10.475	1.19
68	n910	10.67	10.67	9.48	0.3	0.375	9.496	9.496	1.19
69	n911	10.14	10.14	8.95	0.375	0.45	8.968	8.968	1.19
70	n912	10.03	10.03	8.84	0.45	0.525	8.859	8.859	1.19
71	n914	9.72	9.72	8.53	0.525	0.6	8.554	8.554	1.19
72	n915	9.8	9.8	8.428	0.6	0.675	8.453	8.453	1.37
73	n916	10.07	10.07	8.326	0.675	0.75	8.353	8.353	1.74
74	n917	10.76	10.76	8.224	0.75	0.825	8.252	8.252	2.54
75	n918	12	12	8.146	0.825	0.9	8.175	8.175	3.85
76	n919	12.7	12.7	8.044	0.9	0.975	8.074	8.074	4.66
77	n920	11.04	11.04	7.942	0.975	1.05	7.973	7.973	3.1
78	n921	10.77	10.77	7.923	1.05	1.125	7.955	7.955	2.85
79	n922	10.46	10.46	7.84	1.125	1.2	7.874	7.874	2.62
80	n923	8.94	8.94	7.738	1.2	1.275	7.768	7.768	1.2
81	n924	8.89	8.89	7.7	1.275	1.35	7.735	7.735	1.19
82	n925	9.33	9.33	7.619	1.35	1.425	7.65	7.65	1.71
83	n926	8.47	8.47	7.28	1.425	1.5	7.313	7.313	1.19
84	n927	8.31	8.31	7.12	1.5	1.575	7.155	7.155	1.19
85	n928	8.23	8.23	7.04	1.575	1.65	7.079	7.079	1.19
86	n929	8.25	8.25	6.991	1.65	1.725	7.031	7.031	1.26
87	n930	8.21	8.21	6.933	2.55	2.625	6.982	6.982	1.28
88	n931	8.17	8.17	6.921	2.625	2.7	6.965	6.965	1.25
89	n932	7.91	7.91	6.72	2.7	2.775	6.771	6.771	1.19
90	n933	8.08	8.08	6.618	2.775	2.85	6.669	6.669	1.46
91	n934	8.09	8.09	6.516	2.85	2.925	6.568	6.568	1.57
92	n935	8.64	8.64	7.45	0	0.075	7.459	7.459	1.19

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93	n936	9.28	9.28	7.348	0.075	0.15	7.361	7.361	1.93
94	n937	9.74	9.74	7.246	0.15	0.225	7.261	7.261	2.49
95	n938	9.83	9.83	7.144	0.225	0.3	7.161	7.161	2.69
96	n939	9.65	9.65	6.94	0.3	0.375	6.959	6.959	2.71
97	n940	9.47	9.47	6.838	0.375	0.45	6.859	6.859	2.63
98	n941	9.43	9.43	6.771	0.45	0.525	6.793	6.793	2.66
99	n942	9.2	9.2	6.634	0.525	0.6	6.658	6.658	2.57
100	n943	9.12	9.12	6.606	0.6	0.675	6.631	6.631	2.51
101	n944	8.86	8.86	6.532	0.675	0.75	6.559	6.559	2.33
102	n945	8.14	8.14	6.43	0.75	0.825	6.458	6.458	1.71
103	n946	7.96	7.96	6.328	0.825	0.9	6.357	6.357	1.63
104	n947	7.7	7.7	6.226	0.9	0.975	6.256	6.256	1.47
105	n948	7.51	7.51	6.124	0.975	1.05	6.156	6.156	1.39
106	n949	7.4	7.4	3.476	7.125	7.2	3.559	3.559	3.92
107	n950	7.37	7.37	3.374	7.2	7.275	3.458	3.458	4
108	n951	7.27	7.27	3.272	7.275	7.35	3.356	3.356	4
109	n952	6.93	6.93	3.17	7.35	7.425	3.255	3.255	3.76
110	n953	6.77	6.77	3.068	7.425	7.5	3.153	3.153	3.7
111	n954	6.78	6.78	2.966	7.5	7.575	3.052	3.052	3.81
113	n956	7.11	7.11	5.691	7.575	7.65	5.777	5.777	1.42
114	n957	7.16	7.16	5.589	7.65	7.725	5.676	5.676	1.57
115	n958	7.14	7.14	5.514	7.8	7.875	5.602	5.602	1.63
116	n959	7.18	7.18	5.374	7.875	7.95	5.462	5.462	1.81
117	n960	7.17	7.17	5.272	7.95	8.025	5.361	5.361	1.9
118	n961	7.21	7.21	5.17	8.025	8.1	5.259	5.259	2.04
119	n962	7.27	7.27	5.068	8.1	8.175	5.158	5.158	2.2
120	n963	7.31	7.31	4.966	8.175	8.25	5.056	5.056	2.34
121	n964	7.4	7.4	4.864	8.25	8.325	4.954	4.954	2.54
122	n1845	7.37	7.37	5.851	0.6	0.675	5.876	5.876	1.52
123	n1846	7.45	7.45	5.976	0.525	0.6	6	6	1.47
124	n1847	7.5	7.5	6.078	0.45	0.525	6.101	6.101	1.42
125	n1848	7.55	7.55	6.18	0.375	0.45	6.201	6.201	1.37
126	n1849	7.64	7.64	6.282	0.3	0.375	6.301	6.301	1.36
127	n1850	7.72	7.72	6.384	0.225	0.3	6.401	6.401	1.34
128	n1851	7.78	7.78	6.486	0.15	0.225	6.501	6.501	1.29
129	n1852	7.88	7.88	6.588	0.075	0.15	6.601	6.601	1.29
130	n1853	7.88	7.88	6.69	0	0.075	6.699	6.699	1.19
131	n1863	7.4	7.4	5.146	1.125	1.2	5.179	5.179	2.25
132	n1864	7.31	7.31	4.203	1.8	55.95	4.439	4.439	3.11
133	n1865	7.22	7.22	4.305	1.725	1.8	4.44	4.44	2.92
134	n1866	7.2	7.2	4.407	1.65	1.725	4.449	4.449	2.79
135	n1867	7.22	7.22	4.509	1.575	1.65	4.548	4.548	2.71
136	n1868	7.19	7.19	4.611	1.5	1.575	4.649	4.649	2.58
137	n1869	7.28	7.28	4.713	1.425	1.5	4.75	4.75	2.57
138	n1870	7.34	7.34	4.815	1.35	1.425	4.851	4.851	2.53
139	n1871	7.37	7.37	4.917	1.275	1.35	4.952	4.952	2.45
140	n1872	7.35	7.35	5.019	1.2	1.275	5.053	5.053	2.33
141	n1874	7.42	7.42	5.248	1.05	1.125	5.28	5.28	2.17

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142	n1875	7.43	7.43	5.35	0.975	1.05	5.381	5.381	2.08
143	n1876	7.48	7.48	5.452	0.9	0.975	5.482	5.482	2.03
144	n1877	7.51	7.51	5.554	0.825	0.9	5.583	5.583	1.96
145	n1878	7.5	7.5	5.656	0.75	0.825	5.684	5.684	1.84
146	n1879	7.49	7.49	5.758	0.675	0.75	5.785	5.785	1.73
147	n1972	7.6	7.6	4.762	8.325	8.4	4.84	4.84	2.84
148	n1974	7.97	7.97	4.158	13.2	13.275	4.279	4.279	3.81
149	n1975	7.27	7.27	4.272	4.725	4.8	4.339	4.339	3
150	n1976	7.21	7.21	4.374	4.65	4.725	4.441	4.441	2.84
151	n1977	7.28	7.28	4.476	4.575	4.65	4.542	4.542	2.8
152	n1978	7.51	7.51	4.578	4.5	4.575	4.644	4.644	2.93
153	n1979	7.68	7.68	4.68	4.425	4.5	4.745	4.745	3
154	n1980	7.66	7.66	4.725	4.35	4.425	4.789	4.789	2.94
155	n1981	7.93	7.93	4.782	4.275	4.35	4.846	4.846	3.15
156	n1982	8.19	8.19	4.884	4.2	4.275	4.947	4.947	3.31
157	n1983	8.23	8.23	4.93	4.125	4.2	4.992	4.992	3.3
158	n1984	8.13	8.13	4.986	4.05	4.125	5.048	5.048	3.14
159	n1985	7.93	7.93	5.088	3.975	4.05	5.149	5.149	2.84
160	n1986	7.71	7.71	5.129	3.9	3.975	5.189	5.189	2.58
161	n1987	7.77	7.77	5.19	3.825	3.9	5.25	5.25	2.58
162	n1988	7.94	7.94	5.292	3.75	3.825	5.352	5.352	2.65
163	n1989	8.2	8.2	5.394	3.675	3.75	5.453	5.453	2.81
164	n1990	8.68	8.68	5.496	3.6	3.675	5.555	5.555	3.18
165	n1991	9.06	9.06	5.598	3.525	3.6	5.656	5.656	3.46
166	n1992	9.41	9.41	5.7	3.45	3.525	5.757	5.757	3.71
167	n1993	9.59	9.59	5.802	3.375	3.45	5.859	5.859	3.79
168	n1994	9.3	9.3	5.904	3.3	3.375	5.96	5.96	3.4
169	n1995	9.07	9.07	6.006	3.225	3.3	6.061	6.061	3.06
170	n1996	8.84	8.84	6.108	3.15	3.225	6.163	6.163	2.73
171	n1997	8.63	8.63	6.21	3.075	3.15	6.264	6.264	2.42
172	n1998	8.6	8.6	6.312	3	3.075	6.365	6.365	2.29
173	n1999	8.37	8.37	6.414	2.925	3	6.467	6.467	1.96
174	n2000	8.18	8.18	4.057	13.275	13.35	4.179	4.179	4.12
175	n2001	8.06	8.06	3.955	13.35	13.425	4.077	4.077	4.1
176	n2002	7.89	7.89	3.853	13.425	13.5	3.976	3.976	4.04
177	n2003	7.75	7.75	3.751	13.5	13.575	3.874	3.874	4
178	n2004	7.62	7.62	3.649	13.575	13.65	3.773	3.773	3.97
179	n2009	7.34	7.34	4.04	56.1	56.175	4.283	4.283	3.3
180	n2010	7.26	7.26	3.995	56.175	56.25	4.238	4.238	3.26
181	n2011	7.3	7.3	3.95	56.25	56.325	4.191	4.191	3.35
182	n2012	7.39	7.39	3.905	56.325	56.4	4.142	4.142	3.48
183	n2013	7.74	7.74	3.873	56.4	56.475	4.103	4.103	3.87
184	n2014	7.65	7.65	3.404	13.725	13.8	3.591	3.591	4.25
185	n2015	7.79	7.79	3.302	13.8	13.875	3.531	3.531	4.49
186	n2016	7.81	7.81	3.288	13.875	13.95	3.523	3.523	4.52
187	n2017	7.74	7.74	3.192	70.5	70.575	3.465	3.465	4.55
188	n2019	7.71	7.71	3.828	56.475	56.55	4	4	3.88
189	n2020	5.43	5.43	4.01	81.825	81.9	4.212	4.212	1.42

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190	n2021	5.18	5.18	3.76	81.9	81.975	4.006	4.006	1.42
191	n2022	5.1	5.1	3.68	81.975	82.05	3.951	3.951	1.42
192	n2023	5.06	5.06	3.636	82.05	82.125	3.87	3.87	1.42
193	n2024	4.97	4.97	3.55	82.125	82.2	3.782	3.782	1.42
194	n2025	4.87	4.87	3.45	82.2	82.275	3.737	3.737	1.42
195	n2026	13.59	13.59	12.4	0	0.075	12.407	12.407	1.19
196	n2027	8.68	8.68	7.49	0.75	0.825	7.514	7.514	1.19
197	n2028	9.14	9.14	7.95	0.675	0.75	7.973	7.973	1.19
198	n2029	9.63	9.63	8.44	0.6	0.675	8.462	8.462	1.19
199	n2030	10.5	10.5	9.31	0.525	0.6	9.331	9.331	1.19
200	n2031	11.98	11.98	10.79	0.45	0.525	10.809	10.809	1.19
201	n2032	4.92	4.92	3.406	82.275	82.35	3.687	3.687	1.51
202	n2033	4.95	4.95	3.362	82.35	82.425	3.631	3.631	1.59
203	n2034	4.89	4.89	3.318	82.425	82.5	3.521	3.521	1.57
204	n2035	4.82	4.82	2.666	153.9	153.975	2.938	2.938	2.15
205	n2036	5.05	5.05	2.706	71.325	71.4	2.979	2.979	2.34
206	n2037	5.21	5.21	2.745	71.25	71.325	3.019	3.019	2.46
207	n2038	5.37	5.37	2.785	71.175	71.25	3.059	3.059	2.59
208	n2039	5.61	5.61	2.824	71.1	71.175	3.099	3.099	2.79
209	n2040	6.03	6.03	2.864	71.025	71.1	3.138	3.138	3.17
210	n2041	6.39	6.39	2.904	70.95	71.025	3.178	3.178	3.49
211	n2042	6.78	6.78	2.943	70.875	70.95	3.217	3.217	3.84
212	n2043	7.01	7.01	2.983	70.8	70.875	3.257	3.257	4.03
213	n2044	7.42	7.42	3.062	70.725	70.8	3.336	3.336	4.36
214	n2045	7.52	7.52	3.102	70.65	70.725	3.375	3.375	4.42
215	n2046	7.6	7.6	3.141	70.575	70.65	3.414	3.414	4.46
216	n2135	13.55	13.55	10.712	2.4	2.475	10.76	10.76	2.84
217	n2136	13.25	13.25	10.814	2.325	2.4	10.861	10.861	2.44
218	n2137	12.85	12.85	10.916	2.25	2.325	10.962	10.962	1.93
219	n2138	12.55	12.55	11.018	2.175	2.25	11.064	11.064	1.53
220	n2139	12.31	12.31	11.12	0	2.175	11.165	11.165	1.19
221	n2140	11.97	11.97	8.266	2.025	2.1	8.31	8.31	3.7
222	n2141	11.76	11.76	8.368	1.95	2.025	8.411	8.411	3.39
223	n2142	11.8	11.8	8.47	1.875	1.95	8.513	8.513	3.33
224	n2143	11.94	11.94	8.572	1.8	1.875	8.614	8.614	3.37
225	n2144	12.52	12.52	8.674	1.725	1.8	8.715	8.715	3.85
226	n2145	12.94	12.94	8.776	1.65	1.725	8.816	8.816	4.16
227	n2146	12.64	12.64	8.878	1.575	1.65	8.917	8.917	3.76
228	n2147	12.12	12.12	8.98	1.5	1.575	9.018	9.018	3.14
229	n2148	11.55	11.55	9.082	1.425	1.5	9.119	9.119	2.47
230	n2149	11.01	11.01	9.184	1.35	1.425	9.22	9.22	1.83
231	n2150	10.69	10.69	9.286	1.275	1.35	9.321	9.321	1.4
232	n2151	10.58	10.58	9.388	1.2	1.275	9.422	9.422	1.19
233	n2152	10.68	10.68	9.49	1.125	1.2	9.523	9.523	1.19
234	n2153	10.95	10.95	9.76	1.05	1.125	9.788	9.788	1.19
235	n2154	11.52	11.52	10.33	0.975	1.05	10.357	10.357	1.19
236	n2155	12.6	12.6	11.41	0.9	0.975	11.436	11.436	1.19
237	n2156	13.39	13.39	12.2	0.825	0.9	12.225	12.225	1.19

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238	n2157	14.1	14.1	12.91	0.75	0.825	12.934	12.934	1.19
239	n2158	14.7	14.7	13.51	0.675	0.75	13.533	13.533	1.19
240	n2159	15.42	15.42	14.23	0.6	0.675	14.252	14.252	1.19
241	n2160	16.65	16.65	15.46	0.525	0.6	15.481	15.481	1.19
242	n2161	18.2	18.2	16.958	0.45	0.525	16.977	16.977	1.24
243	n2162	19.66	19.66	18.47	0.375	0.45	18.488	18.488	1.19
244	n2163	20.82	20.82	19.63	0.3	0.375	19.646	19.646	1.19
245	n2164	21.44	21.44	20.25	0.225	0.3	20.265	20.265	1.19
246	n2187	13	13	11.81	0.525	0.6	11.831	11.831	1.19
247	n2188	12.31	12.31	11.12	0.6	0.675	11.142	11.142	1.19
248	n2189	12.13	12.13	10.94	0.675	0.75	10.966	10.966	1.19
249	n2190	12.01	12.01	10.82	0.75	0.825	10.848	10.848	1.19
250	n2191	12.14	12.14	10.67	0.9	0.975	10.7	10.7	1.47
251	n2192	12.42	12.42	10.568	0.975	1.05	10.599	10.599	1.85
252	n2193	12.92	12.92	10.466	1.05	1.125	10.498	10.498	2.45
253	n2194	13.55	13.55	10.364	1.125	1.2	10.398	10.398	3.19
254	n2195	14.29	14.29	10.262	1.2	1.275	10.297	10.297	4.03
255	n2196	14.4	14.4	10.16	1.275	1.35	10.195	10.195	4.24
256	n2197	13.47	13.47	10.058	1.35	1.425	10.094	10.094	3.41
257	n2198	12.17	12.17	9.957	1.425	1.5	9.994	9.994	2.21
258	n2199	11.37	11.37	9.855	1.5	1.575	9.888	9.888	1.52
259	n2200	10.71	10.71	9.52	1.575	1.65	9.554	9.554	1.19
260	n2201	10.49	10.49	9.3	1.65	1.725	9.335	9.335	1.19
261	n2202	10.3	10.3	9.11	1.725	1.8	9.147	9.147	1.19
262	n2203	10.01	10.01	8.82	1.8	1.875	8.856	8.856	1.19
263	n2204	9.42	9.42	8.23	1.875	1.95	8.267	8.267	1.19
264	n2205	8.84	8.84	7.65	1.95	2.025	7.688	7.688	1.19
265	n2206	8.42	8.42	7.23	2.025	2.1	7.269	7.269	1.19
266	n2207	8.13	8.13	5.202	4.725	4.8	5.269	5.269	2.93
267	n2208	7.29	7.29	3.625	5.925	6	3.7	3.7	3.67
268	n2209	7.16	7.16	3.727	5.85	5.925	3.802	3.802	3.43
269	n2210	6.94	6.94	3.829	5.775	5.85	3.903	3.903	3.11
270	n2211	6.88	6.88	3.931	5.7	5.775	4.005	4.005	2.95
271	n2212	7.11	7.11	4.033	5.625	5.7	4.106	4.106	3.08
272	n2213	7.38	7.38	4.135	5.55	5.625	4.208	4.208	3.25
273	n2214	7.63	7.63	4.237	5.475	5.55	4.309	4.309	3.39
274	n2215	7.74	7.74	4.339	5.4	5.475	4.411	4.411	3.4
275	n2216	7.59	7.59	4.441	5.325	5.4	4.512	4.512	3.15
276	n2217	7.51	7.51	4.543	5.25	5.325	4.614	4.614	2.97
277	n2218	7.5	7.5	4.645	5.175	5.25	4.715	4.715	2.86
278	n2219	7.62	7.62	4.747	5.1	5.175	4.817	4.817	2.87
279	n2220	7.75	7.75	4.849	5.025	5.1	4.918	4.918	2.9
280	n2221	7.92	7.92	4.951	4.95	5.025	5.02	5.02	2.97
281	n2222	8.14	8.14	5.1	4.8	4.875	5.168	5.168	3.04
282	n2223	12.02	12.02	10.718	0.825	0.9	10.747	10.747	1.3
283	n2229	7.78	7.78	5.304	2.55	2.625	5.353	5.353	2.48
284	n2230	7.54	7.54	5.406	2.475	2.55	5.454	5.454	2.13
285	n2231	7.23	7.23	5.508	2.4	2.475	5.556	5.556	1.72

ID	Label	Elevation (Ground) (m)	Elevation (Rim) (m)	Elevation (Invert) (m)	Flow (Total In) (L/s)	Flow (Total Out) (L/s)	Hydraulic Grade Line (Out) (m)	Hydraulic Grade Line (In) (m)	Depth (Structure) (m)
286	n2232	7.08	7.08	5.558	2.325	2.4	5.605	5.605	1.52
287	n2233	7	7	5.81	2.175	2.25	5.851	5.851	1.19
288	n2234	7.17	7.17	5.98	2.1	2.175	6.02	6.02	1.19
289	n2235	7.34	7.34	6.15	2.025	2.1	6.189	6.189	1.19
290	n2236	7.6	7.6	6.41	1.95	2.025	6.448	6.448	1.19
291	n2237	8.28	8.28	7.09	1.875	1.95	7.127	7.127	1.19
292	n2238	8.92	8.92	7.73	1.8	1.875	7.766	7.766	1.19
293	n2239	9.8	9.8	8.61	1.725	1.8	8.646	8.646	1.19
294	n2240	11.29	11.29	10.1	1.65	1.725	10.135	10.135	1.19
295	n2241	12.58	12.58	11.314	1.575	1.65	11.348	11.348	1.27
296	n2242	13.48	13.48	11.898	1.425	1.5	11.936	11.936	1.58
297	n2243	14.22	14.22	11.97	1.35	1.425	12.006	12.006	2.25
298	n2244	14.87	14.87	12.072	1.275	1.35	12.107	12.107	2.8
299	n2245	14.73	14.73	12.175	1.2	1.275	12.209	12.209	2.55
300	n2246	14.33	14.33	12.248	1.125	1.2	12.281	12.281	2.08
301	n2247	13.54	13.54	12.35	0	1.125	12.382	12.382	1.19
302	n2248	12.32	12.32	9.192	0.975	1.05	9.223	9.223	3.13
303	n2249	11.43	11.43	9.294	0.9	0.975	9.324	9.324	2.14
304	n2250	10.9	10.9	9.396	0.825	0.9	9.425	9.425	1.5
305	n2251	10.73	10.73	9.498	0.75	0.825	9.526	9.526	1.23
306	n2252	10.79	10.79	9.6	0.675	0.75	9.627	9.627	1.19
307	n2253	11.03	11.03	9.84	0.6	0.675	9.862	9.862	1.19
308	n2254	11.8	11.8	10.61	0.525	0.6	10.631	10.631	1.19
309	n2255	13.12	13.12	11.93	0.45	0.525	11.949	11.949	1.19
310	n2256	14.34	14.34	12.376	0.375	0.45	12.393	12.393	1.96
311	n2257	14.4	14.4	12.478	0.3	0.375	12.497	12.497	1.92
312	n2258	14.12	14.12	12.566	0.225	0.3	12.583	12.583	1.55
313	n2259	13.92	13.92	12.668	0.15	0.225	12.683	12.683	1.25
314	n2260	13.96	13.96	12.77	0.075	0.15	12.783	12.783	1.19
315	n2261	14.47	14.47	13.28	0	0.075	13.287	13.287	1.19
316	n2619	23.13	23.13	21.748	0.15	0.225	21.76	21.76	1.38
317	n2620	24.89	24.89	23.438	0.075	0.15	23.448	23.448	1.45
318	n2621	26.51	26.51	25.198	0	0.075	25.205	25.205	1.31
319	n4839	7.36	7.36	4.152	55.95	56.025	4.39	4.39	3.21
320	n4840	7.35	7.35	4.085	56.025	56.1	4.329	4.329	3.26
321	n5025	13.06	13.06	11.868	1.5	1.575	11.901	11.901	1.19
322	n5111	7.4	7.4	3.523	6	6.075	3.599	3.599	3.88
323	n5128	8.09	8.09	5.034	4.875	4.95	5.102	5.102	3.06
324	n5203	6.81	6.81	5.62	0	0.075	5.628	5.628	1.19
325	n5388	6.85	6.85	5.66	2.25	2.325	5.706	5.706	1.19
326	n5414	7.47	7.47	3.514	13.65	13.725	3.648	3.648	3.96
639	MH-2	14.167	14.167	12.977	0	2.85	13.049	13.049	1.19
646	MH-3	6.973	6.973	5.784	0	7.575	5.87	5.87	1.19

APPENDIX- VII-POWER CALCULATION

Sl no.	Name	Pumpset Capacity in HP	Pumpset Capacity in KW	No of Pumpsets	No of Stand by	Working Time	Power Consumpti on/ day	Power Consumpti on/ year	Power cost @Rs7/unit	Remarks
STP										
1	Raw Sewage Pump	30	22.38	3	1	24	1074.24	392097.6	2744683.2	
2	Septage pump	2	1.492	2	1	24	35.808	13069.92	91489.44	
3	Air Blower	52	38.792	4	1	24	2793.024	1019453.76	7136176.32	
4	Sludge Transfer to Thickner Pump	4	2.984	2	1	24	71.616	26139.84	182978.88	
5	Sludge Transfer to Centrifuge Pump	1.5	1.119	2	1	24	26.856	9802.44	68617.08	
6	Clarified water to ASF/PSF Pump	13	9.698	8	1	24	1629.264	594681.36	4162769.52	
7	Mixer-EQ tank	3	2.238	4	2	24	107.424	39209.76	274468.32	
8	Treated Water to Septage tank	4	2.984	2	1	24	71.616	26139.84	182978.88	
8	Clarifier to Sludge Sump Pump	3	2.238	4	2	24	107.424	39209.76	274468.32	
9	Centrate Sump to EQ Tank	3	2.238	2	1	24	53.712	19604.88	137234.16	
10	High Pressure Jet Pump	1	0.746	1	0	1	0.746	272.29	1906.03	
11	STP Ligting	30				24	720	262800	1839600	
NET WORK										
1	LS-1	0.5	0.373	2	1	24	8.952	3267.48	22872.36	
2	LS-2	0.5	0.373	2	1	24	8.952	3267.48	22872.36	
3	LS-3	2	1.492	2	1	24	35.808	13069.92	91489.44	
4	LS-4	2	1.492	2	1	24	35.808	13069.92	91489.44	
5	LS-5	3	2.238	2	1	24	53.712	19604.88	137234.16	
6	LS-6	1	0.746	2	1	24	17.904	6534.96	45744.72	
7	LS-7	1	0.746	2	1	24	17.904	6534.96	45744.72	
8	LS-8	2	1.492	2	1	24	35.808	13069.92	91489.44	

SI no.	Name	Pumpset Capacity in HP	Pumpset Capacity in KW	No of Pumpsets	No of Stand by	Working Time	Power Consumption/ day	Power Consumption/ year	Power cost @Rs7/unit	Remarks
9	LS-9	3	2.238	2	1	24	53.712	19604.88	137234.16	
10	LS-10	20	14.92	2	1	24	358.08	130699.2	914894.4	
11	LS-11	1	0.746	2	1	24	17.904	6534.96	45744.72	
12	LS-12	0.5	0.373	2	1	24	8.952	3267.48	22872.36	
13	LS-13	1	0.746	2	1	24	17.904	6534.96	45744.72	
14	LS-14	10	7.46	2	1	24	179.04	65349.6	457447.2	
15	LS-15	2	1.492	2	1	24	35.808	13069.92	91489.44	
16	LS-16	0.5	0.373	2	1	24	8.952	3267.48	22872.36	
17	LS-17	1	0.746	2	1	24	17.904	6534.96	45744.72	
18	LS-18	1	0.746	2	1	24	17.904	6534.96	45744.72	
19	LS-19	2	1.492	2	1	24	35.808	13069.92	91489.44	
20	LS-20	0.5	0.373	2	1	24	8.952	3267.48	22872.36	
21	LS-21	6	4.476	2	1	24	107.424	39209.76	274468.32	
22	LS-22	2	1.492	2	1	24	35.808	13069.92	91489.44	
23	LS-23	0.5	0.373	2	1	24	8.952	3267.48	22872.36	
24	LS-24	0.5	0.373	2	1	24	8.952	3267.48	22872.36	
25	LS-25	0.5	0.373	2	1	24	8.952	3267.48	22872.36	
26	LS-26	1	0.746	2	1	24	17.904	6534.96	45744.72	
27	PH-1	35	26.11	3	1	24	1253.28	457447.2	3202130.4	
28	Ligting-Well and Lifting stations		27			24	648	236520	1655640	
								3298421.05	23088947.35	

PRICE

EST NO:

General Abstract

**SEWERAGE SCHEME TO KANHANGAD MUNICIPALITY - CONSTRUCTION OF
7MLD CAPACITY SEWAGE TREATMENT PLANT AT NILANKARAVAYAL AND
LAYING SEWERAGE NET WORK**

(Dsor year: 2018)

SI No	Heading Description	Amount
1	Network Estimate Including O&M (Estimate No:2022/4123)	1795998947.00
2	7MLD STP Estimate Including O&m(Estimate No:2022/4719)	484423629.00
3	7 MLD STP Electro Mechanical Estimate(Estimate No:2022/4936)	96159720.00
	Total	2376582296.00
	Centage @	0.0%
	Centage Amount	0.00
	Provision for GST payments (in %) @	0.0%
	Amount reserved for GST payments	0.00
	Total & Centage	2376582296.00
	Lumpsum for round off	0.00
	GRAND TOTAL Rs	2376582296.00
	Rounded Grand Total Rs 2,37,65,82,296	
	Rupees Two Hundred Thirty Seven Crore Sixty Five Lakh Eighty Two Thousand Two Hundred and Ninety Six Only	

Kerala Water Authority
PRICE

General Abstract

**SEWERAGE SCHEME TO KANHANGAD MUNICIPALITY - CONSTRUCTION OF 7
MLD CAPACITY SEWAGE TREATMENT PLANT AT NILANKARAVAYAL AND
LAYING SEWERAGE NET WORK -STP ESTIMATE**

(Dsor year: 2018)

SI No	Heading Description	Amount
1	RAW SEWAGE RECEIVING CHAMBER CUM WELL	2646950.98
2	SEPTAGE TANK	1258088.70
3	INLET CHEMBER/SCREEN CHANEL/GRIT CHEMBER/PARSHALLFLUME	3974382.72
4	EQUALISATION TANK-2Nos	12335876.77
5	MBBR 1 & 2 (2set)	22379506.44
6	SECONDARY CLARIFIER(2 Nos)	10352520.28
7	SLUDGE SUMP	449629.17
8	SLUDGE THICKNER	2216085.19
9	THICKENED SLUDGE SUMP	486820.95
10	FILTER FEED TANK	1359824.81
11	TREATED WATER TANK	2709299.35
12	Centrate Sump	332046.92
13	Administrative/Laboratory/Chemical House / Control Room Building	5098073.01
14	Security Cabin	297948.09
15	Air Blower Building	2616139.55
16	Chlorination Building	2010961.80
17	Transformer Building	3152274.57
18	Centrifuge Building	3117537.57
19	PSF/ACF Foundation	730840.44
20	Sludge Shed	644439.80
21	STP Land Development & Approach Road and internal Service Roads	30698611.72
22	Storm Water Drains	1407474.00
23	Compound wall and Gate	3470034.31
24	Operation and Maintenance cost for STP and Allied works - 1st year	6818889.06
25	Operation and Maintenance cost for STP and Allied works - 2nd year to 10th year	85918002.16
26	Landscaping and Greenbelt Formation around the STP compound	1000000.00
27	Electricity charges to STP for 10 years	170973701.50
Total		378455959.87
Centage @		10.0%
Centage Amount		37845595.99

Provision for GST payments (in %) @	18.0%
Amount reserved for GST payments	68122072.78
Total & Centage	484423628.63
Lumpsum for round off	0.00
GRAND TOTAL Rs	484423628.63
Rounded Grand Total Rs 48,44,23,629	
Rupees Forty Eight Crore Forty Four Lakh Twenty Three Thousand Six Hundred and Twenty Nine Only	



Kerala Water Authority

PRICE

Detailed Estimate

**SEWERAGE SCHEME TO KANHANGAD MUNICIPALITY - CONSTRUCTION OF 7
MLD CAPACITY SEWAGE TREATMENT PLANT AT NILANKARAVAYAL AND
LAYING SEWERAGE NET WORK -STP ESTIMATE**

(Dsr year: 2018)

Sl No	Description	No	L	B	D	CF	Quantity	Remark	
1 RAW SEWAGE RECEIVING CHAMBER CUM WELL (Cost Index:33.05 %)									
1	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								
		1	7.000	7.000			49.000		
		Total Quantity						49.000 sqm	
		Total Deducted Quantity						0.000 sqm	
		Net Total Quantity						49.000 sqm	
		Say 49.000 sqm @ Rs 106.91 / sqm						Rs 5238.59	
2	100.3.7.1 Earthwork open well excavation (above water) for wells of dia. above 6.0m and upto 9.0 m in all kinds of soil and conveying and depositing the spoil within initial lead of 50m and lift up to 1.5 m including neat banking. NEW DATA								
	For Collection well	3.14	3.500	3.500	1.500		57.698		
		Total Quantity						57.698 cum	
		Total Deducted Quantity						0.000 cum	
		Net Total Quantity						57.698 cum	
		Say 57.698 cum @ Rs 443.26 / cum						Rs 25575.22	
3	100.3.7.2 Earthwork open well excavation (above water) for wells of dia. above 6.0m and upto 9.0 m in all kinds of soil and conveying and depositing the spoil within initial lead of 50m and lift from 1.50m to 3.0 m including neat banking. NEW DATA								
	For Collection well	3.14	3.500	3.500	1.500		57.698		
		Total Quantity						57.698 cum	
		Total Deducted Quantity						0.000 cum	
		Net Total Quantity						57.698 cum	

	Say 57.698 cum @ Rs 487.56 / cum						Rs 28131.24	
4	100.3.7.13 Earthwork open well excavation (in or under water) for wells of dia. above 6.0m and upto 9.0 m in all kinds of soil and conveying and depositing the spoil within initial lead of 50m and lift from 3.0m to 4.5 m including neat banking. NEW DATA							
	For Collection well	3.14	3.500	3.500	1.500		57.698	
	Total Quantity						57.698 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						57.698 cum	
	Say 57.698 cum @ Rs 638.31 / cum						Rs 36829.21	
5	100.3.8.14 Earthwork open well excavation (in or under water) for wells of dia. above 6.0m and upto 9.0 m in ordinary rock in ordinary rock and conveying and depositing the spoil within initial lead of 50m and lift from 4.5m to 6.0 m including neat banking. NEW DATA							
	For collection well	3.14	3.500	3.500	1.500		57.698	
	Total Quantity						57.698 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						57.698 cum	
	Say 57.698 cum @ Rs 1770.30 / cum						Rs 102142.77	
6	5.7 Reinforced cement concrete work in well - steining excluding the cost of centering, shuttering, finishing and reinforcement, with 1:1.5:3 (1 cement : 1.5 coarse sand (Zone - III) : 3 graded stone aggregate 20 mm nominal size)							
	For steining up to Top	3.14	6.300	0.300	5.500		32.641	
	Total Quantity						32.641 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						32.641 cum	
	Say 32.641 cum @ Rs 8397.45 / cum						Rs 274101.17	
7	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)							
	Well Bottom portion	1	3.140	3.5*3.5	0.200		7.694	
	Total Quantity						7.694 cum	
	Total Deducted Quantity						0.000 cum	

	Net Total Quantity						7.694 cum	
	Say 7.694 cum @ Rs 6687.23 / cum						Rs 51451.55	
8	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							
	well base	1	3.14/4	6.6*6.6	0.300		10.259	
	Total Quantity						10.259 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						10.259 cum	
	Say 10.259 cum @ Rs 8914.95 / cum						Rs 91458.47	
9	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.							
	For steining up to Top	3.14	6.300	0.300	5.500		32.641	
	well base	1	3.14/4	6.6*6.6	0.300		10.259	
	Total Quantity						42.900 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						42.900 cum	
	Say 42.900 cum @ Rs 917.85 / cum						Rs 39375.77	
10	5.3 Reinforced cement concrete work in beams, suspended floors, roofs, having slope up to 15 ⁰ 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).							
	Cover slab	1	3.140	3.3*3.3	0.300	0.5	5.130	
	Beam	1	6.600	0.300	0.300		0.594	
	Total Quantity						5.724 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						5.724 cum	
	Say 5.724 cum @ Rs 11277.58 / cum						Rs 64552.87	
11	od353227/2021_2022 Centering and shuttering including strutting propping etc and removal of form etc. Well Steining for							

	circular works							
	steining up to Top - Outer	1	3.140	6.600	5.800		120.200	
	steining up to Top - Inner	1	3.140	6.000	5.500		103.620	
	Total Quantity						223.820 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						223.820 sqm	
	Say 223.820 sqm @ Rs 294.01 / sqm						Rs 65805.32	
12	5.9.5 Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers							
	for beam	1	6.600	0.900			5.940	
	Total Quantity						5.940 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						5.940 sqm	
	Say 5.940 sqm @ Rs 637.64 / sqm						Rs 3787.58	
13	5.9.3 Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform							
	slab for working plat form over the well and beam	1	3.14/4	6.6*6.6		0.5	17.098	
	Total Quantity						17.098 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						17.098 sqm	
	Say 17.098 sqm @ Rs 800.50 / sqm						Rs 13686.95	
14	19.16 Providing orange colour safety foot rest of minimum 6 mm thick plastic encapsulated as per IS: 10910 on 12 mm dia steel 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							
	steps	1	18.000				18.000	
	Total Quantity						18.000 No	

	Total Deducted Quantity						0.000 No	
	Net Total Quantity						18.000 No	
	Say 18.000 No @ Rs 534.79 / No						Rs 9626.22	
15	13.7.1 12 mm cement plaster finished with a floating coat of neat cement of mix:1:3 (1 cement : 3 fine sand)							
	Bottom of well	1	3.14/4	6*6			28.260	
	inside of steining	1	3.140*6		5.500		103.620	
	Cover slab Top	1	3.14/4	6.6*6.6		0.5	17.098	
	Steining out	1	3.14*6.6		5.800		120.200	
	beam	1	6.600	0.900			5.940	
	Total Quantity						275.118 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						275.118 sqm	
	Say 275.118 sqm @ Rs 393.69 / sqm						Rs 108311.21	
16	13.65.1 Painting with black anti- corrosive bitumastic paint of approved brand and manufacture to give an even shade:Two or more coats on new work							
	Bottom of well	1	3.14/4	6*6			28.260	
	inside of steining	1	3.140*6		5.500		103.620	
	Cover slab Top	1	3.14/4	6.6*6.6		0.5	17.098	
	Steining out	1	3.14*6.6		5.800		120.200	
	beam	1	6.600	0.900			5.940	
	Reciving chamber- inside wall	1	5.700*2+1 .25*2		3.000		41.700	
	Reciving chamber- base slab	1	5.700	1.250			7.125	
	Reciving chamber - inside baffle wall	2	3.200	3.000			19.201	
	Total Quantity						343.144 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						343.144 sqm	
	Say 343.144 sqm @ Rs 122.47 / sqm						Rs 42024.85	
17	od353228/2021_2022 Conveying disposing the excess earth and debries etc.by lorry up to 5Km s							
	collection well	1	3.140	3.5*3.5	5.500		211.558	

	reciving chamber	1	7.200	2.750	3.450		68.310		
	Total Quantity						279.868 cum		
	Total Deducted Quantity						0.000 cum		
	Net Total Quantity						279.868 cum		
	Say 279.868 cum @ Rs 138.64 / cum						Rs 38800.90		
18	100.7.1 Bailing out water with 5 HP engine and pumpset including conveyance to the site, errection, dismantling and taking back of engine and pump, cost of fuel lubricating oil and other stores pay of staff etc. complete. NEW DATA (Prepared based on PHED SDB - Item No.1070								
		1	5*0.746	30.000	4.000		447.600		
	Total Quantity						447.600 Kwh		
	Total Deducted Quantity						0.000 Kwh		
	Net Total Quantity						447.600 Kwh		
	Say 447.600 Kwh @ Rs 36.26 / Kwh						Rs 16229.98		
19	100.7.2 Bailing out water with engine and pumpset above 5 HP upto 10 HP including conveyance to the site, errection, dismantling and taking back of engine and pump, cost of fuel lubricating oil and other stores pay of staff etc. complete. NEW DATA (Prepared based on PHED SDB - Item No.1070								
		1	10*0.746	30.000	4.000		895.200		
	Total Quantity						895.200 Kwh		
	Total Deducted Quantity						0.000 Kwh		
	Net Total Quantity						895.200 Kwh		
	Say 895.200 Kwh @ Rs 18.09 / Kwh						Rs 16194.17		
20	100.98.1008 Engaging Coolie								
		1	50.000				50.000		
	Total Quantity						50.000 Day		
	Total Deducted Quantity						0.000 Day		
	Net Total Quantity						50.000 Day		
	Say 50.000 Day @ Rs 862.30 / Day						Rs 43115.00		
21	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 1.5 m, including getting out the excavated soil, and then returning the soil as required, in layers not exceeding 20 cm in depth, including consolidatingeach deposited layer by ramming, watering, etc. and disposing of surplus excavated soil as directed, within a								

	lead of 50 m : All kinds of soil (Ref. Item No. 2.10.1 of DSR)								
		1	7.200	2.750	1.500		29.701		
		Total Quantity					29.701 cum		
		Total Deducted Quantity					0.000 cum		
		Net Total Quantity					29.701 cum		
		Say 29.701 cum @ Rs 545.11 / cum					Rs 16190.31		
22	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 3 m, including getting out the excavated soil, and then returning the soil as required, in layers not exceeding 20 cm 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: 1.50m to 3.0m All kinds of soil (Ref. Item No. 2.11 of DSR)								
		1	7.200	2.750	1.500		29.701		
		Total Quantity					29.701 cum		
		Total Deducted Quantity					0.000 cum		
		Net Total Quantity					29.701 cum		
		Say 29.701 cum @ Rs 649.48 / cum					Rs 19290.21		
23	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.								
	Receiving Chamber	1	7.2*2+3*2		3.000	0.5	30.600		
	Collection Well	1	3.14*7		6.000		131.880		
		Total Quantity					162.480 sqm		
		Total Deducted Quantity					0.000 sqm		
		Net Total Quantity					162.480 sqm		
		Say 162.480 sqm @ Rs 735.10 / sqm					Rs 119439.05		
24	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)							
		1	7.200	2.750	0.200		3.961	
	Total Quantity						3.961 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						3.961 cum	
	Say 3.961 cum @ Rs 7229.54 / cum						Rs 28636.21	
25	5.37.1 Providing and laying in position ready mixed M-25 grade concrete for reinforced cement concrete work, using cement content as per approved design mix, manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for reinforced cement concrete work including pumping of R.M.C. from transit mixer to site of laying, excluding the cost of centering, shuttering finishing and reinforcement including cost of 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 the Engineer - in -charge. Note:- Cement content considered in this item is @330 kg/cum. Excess /less cement used as per design mix is payable/recoverable separately.All work upto plinth level							
	Base slab	1	6.800	2.350	0.250		3.995	
	side wall	2	6.200	0.250	3.000		9.300	
		2	1.250	0.250	3.000		1.875	
	inner wall	1	3.700	0.250	3.000		2.776	
	Baffle wall	2*2	0.500	0.250	2.300		1.150	
	Landing slab	1	1.750	1.200	0.120		0.252	
	Total Quantity						19.348 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						19.348 cum	
	Say 19.348 cum @ Rs 9700.81 / cum						Rs 187691.27	
26	5.34.1 Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately.Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).							
	Total Qty of item no-25 (receiving chamber)	1	19.348				19.348	
	For steining up to Top	3.14	6.300	0.300	5.500		32.641	
	well base	1	3.14/4	6.6*6.6	0.300		10.259	

	Cover slab	1	3.140	3.3*3.3	0.300	0.5	5.130	
	Beam	1	6.600	0.300	0.300		0.594	
	Total Quantity						67.972 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						67.972 cum	
	Say 67.972 cum @ Rs 80.56 / cum						Rs 5475.82	
27	4.12 Extra for providing and mixing water proofing material in cement concrete work in doses by weight of cement as per manufacturer's specification .							
	Total Qty of item no-26	1	67.972			340.0	23110.480	
	Total Quantity						23110.480 kg	
	Total Deducted Quantity						0.000 kg	
	Net Total Quantity						23110.480 kg	
	Say 23110.480 kg @ Rs 1.33 / kg						Rs 30736.94	
28	5.22.6 Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth level Thermo - Mechanically Treated bars of grade Fe-500D or more							
	Qty vide item no-26 *@120kg/m3	1	67.972			120.0	8156.640	
	Total Quantity						8156.640 kilogram	
	Total Deducted Quantity						0.000 kilogram	
	Net Total Quantity						8156.640 kilogram	
	Say 8156.640 kilogram @ Rs 96.46 / kilogram						Rs 786789.49	
29	od353220/2021_2022 Extra for providing epoxy coating for reinforcement bars.							
	Qty vide item no-26 *@120kg/m3	1	67.972			120.0	8156.640	
	Total Quantity						8156.640 kg	
	Total Deducted Quantity						0.000 kg	
	Net Total Quantity						8156.640 kg	
	Say 8156.640 kg @ Rs 2.32 / kg						Rs 18923.40	
30	5.9.1 Centering and shuttering including strutting, etc. and removal of form for: Foundations, footings, bases of columns, etc for mass concrete							
	Base PCC	2	7.200		0.200		2.881	

		2	2.750		0.200		1.100		
	Base slab	2	6.800		0.300		4.080		
	„	2	2.350		0.300		1.410		
	Well base	3.14	6.000		0.200		3.769		
	„	3.14	5.600		0.300		5.276		
		Total Quantity					18.516 sqm		
		Total Deducted Quantity					0.000 sqm		
		Net Total Quantity					18.516 sqm		
		Say 18.516 sqm @ Rs 329.03 / sqm					Rs 6092.32		
31	5.9.2 Centering and shuttering including strutting, etc. and removal of form for:Walls (any thickness) including attached pilasters, butresses, plinth and string courses etc.								
	side wall	2	14.900		3.000		89.400		
	innerwall	2	3.200		3.000		19.201		
	Baffle wall	4*2	0.500		2.300		9.200		
		4	0.500	0.250			0.500		
	Landing slab	2	1.200	0.500			1.200		
		Total Quantity					119.501 sqm		
		Total Deducted Quantity					0.000 sqm		
		Net Total Quantity					119.501 sqm		
		Say 119.501 sqm @ Rs 703.77 / sqm					Rs 84101.22		
32	13.1.1 12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)								
	side wall	2	14.900		3.000		89.400		
	innerwall	2	3.200		3.000		19.201		
	Baffle wall	4*2	0.500		2.300		9.200		
		4	0.500	0.250			0.500		
	Bottom	1	5.700	1.250			7.125		
	Landing slab	2	1.200	0.500			1.200		
		Total Quantity					126.626 sqm		
		Total Deducted Quantity					0.000 sqm		
		Net Total Quantity					126.626 sqm		
		Say 126.626 sqm @ Rs 308.21 / sqm					Rs 39027.40		
33	13.82.2								

	Wall painting with acrylic emulsion paint, having VOC (Volatile Organic Compound) content less than 50 grams/ litre, of approved brand and manufacture including applying additional coats wherever required, to achieve even shade and colour.Two coats						
	side wall - outer	1	6.2*2+1.7 5*2		0.500		7.950
	Well outer	1	3.14*6.6		0.500		10.362
	Total Quantity						18.312 sqm
	Total Deducted Quantity						0.000 sqm
	Net Total Quantity						18.312 sqm
	Say 18.312 sqm @ Rs 123.40 / sqm						Rs 2259.70
34	<p>22.23.1</p> <p>Providing and applying integral crystalline slurry of hydrophilic in nature for waterproofing treatment to the RCC structures like retaining walls of the basement, water tanks, roof slabs, podiums, reservoir, sewage & water treatment plant, tunnels/ subway and bridge deck etc., prepared by mixing in the ratio of 5 : 2 (5 parts integral crystalline slurry : 2 parts water) for vertical surfaces and 3 : 1 (3 parts integral crystalline slurry : 1 part water) for horizontal surfaces and applying the same from negative (internal) side with the help of synthetic fiber brush. The material shall meet the requirements as specified in ACI-212-3R-2010 i.e by reducing permeability of concrete by more than 90% compared with control concrete as per DIN 1048 and resistant to 16 bar hydrostatic pressure on negative side. The crystalline slurry shall be capable of self-healing of cracks up to a width of 0.50mm. The work shall be carried out all complete as per specification and the direction of the engineer in-charge. The product performance shall carry guarantee for 10 years against any leakage. For vertical surface two coats @ 0.70 kg per sqm</p>						
	side wall	2	5.700		3.000		34.200
		2	1.250		3.000		7.500
	inner wall	2	3.200		3.000		19.201
	Baffle wall	4*2	0.500		2.300		9.200
	inside of steining	1	3.14*6		5.500		103.620
	Steining out	1	3.14*6.6		5.800		120.200
	beam	1	6.600	0.900			5.940
	Total Quantity						299.861 sqm
	Total Deducted Quantity						0.000 sqm
	Net Total Quantity						299.861 sqm
	Say 299.861 sqm @ Rs 559.61 / sqm						Rs 167805.21
35	<p>22.23.2</p> <p>Providing and applying integral crystalline slurry of hydrophilic in nature for waterproofing treatment to the RCC structures like retaining walls of the basement, water tanks, roof slabs, podiums, reservoir, sewage & water treatment plant, tunnels/ subway and bridge deck etc., prepared by mixing in the ratio of 5 : 2 (5 parts integral crystalline slurry : 2 parts water) for vertical surfaces and 3 : 1 (3 parts integral crystalline</p>						

	slurry : 1 part water) for horizontal surfaces and applying the same from negative (internal) side with the help of synthetic fiber brush. The material shall meet the requirements as specified in ACI-212-3R-2010 i.e. by reducing permeability of concrete by more than 90% compared with control concrete as per DIN 1048 and resistant to 16 bar hydrostatic pressure on negative side. The crystalline slurry shall be capable of self-healing of cracks up to a width of 0.50mm. The work shall be carried out all complete as per specification and the direction of the engineer in-charge. The product performance shall carry guarantee for 10 years against any leakage. For horizontal surface one coat @ 1.10 kg per sqm.							
	Receiving chamber-Base slab	1	5.700	1.250			7.125	
	Receiving chamber-Landing slab	2	0.500	1.200			1.200	
	Collection well base slab	1	3.14/4	6*6			28.260	
	Collection well cover slab bottom	1	3.14/4	6.6*6.6		0.5	17.098	
	Total Quantity						53.683 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						53.683 sqm	
	Say 53.683 sqm @ Rs 431.28 / sqm						Rs 23152.40	
36	100.36.1 Filling water with 5000 litre tankers fitted in lorry and conveying water from a distance of 5 km (average) to the reservoir site and pumping the water into the reservoir of height not less than 3 m using 5 HP diesel engine pump set, hire for tanker lorry, tools and other appliances and cost of water etc. complete. "(Ref. No. 000, Technical Circular)"							
	Receiving Chamber	1	5.700	1.250	3.000		21.375	
	Collection well	1	3.14/4	6*6	6.000		169.560	
	Total Quantity						190.935 Kilo litre	
	Total Deducted Quantity						0.000 Kilo litre	
	Net Total Quantity						190.935 Kilo litre	
	Say 190.935 Kilo litre @ Rs 182.79 / Kilo litre						Rs 34901.01	
SI No	Description	No	L	B	D	CF	Quantity	Remark
2 SEPTAGE TANK (Cost Index:33.05 %)								
1	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							
		1	7.400	5.400	2.000		79.921	

							Total Quantity	79.921 cum
							Total Deducted Quantity	0.000 cum
							Net Total Quantity	79.921 cum
							Say 79.921 cum @ Rs 210.02 / cum	Rs 16785.01
2	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	7.400	5.400	0.200		7.993	
							Total Quantity	7.993 cum
							Total Deducted Quantity	0.000 cum
							Net Total Quantity	7.993 cum
							Say 7.993 cum @ Rs 7229.54 / cum	Rs 57785.71
3	5.37.1	Providing and laying in position ready mixed M-25 grade concrete for reinforced cement concrete work, using cement content as per approved design mix, manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for reinforced cement concrete work including pumping of R.M.C. from transit mixer to site of laying, excluding the cost of centering, shuttering finishing and reinforcement including cost of 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 the Engineer - in -charge. Note:- Cement content considered in this item is @330 kg/cum. Excess /less cement used as per design mix is payable/recoverable separately.All work upto plinth level						
	Base slab	1	7.200	5.200	0.300		11.233	
							Total Quantity	11.233 cum
							Total Deducted Quantity	0.000 cum
							Net Total Quantity	11.233 cum
							Say 11.233 cum @ Rs 9700.81 / cum	Rs 108969.20
4	5.37.2	Providing and laying in position ready mixed M-25 grade concrete for reinforced cement concrete work, using cement content as per approved design mix, manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for reinforced cement concrete work including pumping of R.M.C. from transit mixer to site of laying, excluding the cost of centering, shuttering finishing and reinforcement including cost of 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 the Engineer - in -charge. Note:- Cement content considered in this item is @330 kg/cum. Excess /less cement used as per design mix is payable/recoverable separately.All work above plinth level upto floor V level						
	Cover slab	1	6.600	4.600	0.200		6.072	

	Side wall-Allround	1	21.200	0.300	3.000		19.080	
	Total Quantity						25.152 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						25.152 cum	
	Say 25.152 cum @ Rs 11321.96 / cum						Rs 284769.94	
5	5.34.1 Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately. Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).							
	Base slab	1	7.200	5.200	0.300		11.233	
	Cover slab	1	6.600	4.600	0.200		6.072	
	Side wall-Allround	1	21.200	0.300	3.000		19.080	
	Total Quantity						36.385 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						36.385 cum	
	Say 36.385 cum @ Rs 80.56 / cum						Rs 2931.18	
6	4.12 Extra for providing and mixing water proofing material in cement concrete work in doses by weight of cement as per manufacturer's specification .							
	Qty vide item no -5	1	36.385	340.000			12370.900	
	Total Quantity						12370.900 kg	
	Total Deducted Quantity						0.000 kg	
	Net Total Quantity						12370.900 kg	
	Say 12370.900 kg @ Rs 1.33 / kg						Rs 16453.30	
7	5.22.6 Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth level Thermo - Mechanically Treated bars of grade Fe-500D or more							
	Qty vide item no - 5* @ 120 kg/m3	1	36.385	120.000			4366.200	
	Total Quantity						4366.200 kilogram	
	Total Deducted Quantity						0.000 kilogram	
	Net Total Quantity						4366.200 kilogram	
	Say 4366.200 kilogram @ Rs 96.46 / kilogram						Rs 421163.65	
8	od353220/2021_2022 Extra for providing epoxy coating for reinforcement bars.							

	Qty vide item no - 5* @ 120 kg/m3	1	36.385	120.000			4366.200	
	Total Quantity						4366.200 kg	
	Total Deducted Quantity						0.000 kg	
	Net Total Quantity						4366.200 kg	
	Say 4366.200 kg @ Rs 2.32 / kg						Rs 10129.58	
9	5.9.1 Centering and shuttering including strutting, etc. and removal of form for: Foundations, footings, bases of columns, etc for mass concrete							
	PCC	1	7.400*2+5 .4*2		0.200		5.121	
	Base slab	1	7.200*2+5 .2*2		0.300		7.440	
	Total Quantity						12.561 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						12.561 sqm	
	Say 12.561 sqm @ Rs 329.03 / sqm						Rs 4132.95	
10	5.9.2 Centering and shuttering including strutting, etc. and removal of form for: Walls (any thickness) including attached pilasters, butresses, plinth and string courses etc.							
	side wall inside allround	1	20.000		3.000		60.000	
	side wall outside allround	1	22.400		3.000		67.200	
	Total Quantity						127.200 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						127.200 sqm	
	Say 127.200 sqm @ Rs 703.77 / sqm						Rs 89519.54	
11	5.9.3 Centering and shuttering including strutting, etc. and removal of form for: Suspended floors, roofs, landings, balconies and access platform							
	Cover slab	1	6.600	4.600			30.360	
	Total Quantity						30.360 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						30.360 sqm	
	Say 30.360 sqm @ Rs 800.50 / sqm						Rs 24303.18	

12	13.7.1 12 mm cement plaster finished with a floating coat of neat cement of mix:1:3 (1 cement : 3 fine sand)								
	PCC	1	7.400*2+5 .4*2		0.200		5.121		
	Base slab	1	7.200*2+5 .2*2		0.300		7.440		
	side wall Inside allround	1	20.000		3.000		60.000		
	side wall outside allround	1	22.400		3.000		67.200		
	Cover slab	1	6.600	4.600			30.360		
	base slab - tank inside	1	6.000	4.000			24.000		
	Total Quantity						194.121 sqm		
	Total Deducted Quantity						0.000 sqm		
	Net Total Quantity						194.121 sqm		
	Say 194.121 sqm @ Rs 393.69 / sqm						Rs 76423.50		
13	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								
	Tank out side	1	22.400		3.000		67.200		
	Total Quantity						67.200 sqm		
	Total Deducted Quantity						0.000 sqm		
	Net Total Quantity						67.200 sqm		
	Say 67.200 sqm @ Rs 218.73 / sqm						Rs 14698.66		
14	13.65.1 Painting with black anti- corrosive bitumastic paint of approved brand and manufacture to give an even shade:Two or more coats on new work								
	side wall Inside allround	1	20.000		3.000		60.000		
	side wall outside allround	1	22.400		3.000		67.200		
	Cover slab	1	6.600	4.600			30.360		
	base slab - tank inside	1	6.000	4.000			24.000		
	Total Quantity						181.560 sqm		
	Total Deducted Quantity						0.000 sqm		

	Net Total Quantity						181.560 sqm	
	Say 181.560 sqm @ Rs 122.47 / sqm						Rs 22235.65	
15	<p>22.23.1</p> <p>Providing and applying integral crystalline slurry of hydrophilic in nature for waterproofing treatment to the RCC structures like retaining walls of the basement, water tanks, roof slabs, podiums, reservoir, sewage & water treatment plant, tunnels/ subway and bridge deck etc., prepared by mixing in the ratio of 5 : 2 (5 parts integral crystalline slurry : 2 parts water) for vertical surfaces and 3 : 1 (3 parts integral crystalline slurry : 1 part water) for horizontal surfaces and applying the same from negative (internal) side with the help of synthetic fiber brush. The material shall meet the requirements as specified in ACI-212-3R-2010 i.e by reducing permeability of concrete by more than 90% compared with control concrete as per DIN 1048 and resistant to 16 bar hydrostatic pressure on negative side. The crystalline slurry shall be capable of self-healing of cracks up to a width of 0.50mm. The work shall be carried out all complete as per specification and the direction of the engineer in-charge. The product performance shall carry guarantee for 10 years against any leakage. For vertical surface two coats @ 0.70 kg per sqm</p>							
	side wall inside all round	1	6*2+4*2		3.000		60.000	
	side wall outside all round	1	6.6*2+4.6*2		3.000		67.200	
	Total Quantity						127.200 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						127.200 sqm	
	Say 127.200 sqm @ Rs 559.61 / sqm						Rs 71182.39	
16	<p>22.23.2</p> <p>Providing and applying integral crystalline slurry of hydrophilic in nature for waterproofing treatment to the RCC structures like retaining walls of the basement, water tanks, roof slabs, podiums, reservoir, sewage & water treatment plant, tunnels/ subway and bridge deck etc., prepared by mixing in the ratio of 5 : 2 (5 parts integral crystalline slurry : 2 parts water) for vertical surfaces and 3 : 1 (3 parts integral crystalline slurry : 1 part water) for horizontal surfaces and applying the same from negative (internal) side with the help of synthetic fiber brush. The material shall meet the requirements as specified in ACI-212-3R-2010 i.e by reducing permeability of concrete by more than 90% compared with control concrete as per DIN 1048 and resistant to 16 bar hydrostatic pressure on negative side. The crystalline slurry shall be capable of self-healing of cracks up to a width of 0.50mm. The work shall be carried out all complete as per specification and the direction of the engineer in-charge. The product performance shall carry guarantee for 10 years against any leakage. For horizontal surface one coat @ 1.10 kg per sqm.</p>							
	Cover slab-tank inside	1	6.600	4.600			30.360	
	base slab - tank inside	1	6.000	4.000			24.000	
	Total Quantity						54.360 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						54.360 sqm	
	Say 54.360 sqm @ Rs 431.28 / sqm						Rs 23444.38	

17	100.36.1 Filling water with 5000 litre tankers fitted in lorry and conveying water from a distance of 5 km (average) to the reservoir site and pumping the water into the reservoir of height not less than 3 m using 5 HP diesel engine pump set , hire for tanker lorry, tools and other appliances and cost of water etc. complete. "(Ref. No. 000, Technical Circular)"								
		1	6.000	4.000	3.000			72.000	
		Total Quantity						72.000 Kilo litre	
		Total Deducted Quantity						0.000 Kilo litre	
		Net Total Quantity						72.000 Kilo litre	
		Say 72.000 Kilo litre @ Rs 182.79 / Kilo litre						Rs 13160.88	
SI No	Description	No	L	B	D	CF	Quantity	Remark	
3INLET CEMBER/SCREEN CHANEL/GRIT CEMBER/PARSHALLFLUME (Cost Index:33.05 %)									
1	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								
	Receiving chamber footing	4	1.600	1.600	1.500		15.361		
	Receiving and Distribution chamber footing	6	1.900	1.900	1.500		32.491		
	Grit chamber Footing	6	2.200	2.200	1.500		43.561		
	Parshalflume and Distribution chamber	6	1.900	1.900	1.500		32.491		
	Staircase column footing	3	1.600	1.600	1.500		11.521		
		Total Quantity						135.425 cum	
		Total Deducted Quantity						0.000 cum	
		Net Total Quantity						135.425 cum	
		Say 135.425 cum @ Rs 210.02 / cum						Rs 28441.96	
2	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)								
	Receiving chamber footing	4	1.600	1.600	0.200		2.049		

	Receiving and Distribution chamber footing	6	1.900	1.900	0.200		4.332		
	Grit chamber Footing	6	2.200	2.200	0.200		5.809		
	Parshalflume and Distribution chamber	6	1.900	1.900	0.200		4.332		
	Staircase column footing	3	1.600	1.600	0.200		1.537		
	Total Quantity						18.059 cum		
	Total Deducted Quantity						0.000 cum		
	Net Total Quantity						18.059 cum		
	Say 18.059 cum @ Rs 7229.54 / cum							Rs 130558.26	
3	5.37.1 Providing and laying in position ready mixed M-25 grade concrete for reinforced cement concrete work, using cement content as per approved design mix, manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for reinforced cement concrete work including pumping of R.M.C. from transit mixer to site of laying, excluding the cost of centering, shuttering finishing and reinforcement including cost of 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 the Engineer - in-charge. Note:- Cement content considered in this item is @330 kg/cum. Excess /less cement used as per design mix is payable/recoverable separately.All work upto plinth level								
	Receiving chamber footing Size 1.2 x 1.2 x 0.9 m	4	1.200	1.200	0.150		0.864		
		4	0.700	0.700	0.750		1.470		
	Receiving and Distribution chamber footing Size 1.5 x 1.5 x 0.9 m	6	1.500	1.500	0.150		2.025		
		6	0.900	0.900	0.750		3.646		
	Grit chamber Footing Size 1.8x1.8x0.9m	6	1.800	1.800	0.150		2.916		
		6	1.100	1.100	0.750		5.446		
	Parshalflume and Distribution chamber footing Size 1.5 x 1.5 x 0.9 m	6	1.500	0.150	0.150		0.203		
		6	0.900	0.900	0.750		3.646		

	Staircase column footing Size 1.2 x 1.2 x 0.9 m	3	1.200	1.200	0.150		0.648		
		3	0.700	0.700	0.750		1.103		
	Pedastral column-Reciving chamber	4	0.250	0.400	0.400		0.161		
	Pedastral column-Reciving and Distribution chamber	6	0.250	0.450	0.400		0.270		
	Pedastral column-staircase	3	0.200	0.400	0.400		0.097		
	Pedastral column-Gritchamber	6	0.250	0.500	0.400		0.301		
	Pedastral column-Parshalflume and Distribution chamber	6	0.250	0.450	0.400		0.270		
		Total Quantity						23.066 cum	
		Total Deducted Quantity						0.000 cum	
		Net Total Quantity						23.066 cum	
		Say 23.066 cum @ Rs 9700.81 / cum						Rs 223758.88	
4	<p>5.37.2 Providing and laying in position ready mixed M-25 grade concrete for reinforced cement concrete work, using cement content as per approved design mix, manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for reinforced cement concrete work including pumping of R.M.C. from transit mixer to site of laying, excluding the cost of centering, shuttering finishing and reinforcement including cost of 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 the Engineer - in-charge. Note:- Cement content considered in this item is @330 kg/cum. Excess /less cement used as per design mix is payable/recoverable separately.All work above plinth level upto floor V level</p>								
	Plinth level beam	1	117.750	0.250	0.450		13.247		
	Reciving chamber column 250x400	4	0.250	0.400	2.550		1.020		
	Reciving and Distribution chamber column 250x450	6	0.250	0.450	3.000		2.026		
	Grit chamber Column 250x500	6	0.250	0.500	2.200		1.651		

Parshalflume and Distribution chamber column 250x450	6	0.250	0.450	3.000		2.026	
Staircase column 200x400	1	0.200	0.400	1.500		0.121	
Staircase column 200x400	1	0.200	0.400	3.000		0.241	
Staircase column 200x400	1	0.200	0.400	5.000		0.401	
Receiving chamber base slab	1	2.250	1.700	0.200		0.765	
Receiving chamber side wall	1	2.750	0.250	2.200		1.513	
	2	1.700	0.250	2.200		1.870	
	1	2.750	0.250	1.000		0.688	
Coarse and fine screen chamber base slab	2	10.000	1.000	0.200		4.000	
Coarse and fine screen chamber side wall	3	10.000	0.250	1.000		7.500	
Grit chamber base slab -side portion	2	8.800		0.200		3.521	
Grit chamber base slab -Centre portion	2	12.900		0.200		5.160	
Grit Chamber sidewall	2	9.350	0.250	2.500		11.688	
	3	4.300	0.250	2.500		8.063	
parshelfume and distribution chamber base slab	1	5.750	2.500	0.200		2.875	
parshelfume and distribution chamber side wall	2	5.750	0.250	1.000		2.875	
Allround verandha slab	1	61.120	1.000	0.150		9.168	
verandha beam	15	1.000	0.250	0.400		1.500	
Staircase -steps	18	1.000	0.300	0.150		0.810	
Staircase -landing	1	1.000	1.000	0.150		0.150	

		1	1.700	1.000	0.150		0.255		
	Total Quantity						83.134 cum		
	Total Deducted Quantity						0.000 cum		
	Net Total Quantity						83.134 cum		
	Say 83.134 cum @ Rs 11321.96 / cum						Rs 941239.82		
5	4.12 Extra for providing and mixing water proofing material in cement concrete work in doses by weight of cement as per manufacturer's specification .								
	Reciving chamber base slab	1	2.250	1.700	0.200	330.0	252.451		
	Reciving chamber side wall	1	2.750	0.250	2.200	330.0	499.126		
		2	1.700	0.250	2.200	330.0	617.100		
		1	2.750	0.250	1.000	330.0	226.875		
	Coarse and fine screen chamber base slab	2	10.000	1.000	0.200	330.0	1320.000		
	Coarse and fine screen chamber side wall	3	10.000	0.250	1.000	330.0	2475.000		
	Grit chamber base slab -side portion	2	8.800		0.200	330.0	1161.601		
	Grit chamber base slab -Centre portion	2	12.900		0.200	330.0	1702.800		
	Grit Chamber sidewall	2	9.350	0.250	2.500	330.0	3856.875		
		3	4.300	0.250	2.500	330.0	2660.625		
	parshelfume and distribution chamber base slab	1	5.750	2.500	0.200	330.0	948.750		
	parshelfume and distribution chamber side wall	2	5.750	0.250	1.000	330.0	948.750		
	Allround verandha slab	1	61.120	1.000	0.150	330.0	3025.440		
	Total Quantity						19695.393 kg		
	Total Deducted Quantity						0.000 kg		
	Net Total Quantity						19695.393 kg		

	Say 19695.393 kg @ Rs 1.33 / kg						Rs 26194.87	
6	5.22.6 Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth level Thermo - Mechanically Treated bars of grade Fe-500D or more							
	From item no 3 @120 kg/m3	1			23.066	120.0	2767.920	
	From item no 4 @120 kg/m3	1			83.134	120.0	9976.080	
	Total Quantity						12744.000 kilogram	
	Total Deducted Quantity						0.000 kilogram	
	Net Total Quantity						12744.000 kilogram	
	Say 12744.000 kilogram @ Rs 96.46 / kilogram						Rs 1229286.24	
7	5.9.1 Centering and shuttering including strutting, etc. and removal of form for: Foundations, footings, bases of columns, etc for mass concrete							
	Receiving chamber footing Size 1.2 x 1.2 x 0.9 m	4	4.800		0.150		2.880	
	Receiving and Distribution chamber footing Size 1.5 x 1.5 x 0.9 m	6	6.000		0.150		5.400	
	Grit chamber Footing Size 1.8x1.8x0.9m	6	7.200		0.150		6.480	
	Parshall flume and Distribution chamber footing Size 1.5 x 1.5 x 0.9 m	6	6.000		0.150		5.400	
	Staircase column footing Size 1.2 x 1.2 x 0.9 m	3	4.800		0.150		2.160	
	Pedestal column- Receiving chamber	4	1.300		0.400		2.080	
	Pedestal column- Receiving and Distribution chamber	6	1.400		0.400		3.360	
	Pedestal column- staircase	3	1.200		0.400		1.440	

	Pedastral column-Gritchamber	6	1.500		0.400		3.601	
	Pedastral column-Parshalflume and Distribution chamber	6	1.400		0.400		3.360	
	Total Quantity						36.161 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						36.161 sqm	
	Say 36.161 sqm @ Rs 329.03 / sqm						Rs 11898.05	
8	5.9.2 Centering and shuttering including strutting, etc. and removal of form for:Walls (any thickness) including attached pilasters, buttresses, plinth and string courses etc.							
	Reciving chamber side wall	2	2.750		2.200		12.101	
		4	1.850		2.200		16.281	
		2	2.750		1.000		5.500	
	Coarse and fine screen chamber side wall	6	10.000		1.000		60.000	
	Grit Chamber sidewall	2	9.350		2.500		46.750	
		2	9.650		2.500		48.250	
		3	4.300		2.500		32.250	
		3	4.600		2.500		34.500	
	parshelfume and distribution chamber side wall	4	5.750		1.000		23.000	
		2	2.500		1.000		5.000	
	Total Quantity						283.632 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						283.632 sqm	
	Say 283.632 sqm @ Rs 703.77 / sqm						Rs 199611.69	
9	5.9.3 Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform							
	Reciving chamber base slab	1	2.250	1.700			3.825	

	Coarse and fine screen chamber base slab	2	10.000	1.000			20.000		
	Grit chamber base slab -side portion	2	8.800				17.600		
	Grit chamber base slab -Centre portion	2	12.900				25.800		
	parshelfume and distribution chamber base slab	1	5.750	2.500			14.375		
	Total Quantity						81.600 sqm		
	Total Deducted Quantity						0.000 sqm		
	Net Total Quantity						81.600 sqm		
	Say 81.600 sqm @ Rs 800.50 / sqm						Rs 65320.80		
10	5.9.5 Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers								
	Allround verandha slab	1	61.120	1.150			70.288		
	verandha beam	15	1.000	0.250+0.4 *2			15.750		
	Staircase -steps	18	1.000	0.300*2+0 .15*2			16.200		
	Staircase -landing	1	1.000	1.000			1.000		
		1	1.700	1.000			1.700		
	Total Quantity						104.938 sqm		
	Total Deducted Quantity						0.000 sqm		
	Net Total Quantity						104.938 sqm		
	Say 104.938 sqm @ Rs 637.64 / sqm						Rs 66912.67		
11	5.9.6 Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts								
	Plinth level beam	1	117.750	0.250+0.4 5*2			135.413		
	Reciving chamber column 250x400	4	0.250*2+0 .4*2		2.550		13.260		

	Receiving and Distribution chamber column 250x450	6	0.250*2+0.45*2		3.000		25.200	
	Grit chamber Column 250x500	6	0.250*2+0.5*2		2.200		19.800	
	Parshalflume and Distribution chamber column 250x450	6	0.250*2+0.45*2		3.000		25.200	
	Staircase column 200x400	1	0.2*2+0.482		1.500		1.323	
	Staircase column 200x400	1	0.200*2+0.4*2		3.000		3.601	
	Staircase column 200x400	1	0.200*2+0.4*2		5.750		6.901	
						Total Quantity	230.698 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	230.698 sqm	
						Say 230.698 sqm @ Rs 847.46 / sqm	Rs 195507.33	
12	13.7.1 12 mm cement plaster finished with a floating coat of neat cement of mix:1:3 (1 cement : 3 fine sand)							
	Plinth level beam	1	117.750	1.400			164.850	
	Receiving chamber column 250x400	4	1.300		2.550		13.260	
	Receiving and Distribution chamber column 250x450	6	1.400		3.000		25.200	
	Grit chamber Column 250x500	6	1.500		2.200		19.800	
	Parshalflume and Distribution chamber column 250x450	6	1.400		3.000		25.200	
	Staircase column 200x400	1	1.200		1.500		1.800	
	Staircase column 200x400	1	1.200		3.000		3.600	
	Staircase column 200x400	1	1.200		5.000		6.000	

	Receiving chamber base slab- top and bottom	2	2.250	1.700			7.650	
	Receiving chamber side wall- inside and out side	2	2.750		2.200		12.101	
		4	1.700		2.200		14.960	
		2	2.750		1.000		5.500	
	Coarse and fine screen chamber base slab-top and bottom	4	10.000	1.000			40.000	
	Coarse and fine screen chamber side wall	6	10.000		1.000		60.000	
	Grit chamber base slab -side portion -top and bottom	4	8.800				35.200	
	Grit chamber base slab -Centre portion -top and bottom	4	12.900				51.600	
	Grit Chamber sidewall-inside and out side	4	9.350		2.500		93.500	
		6	4.300		2.500		64.500	
	parshelfume and distribution chamber base slab-top and bottom	2	5.750	2.500			28.750	
	parshelfume and distribution chamber side wall-inside and out side	4	5.750		1.000		23.000	
	Allround verandha slab-top and bottom	2	61.120	1.000	0.150		18.336	
	verandha -edge	1	61.200	0.150			9.180	
	verandha beam	15	1.000	1.050			15.750	
	Staircase -steps	18	1.000	0.900			16.200	
	Staircase -waist slab bottom	1	15.000	1.000			15.000	

	Staircase -landing -top only	1	1.000	1.000			1.000	
		1	1.700	1.000			1.700	
	Total Quantity						773.637 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						773.637 sqm	
	Say 773.637 sqm @ Rs 393.69 / sqm						Rs 304573.15	
13	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							
	Qty same as item no-13	1	773.637				773.637	
	Total Quantity						773.637 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						773.637 sqm	
	Say 773.637 sqm @ Rs 218.73 / sqm						Rs 169217.62	
14	22.23.1 Providing and applying integral crystalline slurry of hydrophilic in nature for waterproofing treatment to the RCC structures like retaining walls of the basement, water tanks, roof slabs, podiums, reservoir, sewage & water treatment plant, tunnels/ subway and bridge deck etc., prepared by mixing in the ratio of 5 : 2 (5 parts integral crystalline slurry : 2 parts water) for vertical surfaces and 3 : 1 (3 parts integral crystalline slurry : 1 part water) for horizontal surfaces and applying the same from negative (internal) side with the help of synthetic fiber brush. The material shall meet the requirements as specified in ACI-212-3R-2010 i.e by reducing permeability of concrete by more than 90% compared with control concrete as per DIN 1048 and resistant to 16 bar hydrostatic pressure on negative side. The crystalline slurry shall be capable of self-healing of cracks up to a width of 0.50mm. The work shall be carried out all complete as per specification and the direction of the engineer in-charge. The product performance shall carry guarantee for 10 years against any leakage. For vertical surface two coats @ 0.70 kg per sqm							
	Receiving chamber side wall- inside and out side	2	2.750		2.200		12.101	
		4	1.700		2.200		14.960	
		2	2.750		1.000		5.500	
	Coarse and fine screen chamber side wall	6	10.000		1.000		60.000	

	Grit Chamber sidewall-inside and out side	4	9.350		2.500		93.500		
		6	4.300		2.500		64.500		
	parshelfume and distribution chamber side wall-inside and out side	4	5.750		1.000		23.000		
	Total Quantity						273.561 sqm		
	Total Deducted Quantity						0.000 sqm		
	Net Total Quantity						273.561 sqm		
	Say 273.561 sqm @ Rs 559.61 / sqm							Rs 153087.47	
15	<p>22.23.2 Providing and applying integral crystalline slurry of hydrophilic in nature for waterproofing treatment to the RCC structures like retaining walls of the basement, water tanks, roof slabs, podiums, reservoir, sewage & water treatment plant, tunnels/ subway and bridge deck etc., prepared by mixing in the ratio of 5 : 2 (5 parts integral crystalline slurry : 2 parts water) for vertical surfaces and 3 : 1 (3 parts integral crystalline slurry : 1 part water) for horizontal surfaces and applying the same from negative (internal) side with the help of synthetic fiber brush. The material shall meet the requirements as specified in ACI-212-3R-2010 i.e. by reducing permeability of concrete by more than 90% compared with control concrete as per DIN 1048 and resistant to 16 bar hydrostatic pressure on negative side. The crystalline slurry shall be capable of self-healing of cracks up to a width of 0.50mm. The work shall be carried out all complete as per specification and the direction of the engineer-in-charge. The product performance shall carry guarantee for 10 years against any leakage. For horizontal surface one coat @ 1.10 kg per sqm.</p>								
	Receiving chamber base slab- top and bottom	2	2.250	1.700			7.650		
	Coarse and fine screen chamber base slab-top and bottom	4	10.000	1.000			40.000		
	Grit chamber base slab -side portion -top and bottom	4	8.800				35.200		
	Grit chamber base slab -Centre portion - top and bottom	4	12.900				51.600		
	parshelfume and distribution chamber base slab-top and bottom	2	5.750	2.500			28.750		
	Total Quantity						163.200 sqm		

							Total Deducted Quantity	0.000 sqm		
							Net Total Quantity	163.200 sqm		
							Say 163.200 sqm @ Rs 431.28 / sqm	Rs 70384.90		
16	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								
	All round verandha	1	850.000				850.000			
							Total Quantity	850.000 kg		
							Total Deducted Quantity	0.000 kg		
							Net Total Quantity	850.000 kg		
							Say 850.000 kg @ Rs 186.34 / kg	Rs 158389.00		
SI No	Description	No	L	B	D	CF	Quantity	Remark		
4EQUALISATION TANK-2Nos (Cost Index:33.05 %)										
1	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 for 2 tank	2	3.140	8.4*8.4	1.000		443.117			
							Total Quantity	443.117 cum		
							Total Deducted Quantity	0.000 cum		
							Net Total Quantity	443.117 cum		
							Say 443.117 cum @ Rs 210.02 / cum	Rs 93063.43		
2	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)								
	For 2 EQ tank	2	3.140	8.4*8.4	0.200		88.624			
							Total Quantity	88.624 cum		
							Total Deducted Quantity	0.000 cum		
							Net Total Quantity	88.624 cum		
							Say 88.624 cum @ Rs 7229.54 / cum	Rs 640710.75		
3	5.37.1	Providing and laying in position ready mixed M-25 grade concrete for reinforced cement concrete work, using cement content as per approved design mix, manufactured in fully automatic batching plant and								

	transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for reinforced cement concrete work including pumping of R.M.C. from transit mixer to site of laying, excluding the cost of centering, shuttering finishing and reinforcement including cost of 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 the Engineer - in -charge. Note:- Cement content considered in this item is @330 kg/cum. Excess /less cement used as per design mix is payable/recoverable separately.All work upto plinth level						
	For 2 EQ tank	2	3.140	8.3*8.3	0.300		129.789
	Total Quantity						129.789 cum
	Total Deducted Quantity						0.000 cum
	Net Total Quantity						129.789 cum
	Say 129.789 cum @ Rs 9700.81 / cum						Rs 1259058.43
4	5.37.2 Providing and laying in position ready mixed M-25 grade concrete for reinforced cement concrete work, using cement content as per approved design mix, manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for reinforced cement concrete work including pumping of R.M.C. from transit mixer to site of laying, excluding the cost of centering, shuttering finishing and reinforcement including cost of 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 the Engineer - in -charge. Note:- Cement content considered in this item is @330 kg/cum. Excess /less cement used as per design mix is payable/recoverable separately.All work above plinth level upto floor V level						
	For 2 EQ tank						
	Wall around	2	3.140*15. 7	0.300	5.000		147.894
	Baffle wall	2	15.000	0.300	5.000		45.000
	Walkway	2	3.14*17	1.000	0.150		16.014
	Walkway to MBBR-Beam	2	2*5.000	0.250	0.350		1.750
	Walkway to MBBR-slab	2	5.000	1.500	0.150		2.250
	Total Quantity						212.908 cum
	Total Deducted Quantity						0.000 cum
	Net Total Quantity						212.908 cum
	Say 212.908 cum @ Rs 11321.96 / cum						Rs 2410535.86
5	5.34.1 Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately.Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).						

	For 2 EQ tank						
	Qty vide Item no-4	1	212.908				212.908
	Qty vide Item no-3	1	129.789				129.789
	Total Quantity						342.697 cum
	Total Deducted Quantity						0.000 cum
	Net Total Quantity						342.697 cum
	Say 342.697 cum @ Rs 80.56 / cum						Rs 27607.67
6	4.12 Extra for providing and mixing water proofing material in cement concrete work in doses by weight of cement as per manufacturer's specification .						
	For 2 EQ tank						
	Qty vide Item no-4	1	212.908	340.000			72388.720
	Qty vide Item no-3	1	129.789	340.000			44128.260
	Total Quantity						116516.980 kg
	Total Deducted Quantity						0.000 kg
	Net Total Quantity						116516.980 kg
	Say 116516.980 kg @ Rs 1.33 / kg						Rs 154967.58
7	5.22.6 Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth level Thermo - Mechanically Treated bars of grade Fe-500D or more						
	For 2 EQ tank						
	Qty vide Item no-4 @ 120kg/m3	1	212.908	120.000			25548.960
	Qty vide Item no-3 @ 120kg/m3	1	129.789	120.000			15574.680
	Total Quantity						41123.640 kilogram
	Total Deducted Quantity						0.000 kilogram
	Net Total Quantity						41123.640 kilogram
	Say 41123.640 kilogram @ Rs 96.46 / kilogram						Rs 3966786.31
8	od353220/2021_2022 Extra for providing epoxy coating for reinforcement bars.						
	For 2 EQ						
	Qty Vide Item no.8	1	41123.640				41123.640
	Total Quantity						41123.640 kg
	Total Deducted Quantity						0.000 kg

		Net Total Quantity						41123.640 kg
		Say 41123.640 kg @ Rs 2.32 / kg						Rs 95406.84
9	5.9.1	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete						
		For 2 EQ tank						
		2	3.14*16.6		0.300		31.275	
		Total Quantity						31.275 sqm
		Total Deducted Quantity						0.000 sqm
		Net Total Quantity						31.275 sqm
		Say 31.275 sqm @ Rs 329.03 / sqm						Rs 10290.41
10	5.9.2	Centering and shuttering including strutting, etc. and removal of form for:Walls (any thickness) including attached pilasters, buttersesses, plinth and string courses etc.						
		For 2 EQ tank						
	Wall around	2*2	3.140*15. 7		5.000		985.960	
	Baffle wall	2*2	15.000		5.000		300.000	
		Total Quantity						1285.960 sqm
		Total Deducted Quantity						0.000 sqm
		Net Total Quantity						1285.960 sqm
		Say 1285.960 sqm @ Rs 703.77 / sqm						Rs 905020.07
11	5.9.3	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform						
		For 2 EQ tank						
	Walkway	2	3.14*17	1.000			106.760	
	Walkway to MBBR-Beam	2	2*2*5	0.250+0.3 5*2			38.000	
	Walkway to MBBR-slab	2	5.000	1.500			15.000	
		Total Quantity						159.760 sqm
		Total Deducted Quantity						0.000 sqm
		Net Total Quantity						159.760 sqm
		Say 159.760 sqm @ Rs 800.50 / sqm						Rs 127887.88
12	13.7.1							

	12 mm cement plaster finished with a floating coat of neat cement of mix:1:3 (1 cement : 3 fine sand)								
	For 2 EQ tank								
	baseslab	2	3.140	7.7*7.7			372.342		
	For 2 EQ tank								
	Wall around-out side	2	3.140*15. 4		5.000		483.560		
	Wall around-in side	2	3.16*16		5.000		505.600		
	Baffle wall	2	2*15.000		5.000		300.000		
	For 2 EQ tank								
	Walkway (inside outside and edges)	2	3.14*17	2.150			229.534		
	Walkway to MBBR-Beam	2	2*2*5	0.250+0.3 5*2			38.000		
	Walkway to MBBR-slab	2	2*5.000	1.500			30.000		
	Total Quantity						1959.036 sqm		
	Total Deducted Quantity						0.000 sqm		
	Net Total Quantity						1959.036 sqm		
	Kerala Water Authority Say 1959.036 sqm @ Rs 393.69 / sqm						Rs 771252.88		
13	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								
	Tank	1	3.140*16	5.000			251.201		
	Walkway	2	5.000	1.500			15.000		
	Beams	2	2*5	0.700			14.000		
	Total Quantity						280.201 sqm		
	Total Deducted Quantity						0.000 sqm		
	Net Total Quantity						280.201 sqm		
	Say 280.201 sqm @ Rs 218.73 / sqm						Rs 61288.36		
14	13.65.1 Painting with black anti- corrosive bitumastic paint of approved brand and manufacture to give an even shade:Two or more coats on new work								
	For 2 EQ tank								
	baseslab	2	3.140	7.7*7.7			372.342		

For 2 EQ tank							
	Wall around-in side	2	3.16*16		5.000		505.600
	Baffle wall	2	2*15.000		5.000		300.000
	Total Quantity						1177.942 sqm
	Total Deducted Quantity						0.000 sqm
	Net Total Quantity						1177.942 sqm
	Say 1177.942 sqm @ Rs 122.47 / sqm						Rs 144262.56
15	<p>22.23.1</p> <p>Providing and applying integral crystalline slurry of hydrophilic in nature for waterproofing treatment to the RCC structures like retaining walls of the basement, water tanks, roof slabs, podiums, reservoir, sewage & water treatment plant, tunnels/ subway and bridge deck etc., prepared by mixing in the ratio of 5 : 2 (5 parts integral crystalline slurry : 2 parts water) for vertical surfaces and 3 : 1 (3 parts integral crystalline slurry : 1 part water) for horizontal surfaces and applying the same from negative (internal) side with the help of synthetic fiber brush. The material shall meet the requirements as specified in ACI-212-3R-2010 i.e by reducing permeability of concrete by more than 90% compared with control concrete as per DIN 1048 and resistant to 16 bar hydrostatic pressure on negative side. The crystalline slurry shall be capable of self-healing of cracks up to a width of 0.50mm. The work shall be carried out all complete as per specification and the direction of the engineer in-charge. The product performance shall carry guarantee for 10 years against any leakage. For vertical surface two coats @ 0.70 kg per sqm</p>						
For 2 EQ tank							
	Wall around	2	3.140*15.4		5.000		483.560
		2	3.140*16		5.000		502.401
	Baffle wall	2	2*15.000		5.000		300.000
	Total Quantity						1285.961 sqm
	Total Deducted Quantity						0.000 sqm
	Net Total Quantity						1285.961 sqm
	Say 1285.961 sqm @ Rs 559.61 / sqm						Rs 719636.64
16	<p>22.23.2</p> <p>Providing and applying integral crystalline slurry of hydrophilic in nature for waterproofing treatment to the RCC structures like retaining walls of the basement, water tanks, roof slabs, podiums, reservoir, sewage & water treatment plant, tunnels/ subway and bridge deck etc., prepared by mixing in the ratio of 5 : 2 (5 parts integral crystalline slurry : 2 parts water) for vertical surfaces and 3 : 1 (3 parts integral crystalline slurry : 1 part water) for horizontal surfaces and applying the same from negative (internal) side with the help of synthetic fiber brush. The material shall meet the requirements as specified in ACI-212-3R-2010 i.e by reducing permeability of concrete by more than 90% compared with control concrete as per DIN 1048 and resistant to 16 bar hydrostatic pressure on negative side. The crystalline slurry shall be capable of self-healing of cracks up to a width of 0.50mm. The work shall be carried out all complete as per specification and the direction of the engineer in-charge. The product performance shall carry guarantee for 10 years against any leakage. For horizontal surface one coat @ 1.10 kg per sqm.</p>						

SI No	Description	No	L	B	D	CF	Quantity	Remark	
	For 2 EQ tank								
	baseslab	2	3.140	7.7*7.7			372.342		
	Total Quantity							372.342 sqm	
	Total Deducted Quantity							0.000 sqm	
	Net Total Quantity							372.342 sqm	
	Say 372.342 sqm @ Rs 431.28 / sqm							Rs 160583.66	
17	100.36.1 Filling water with 5000 litre tankers fitted in lorry and conveying water from a distance of 5 km (average) to the reservoir site and pumping the water into the reservoir of height not less than 3 m using 5 HP diesel engine pump set , hire for tanker lorry, tools and other appliances and cost of water etc. complete. "(Ref. No. 000, Technical Circular)"								
	For 2 EQ tank	2	3.140	7.7*7.7	5.000		1861.707		
	Total Quantity							1861.707 Kilo litre	
	Total Deducted Quantity							0.000 Kilo litre	
	Net Total Quantity							1861.707 Kilo litre	
	Say 1861.707 Kilo litre @ Rs 182.79 / Kilo litre							Rs 340301.42	
18	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								
		2	1200.000				2400.000		
	Total Quantity							2400.000 kg	
	Total Deducted Quantity							0.000 kg	
	Net Total Quantity							2400.000 kg	
	Say 2400.000 kg @ Rs 186.34 / kg							Rs 447216.00	
5MBBR 1 & 2 (2set) (Cost Index:33.05 %)									
1	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								
	MBBR Tank-1	2	3.140	8.3*8.3	1.000		432.630		
	MBBR Tank-2	2	3.140	7.8*7.8	1.000		382.076		
	Total Quantity							814.706 cum	
	Total Deducted Quantity							0.000 cum	

	Net Total Quantity						814.706 cum	
	Say 814.706 cum @ Rs 210.02 / cum						Rs 171104.55	
2	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)							
	MBBR Tank-1	2	3.140	8.3*8.3	0.200		86.526	
	MBBR Tank-2	2	3.140	7.8*7.8	0.200		76.416	
	Total Quantity						162.942 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						162.942 cum	
	Say 162.942 cum @ Rs 7229.54 / cum						Rs 1177995.71	
3	5.37.1 Providing and laying in position ready mixed M-25 grade concrete for reinforced cement concrete work, using cement content as per approved design mix, manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for reinforced cement concrete work including pumping of R.M.C. from transit mixer to site of laying, excluding the cost of centering, shuttering finishing and reinforcement including cost of 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 the Engineer - in -charge. Note:- Cement content considered in this item is @330 kg/cum. Excess /less cement used as per design mix is payable/recoverable separately.All work upto plinth level							
	MBBR Tank-1	2	3.140	8.3*8.3	0.350		151.421	
	MBBR Tank-2	2	3.140	7.8*7.8	0.350		133.727	
	Total Quantity						285.148 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						285.148 cum	
	Say 285.148 cum @ Rs 9700.81 / cum						Rs 2766166.57	
4	5.37.2 Providing and laying in position ready mixed M-25 grade concrete for reinforced cement concrete work, using cement content as per approved design mix, manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for reinforced cement concrete work including pumping of R.M.C. from transit mixer to site of laying, excluding the cost of centering, shuttering finishing and reinforcement including cost of 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 the Engineer - in -charge. Note:- Cement content considered in this item is @330 kg/cum. Excess /less cement used as per design mix is payable/recoverable separately.All work above plinth level upto floor V level							

	MBBR Tank-1 Wall alround	2	3.140*15. 35	0.350	5.000		168.697	
	MBBR Tank-1 RCC Shaft chamber	2	7.000	0.300	5.000		21.000	
	M B B R Tank - 1 W a l k w a y	2	3.14*16.7	1.000	0.150		15.732	
	Walkway to MBBR-1 to MBBR-2 -Beam	2	2*5.000	0.250	0.350		1.750	
	Walkway to MBBR- slab	2	5.000	1.500	0.150		2.250	
	MBBR Tank-2 Wall alround	2	3.140*14. 35	0.350	5.000		157.707	
	M B B R Tank - 2 W a l k w a y	2	3.14*15.7	1.000	0.150		14.790	
						Total Quantity	381.926 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	381.926 cum	
						Say 381.926 cum @ Rs 11321.96 / cum	Rs 4324150.89	
5	5.34.1 Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately. Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).							
	MBBR Tank-1	2	3.140	8.3*8.3	0.350		151.421	
	MBBR Tank-2	2	3.140	7.8*7.8	0.350		133.727	
	MBBR Tank-1 Wall alround	2	3.140*15. 35	0.350	5.000		168.697	
	MBBR Tank-1 RCC Shaft chamber	2	7.000	0.300	5.000		21.000	
	M B B R Tank - 1 W a l k w a y	2	3.14*16.7	1.000	0.150		15.732	
	Walkway to MBBR-1 to MBBR-2 -Beam	2	2*5.000	0.250	0.350		1.750	
	Walkway to MBBR- slab	2	5.000	1.500	0.150		2.250	
	MBBR Tank-2 Wall alround	2	3.140*14. 35	0.350	5.000		157.707	
	M B B R Tank - 2 W a l k w a y	2	3.14*15.7	1.000	0.150		14.790	

	Total Quantity						667.074 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						667.074 cum	
	Say 667.074 cum @ Rs 80.56 / cum						Rs 53739.48	
6	4.12 Extra for providing and mixing water proofing material in cement concrete work in doses by weight of cement as per manufacturer's specification .							
	Qty vide item 3	1	285.148		340.000		96950.320	
	Qty vide item 4	1	381.926		340.000		129854.84 0	
	Total Quantity						226805.160 kg	
	Total Deducted Quantity						0.000 kg	
	Net Total Quantity						226805.160 kg	
	Say 226805.160 kg @ Rs 1.33 / kg						Rs 301650.86	
7	5.22.6 Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth level Thermo - Mechanically Treated bars of grade Fe-500D or more							
	Qty vide item 3 @ 120 kg/m ³	1	285.148		120.000		34217.760	
	Qty vide item 4 @ 120 kg/m ³	1	381.926		120.000		45831.120	
	Total Quantity						80048.880 kilogram	
	Total Deducted Quantity						0.000 kilogram	
	Net Total Quantity						80048.880 kilogram	
	Say 80048.880 kilogram @ Rs 96.46 / kilogram						Rs 7721514.96	
8	od353220/2021_2022 Extra for providing epoxy coating for reinforcement bars.							
	Qty vide item 3 @ 120 kg/m ³	1	285.148		120.000		34217.760	
	Qty vide item 4 @ 120 kg/m ³	1	381.926		120.000		45831.120	
	Total Quantity						80048.880 kg	
	Total Deducted Quantity						0.000 kg	
	Net Total Quantity						80048.880 kg	
	Say 80048.880 kg @ Rs 2.32 / kg						Rs 185713.40	
9	5.9.1							

	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete							
	MBBR Tank-1	2	3.140	16.600	0.350		36.487	
	MBBR Tank-2	2	3.140	15.600	0.350		34.289	
	Total Quantity						70.776 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						70.776 sqm	
	Say 70.776 sqm @ Rs 329.03 / sqm						Rs 23287.43	
10	5.9.2 Centering and shuttering including strutting, etc. and removal of form for:Walls (any thickness) including attached pilasters, buttersesses, plinth and string courses etc.							
	MBBR Tank-1 Wall alround	2*2	3.140*15. 35		5.000		963.980	
	MBBR Tank-1 RCC Shaft chamber	2*2	7.000		5.000		140.000	
	MBBR Tank-2 Wall alround	2*2	3.140*14. 35		5.000		901.180	
	Total Quantity						2005.160 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						2005.160 sqm	
	Say 2005.160 sqm @ Rs 703.77 / sqm						Rs 1411171.45	
11	5.9.3 Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform							
	M B B R T a n k - 1 W a l k w a y	2	3.14*16.7	1.000+0.1 5			120.608	
	Walkway to MBBR-1 to MBBR-2 -Beam	2	2*5.000	0.250+0.3 5*2			19.000	
	Walkway to MBBR- slab	2	5.000	1.500			15.000	
	M B B R T a n k - 2 W a l k w a y	2	3.14*15.7	1.000+0.1 5			113.386	
	Total Quantity						267.994 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						267.994 sqm	
	Say 267.994 sqm @ Rs 800.50 / sqm						Rs 214529.20	

12	13.7.1 12 mm cement plaster finished with a floating coat of neat cement of mix:1:3 (1 cement : 3 fine sand)								
	MBBR Tank-1 Wall alround INSIDE	2	3.140*15		5.000		471.000		
	MBBR Tank-1 Wall alround OUTSIDE	2	3.140*15. 7		5.000		492.980		
	MBBR Tank-1 RCC Shaft chamber	2*2	7.000		5.000		140.000		
	MBBR Tank-2 Wall alround-Inside	2	3.140*14		5.000		439.600		
	MBBR Tank-2 Wall alround-outside	1	3.140*14. 7		5.000		230.791		
	M B B R Tank - 1 W a l k w a y	2	3.14*16.7	1.000+0.1 5+1			225.484		
	Walkway to MBBR-1 to MBBR-2 -Beam	2	2*5.000	0.250+0.3 5*2			19.000		
	Walkway to MBBR- slab	2	5.000	1.500+1.5			30.000		
	M B B R Tank - 2 W a l k w a y	2	3.14*15.7	1.000+0.1 5+1			211.982		
	MBBR Tank-1 base slab	2	3.140	7.5*7.5			353.250		
	MBBR Tank-2 base slab	2	3.140	7*7			307.720		
	Total Quantity						2921.807 sqm		
	Total Deducted Quantity						0.000 sqm		
	Net Total Quantity						2921.807 sqm		
	Say 2921.807 sqm @ Rs 393.69 / sqm						Rs 1150286.20		
13	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								
	MBBR Tank-1 Wall alround OUTSIDE	2	3.140*15. 7		5.000		492.980		
	MBBR Tank-2 Wall alround-outside	1	3.140*14. 7		5.000		230.791		
	M B B R Tank - 1 W a l k w a y	2	3.14*16.7	1.000+0.1 5+1			225.484		

	Walkway to MBBR-1 to MBBR-2 -Beam	2	2*5.000	0.250+0.3 5*2			19.000		
	Walkway to MBBR-slab	2	5.000	1.500+1.5			30.000		
	MBBR Tank - 2 Walkway	2	3.14*15.7	1.000+0.1 5+1			211.982		
	Total Quantity						1210.237 sqm		
	Total Deducted Quantity						0.000 sqm		
	Net Total Quantity						1210.237 sqm		
	Say 1210.237 sqm @ Rs 218.73 / sqm						Rs 264715.14		
14	13.65.1 Painting with black anti- corrosive bitumastic paint of approved brand and manufacture to give an even shade:Two or more coats on new work								
	MBBR Tank-1 Wall around INSIDE	2	3.140*15		5.000		471.000		
	MBBR Tank-1 RCC Shaft chamber	2*2	7.000		5.000		140.000		
	MBBR Tank-2 Wall around-Inside	2	3.140*14		5.000		439.600		
	MBBR Tank-1 base slab	2	3.140	7.5*7.5			353.250		
	MBBR Tank-2 base slab	2	3.140	7*7			307.720		
	Total Quantity						1711.570 sqm		
	Total Deducted Quantity						0.000 sqm		
	Net Total Quantity						1711.570 sqm		
	Say 1711.570 sqm @ Rs 122.47 / sqm						Rs 209615.98		
15	22.23.1 Providing and applying integral crystalline slurry of hydrophilic in nature forwaterproofing treatment to the RCC structures like retaining walls of the basement,water tanks, roof slabs, podiums, reservior, sewage & water treatment plant, tunnels/ subway and bridge deck etc., prepared by mixing in the ratio of 5 : 2 (5 partsintegral crystalline slurry : 2 parts water) for vertical surfaces and 3 : 1 (3 partsintegral crystalline slurry : 1 part water) for horizontal surfaces and applying thesame from negative (internal) side with the help of synthetic fiber brush. The materialshall meet the requirements as specified in ACI-212-3R-2010 i.e by reducingpermeability of concrete by more than 90% compared with control concrete as perDIN 1048 and resistant to 16 bar hydrostatic pressure on negative side. The crystallineslurry shall be capable of self-healing of cracks up to a width of 0.50mm. The workshall be carried out all complete as per specification and the direction of the engineerin-charge. The product performance shall carry guarantee for 10 years against anyleakage.For vertical surface two coats @0.70 kg per sqm								

	MBBR Tank-1 Wall alround INSIDE	2	3.140*15		5.000		471.000		
	MBBR Tank-1 Wall alround OUTSIDE	2	3.140*15. 7		5.000		492.980		
	MBBR Tank-1 RCC Shaft chamber	2*2	7.000		5.000		140.000		
	MBBR Tank-2 Wall alround-Inside	2	3.140*14		5.000		439.600		
	MBBR Tank-2 Wall alround-outside	1	3.140*14. 7		5.000		230.791		
	Total Quantity						1774.371 sqm		
	Total Deducted Quantity						0.000 sqm		
	Net Total Quantity						1774.371 sqm		
	Say 1774.371 sqm @ Rs 559.61 / sqm						Rs 992955.76		
16	<p>22.23.2 Providing and applying integral crystalline slurry of hydrophilic in nature for waterproofing treatment to the RCC structures like retaining walls of the basement, water tanks, roof slabs, podiums, reservoir, sewage & water treatment plant, tunnels/ subway and bridge deck etc., prepared by mixing in the ratio of 5 : 2 (5 parts integral crystalline slurry : 2 parts water) for vertical surfaces and 3 : 1 (3 parts integral crystalline slurry : 1 part water) for horizontal surfaces and applying the same from negative (internal) side with the help of synthetic fiber brush. The material shall meet the requirements as specified in ACI-212-3R-2010 i.e by reducing permeability of concrete by more than 90% compared with control concrete as per DIN 1048 and resistant to 16 bar hydrostatic pressure on negative side. The crystalline slurry shall be capable of self-healing of cracks up to a width of 0.50mm. The work shall be carried out all complete as per specification and the direction of the engineer in-charge. The product performance shall carry guarantee for 10 years against any leakage. For horizontal surface one coat @ 1.10 kg per sqm.</p>								
	MBBR Tank-1 base slab	2	3.140	7.5*7.5			353.250		
	MBBR Tank-2 base slab	2	3.140	7*7			307.720		
	Total Quantity						660.970 sqm		
	Total Deducted Quantity						0.000 sqm		
	Net Total Quantity						660.970 sqm		
	Say 660.970 sqm @ Rs 431.28 / sqm						Rs 285063.14		
17	<p>100.36.1 Filling water with 5000 litre tankers fitted in lorry and conveying water from a distance of 5 km (average) to the reservoir site and pumping the water into the reservoir of height not less than 3 m using 5 HP diesel engine pump set, hire for tanker lorry, tools and other appliances and cost of water etc. complete. "(Ref. No. 000, Technical Circular)"</p>								

	MBBR Tank-1	2	3.140	7.5*7.5	5.000		1766.250		
	MBBR Tank-2	2	3.140	7*7	5.000		1538.601		
	Total Quantity						3304.851 Kilo litre		
	Total Deducted Quantity						0.000 Kilo litre		
	Net Total Quantity						3304.851 Kilo litre		
	Say 3304.851 Kilo litre @ Rs 182.79 / Kilo litre						Rs 604093.71		
18	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								
		2	1400.000				2800.000		
	Total Quantity						2800.000 kg		
	Total Deducted Quantity						0.000 kg		
	Net Total Quantity						2800.000 kg		
	Say 2800.000 kg @ Rs 186.34 / kg						Rs 521752.00		
SI No	Description	No	L	B	D	CF	Quantity	Remark	
6SECONDARY CLARIFIER(2 Nos) (Cost Index:33.05 %)									
1	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								
		2	3.14/4	16.3*16.3	1.000		417.134		
	Total Quantity						417.134 cum		
	Total Deducted Quantity						0.000 cum		
	Net Total Quantity						417.134 cum		
	Say 417.134 cum @ Rs 210.02 / cum						Rs 87606.48		
2	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)								
		2	3.14/4	16.3*16.3	0.200		83.427		
	Total Quantity						83.427 cum		
	Total Deducted Quantity						0.000 cum		
	Net Total Quantity						83.427 cum		
	Say 83.427 cum @ Rs 7229.54 / cum						Rs 603138.83		

3	5.37.1 Providing and laying in position ready mixed M-25 grade concrete for reinforced cement concrete work, using cement content as per approved design mix, manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for reinforced cement concrete work including pumping of R.M.C. from transit mixer to site of laying, excluding the cost of centering, shuttering finishing and reinforcement including cost of 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 the Engineer - in -charge. Note:- Cement content considered in this item is @330 kg/cum. Excess /less cement used as per design mix is payable/recoverable separately.All work upto plinth level							
		2	3.14/4	16.3*16.3	0.350	1.15	167.897	
		Total Quantity					167.897 cum	
		Total Deducted Quantity					0.000 cum	
		Net Total Quantity					167.897 cum	
		Say 167.897 cum @ Rs 9700.81 / cum					Rs 1628736.90	
4	5.37.2 Providing and laying in position ready mixed M-25 grade concrete for reinforced cement concrete work, using cement content as per approved design mix, manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for reinforced cement concrete work including pumping of R.M.C. from transit mixer to site of laying, excluding the cost of centering, shuttering finishing and reinforcement including cost of 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 the Engineer - in -charge. Note:- Cement content considered in this item is @330 kg/cum. Excess /less cement used as per design mix is payable/recoverable separately.All work above plinth level upto floor V level							
	SST Tank-1 Wall around	2	3.140*15.05	0.350	3.300		109.164	
	SST Trough chamber	2	3.14*14.45	0.5+0.5	0.150		13.612	
	SST Tank-1 Walkway	2	3.14*16.4	1.000	0.150		15.449	
	Walkway to SST-1 to SST-2 -Beam	2	2*5.000	0.250	0.350		1.750	
	Walkway to SST-2-slab	2	5.000	1.500	0.150		2.250	
		Total Quantity					142.225 cum	
		Total Deducted Quantity					0.000 cum	
		Net Total Quantity					142.225 cum	
		Say 142.225 cum @ Rs 11321.96 / cum					Rs 1610265.76	
5	5.34.1 Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement							

	content used is payable/ recoverable separately.Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).								
	SST Base slab	2	3.14/4	16.3*16.3	0.350	1.15	167.897		
	SST Tank-1 Wall alround	2	3.140*15. 05	0.350	3.300		109.164		
	SST Trough chamber	2	3.14*14.4 5	0.5+0.5	0.150		13.612		
	SST Tank-1 Walkway	2	3.14*16.4	1.000	0.150		15.449		
	Walkway to SST-1 to SST-2 -Beam	2	2*5.000	0.250	0.350		1.750		
	Walkway to SST-2- slab	2	5.000	1.500	0.150		2.250		
	Total Quantity						310.122 cum		
	Total Deducted Quantity						0.000 cum		
	Net Total Quantity						310.122 cum		
	Say 310.122 cum @ Rs 80.56 / cum						Rs 24983.43		
6	4.12 Extra for providing and mixing water proofing material in cement concrete work in doses by weight of cement as per manufacturer's specification .								
	Qty Vide Item No: 5 * 3 4 0	1	310.122	340.000			105441.48 1		
	Total Quantity						105441.481 kg		
	Total Deducted Quantity						0.000 kg		
	Net Total Quantity						105441.481 kg		
	Say 105441.481 kg @ Rs 1.33 / kg						Rs 140237.17		
7	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								
	Qty Vide Item No: 5 @ 1 2 0 kg / m 3	1	310.220	120.000			37226.400		
	Total Quantity						37226.400 kilogram		
	Total Deducted Quantity						0.000 kilogram		
	Net Total Quantity						37226.400 kilogram		
	Say 37226.400 kilogram @ Rs 96.46 / kilogram						Rs 3590858.54		
8	od353220/2021_2022 Extra for providing epoxy coating for reinforcement bars.								

	Qty Vide Item No:5 @ 120kg/m ³	1	310.220	120.000			37226.400	
	Total Quantity						37226.400 kg	
	Total Deducted Quantity						0.000 kg	
	Net Total Quantity						37226.400 kg	
	Say 37226.400 kg @ Rs 2.32 / kg						Rs 86365.25	
9	5.9.1 Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete							
	SST Base slab	2	3.14*16.3		0.350		35.828	
	Total Quantity						35.828 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						35.828 sqm	
	Say 35.828 sqm @ Rs 329.03 / sqm						Rs 11788.49	
10	5.9.2 Centering and shuttering including strutting, etc. and removal of form for:Walls (any thickness) including attached pilasters, buttersesses, plinth and string courses etc.							
	SST Tank-1 Wall around	2*2	3.140*15. 05		3.300		623.793	
	Total Quantity						623.793 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						623.793 sqm	
	Say 623.793 sqm @ Rs 703.77 / sqm						Rs 439006.80	
11	5.9.3 Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform							
	SST Trough chamber	2	3.14*14.4 5	0.5+0.5			90.746	
	SST Tank-1 Walkway	2	3.14*16.4	1.000			102.992	
	Walkway to SST-1 to SST-2 -Beam	2	2*5.000	0.250+0.3 5*2			19.000	
	Walkway to SST-2- slab	1	5.000	1.500			7.500	
	Total Quantity						220.238 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						220.238 sqm	

	Say 220.238 sqm @ Rs 800.50 / sqm						Rs 176300.52	
12	13.7.1 12 mm cement plaster finished with a floating coat of neat cement of mix:1:3 (1 cement : 3 fine sand)							
	SST Base slab	2	3.14/4	16.3*16.3			417.134	
	SST Tank-1 Wall alround-Inside	2	3.140*14. 7		3.300		304.643	
	SST Tank-1 Wall alround-Outside	2	3.140*15. 40		3.300		319.150	
	SST Trough chamber	2	3.14*14.4 5	1*2			181.492	
	SST Tank-1 Walkway	2	3.14*16.4	1.000*2			205.984	
	Walkway to SST-1 to SST-2 -Beam	2	2*5.000	0.250+0.3 5*2			19.000	
	Walkway to SST-2- slab	1	5.000	1.500*2			15.000	
	Total Quantity						1462.403 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						1462.403 sqm	
	Say 1462.403 sqm @ Rs 393.69 / sqm						Rs 575733.44	
13	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							
	SST Tank-1 Wall alround-Outside	2	3.140*15. 40		3.300		319.150	
	SST Tank-1 Walkway	2	3.14*16.4	1.000*2			205.984	
	Walkway to SST-1 to SST-2 -Beam	2	2*5.000	0.250+0.3 5*2			19.000	
	Walkway to SST-2- slab	1	5.000	1.500*2			15.000	
	Total Quantity						559.134 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						559.134 sqm	
	Say 559.134 sqm @ Rs 218.73 / sqm						Rs 122299.38	
14	13.65.1 Painting with black anti- corrosive bitumastic paint of approved brand and manufacture to give an even shade:Two or more coats on new work							

	SST Base slab	2	3.14/4	16.3*16.3			417.134		
	SST Tank-1 Wall alround-Inside	2	3.140*14. 7		3.300		304.643		
	SST Tank-1 Wall alround-Outside	2	3.140*15. 40		3.300		319.150		
	SST Trough chamber	2	3.14*14.4 5	1*2			181.492		
	Total Quantity						1222.419 sqm		
	Total Deducted Quantity						0.000 sqm		
	Net Total Quantity						1222.419 sqm		
	Say 1222.419 sqm @ Rs 122.47 / sqm						Rs 149709.65		
15	<p>22.23.1 Providing and applying integral crystalline slurry of hydrophilic in nature for waterproofing treatment to the RCC structures like retaining walls of the basement, water tanks, roof slabs, podiums, reservoir, sewage & water treatment plant, tunnels/ subway and bridge deck etc., prepared by mixing in the ratio of 5 : 2 (5 parts integral crystalline slurry : 2 parts water) for vertical surfaces and 3 : 1 (3 parts integral crystalline slurry : 1 part water) for horizontal surfaces and applying the same from negative (internal) side with the help of synthetic fiber brush. The material shall meet the requirements as specified in ACI-212-3R-2010 i.e by reducing permeability of concrete by more than 90% compared with control concrete as per DIN 1048 and resistant to 16 bar hydrostatic pressure on negative side. The crystalline slurry shall be capable of self-healing of cracks up to a width of 0.50mm. The work shall be carried out all complete as per specification and the direction of the engineer in-charge. The product performance shall carry guarantee for 10 years against any leakage. For vertical surface two coats @ 0.70 kg per sqm</p>								
	SST Tank-1 Wall alround-Inside	2	3.140*14. 7		3.300		304.643		
	SST Tank-1 Wall alround-Outside	2	3.140*15. 40		3.300		319.150		
	SST Trough chamber	2	3.14*14.4 5	1*2			181.492		
	Total Quantity						805.285 sqm		
	Total Deducted Quantity						0.000 sqm		
	Net Total Quantity						805.285 sqm		
	Say 805.285 sqm @ Rs 559.61 / sqm						Rs 450645.54		
16	<p>22.23.2 Providing and applying integral crystalline slurry of hydrophilic in nature for waterproofing treatment to the RCC structures like retaining walls of the basement, water tanks, roof slabs, podiums, reservoir, sewage & water treatment plant, tunnels/ subway and bridge deck etc., prepared by mixing in the ratio of 5 : 2 (5 parts integral crystalline slurry : 2 parts water) for vertical surfaces and 3 : 1 (3 parts integral crystalline slurry : 1 part water) for horizontal surfaces and applying the same from negative (internal) side with the help of synthetic fiber brush. The material shall meet the requirements as specified in ACI-212-3R-2010</p>								

	i.e by reducing permeability of concrete by more than 90% compared with control concrete as per DIN 1048 and resistant to 16 bar hydrostatic pressure on negative side. The crystalline slurry shall be capable of self-healing of cracks up to a width of 0.50mm. The work shall be carried out all complete as per specification and the direction of the engineer in-charge. The product performance shall carry guarantee for 10 years against any leakage. For horizontal surface one coat @ 1.10 kg per sqm.								
	SST Base slab	2	3.14/4	16.3*16.3				417.134	
	Total Quantity							417.134 sqm	
	Total Deducted Quantity							0.000 sqm	
	Net Total Quantity							417.134 sqm	
	Say 417.134 sqm @ Rs 431.28 / sqm							Rs 179901.55	
17	100.36.1 Filling water with 5000 litre tankers fitted in lorry and conveying water from a distance of 5 km (average) to the reservoir site and pumping the water into the reservoir of height not less than 3 m using 5 HP diesel engine pump set , hire for tanker lorry, tools and other appliances and cost of water etc. complete. "(Ref. No. 000, Technical Circular)"								
		3.14/4	14.700	14.700	4.500			763.338	
	Total Quantity							763.338 Kilo litre	
	Total Deducted Quantity							0.000 Kilo litre	
	Net Total Quantity							763.338 Kilo litre	
	Say 763.338 Kilo litre @ Rs 182.79 / Kilo litre							Rs 139530.55	
18	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								
		2	900.000					1800.000	
	Total Quantity							1800.000 kg	
	Total Deducted Quantity							0.000 kg	
	Net Total Quantity							1800.000 kg	
	Say 1800.000 kg @ Rs 186.34 / kg							Rs 335412.00	
SI No	Description	No	L	B	D	CF	Quantity	Remark	
7 SLUDGE SUMP (Cost Index:33.05 %)									
1	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								
		1	3.14/4	4.4*4.4	0.500			7.599	

	cover slab	1	3.14/4	3.6*3.6	0.200		2.035	
	manhole	1	0.500	0.500	0.200		-0.050	
	Total Quantity						9.341 cum	
	Total Deducted Quantity						-0.050 cum	
	Net Total Quantity						9.291 cum	
	Say 9.291 cum @ Rs 11321.96 / cum						Rs 105192.33	
5	5.34.1 Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately. Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).							
		1	3.14/4	4.2*4.2	0.300		4.155	
	side wall	1	3.140*3.3	0.300	2.350		7.306	
	cover slab	1	3.14/4	3.6*3.6	0.200		2.035	
	manhole	1	0.500	0.500	0.200		-0.050	
	Total Quantity						13.496 cum	
	Total Deducted Quantity						-0.050 cum	
	Net Total Quantity						13.446 cum	
	Say 13.446 cum @ Rs 80.56 / cum						Rs 1083.21	
6	4.12 Kerala Water Authority Extra for providing and mixing water proofing material in cement concrete work in doses by weight of cement as per manufacturer's specification .							
	Qty vide item no 5	1	13.446		340.000		4571.640	
	Total Quantity						4571.640 kg	
	Total Deducted Quantity						0.000 kg	
	Net Total Quantity						4571.640 kg	
	Say 4571.640 kg @ Rs 1.33 / kg						Rs 6080.28	
7	5.22.6 Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth level Thermo - Mechanically Treated bars of grade Fe-500D or more							
	120kg/m3/cc	1	13.446	120.000			1613.520	
	Total Quantity						1613.520 kilogram	
	Total Deducted Quantity						0.000 kilogram	
	Net Total Quantity						1613.520 kilogram	
	Say 1613.520 kilogram @ Rs 96.46 / kilogram						Rs 155640.14	
8	od353220/2021_2022							

	Extra for providing epoxy coating for reinforcement bars.						
	120kg/m3/cc	1	13.446	120.000			1613.520
	Total Quantity						1613.520 kg
	Total Deducted Quantity						0.000 kg
	Net Total Quantity						1613.520 kg
	Say 1613.520 kg @ Rs 2.32 / kg						Rs 3743.37
9	5.9.1 Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete						
		1	3.140*4.2		0.300		3.957
	Total Quantity						3.957 sqm
	Total Deducted Quantity						0.000 sqm
	Net Total Quantity						3.957 sqm
	Say 3.957 sqm @ Rs 329.03 / sqm						Rs 1301.97
10	5.9.2 Centering and shuttering including strutting, etc. and removal of form for:Walls (any thickness) including attached pilasters, buttersesses, plinth and string courses etc.						
		1	3.140*3		2.350		22.137
		1	3.140*3.6		2.350		26.565
	Total Quantity						48.702 sqm
	Total Deducted Quantity						0.000 sqm
	Net Total Quantity						48.702 sqm
	Say 48.702 sqm @ Rs 703.77 / sqm						Rs 34275.01
11	5.9.3 Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform						
	Cover slab	1	3.14/4	3.6*3.6			10.174
	Total Quantity						10.174 sqm
	Total Deducted Quantity						0.000 sqm
	Net Total Quantity						10.174 sqm
	Say 10.174 sqm @ Rs 800.50 / sqm						Rs 8144.29
12	13.7.1 12 mm cement plaster finished with a floating coat of neat cement of mix:1:3 (1 cement : 3 fine sand)						
	Base slab	1	3.140/4	3.6*3.6			10.174
	wall inside	1	3.140*3		2.350		22.137

	wall outside	1	3.140*3.6		2.350		26.565	
	Cover slab	1	3.14/4	3.6*3.6			10.174	
	Total Quantity						69.050 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						69.050 sqm	
	Say 69.050 sqm @ Rs 393.69 / sqm						Rs 27184.29	
13	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							
		1	3.140*3.6		2.350		26.565	
	Total Quantity						26.565 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						26.565 sqm	
	Say 26.565 sqm @ Rs 218.73 / sqm						Rs 5810.56	
14	13.65.1 Painting with black anti- corrosive bitumastic paint of approved brand and manufacture to give an even shade:Two or more coats on new work							
	Base slab	1	3.140/4	3.6*3.6			10.174	
	wall inside	1	3.140*3		2.350		22.137	
	Total Quantity						32.311 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						32.311 sqm	
	Say 32.311 sqm @ Rs 122.47 / sqm						Rs 3957.13	
15	22.23.1 Providing and applying integral crystalline slurry of hydrophilic in nature for waterproofing treatment to the RCC structures like retaining walls of the basement, water tanks, roof slabs, podiums, reservoir, sewage & water treatment plant, tunnels/ subway and bridge deck etc., prepared by mixing in the ratio of 5 : 2 (5 parts integral crystalline slurry : 2 parts water) for vertical surfaces and 3 : 1 (3 parts integral crystalline slurry : 1 part water) for horizontal surfaces and applying the same from negative (internal) side with the help of synthetic fiber brush. The material shall meet the requirements as specified in ACI-212-3R-2010 i.e by reducing permeability of concrete by more than 90% compared with control concrete as per DIN 1048 and resistant to 16 bar hydrostatic pressure on negative side. The crystalline slurry shall be capable of self-healing of cracks up to a width of 0.50mm. The work shall be carried out all complete as per specification and the direction of the engineer in-charge. The product performance shall carry guarantee for 10 years against any leakage. For vertical surface two coats @ 0.70 kg per sqm							
		1	3.140*3		2.350		22.137	

		1	3.140*3.6		2.350		26.565	
	Total Quantity						48.702 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						48.702 sqm	
	Say 48.702 sqm @ Rs 559.61 / sqm						Rs 27254.13	
16	<p>22.23.2</p> <p>Providing and applying integral crystalline slurry of hydrophilic in nature for waterproofing treatment to the RCC structures like retaining walls of the basement, water tanks, roof slabs, podiums, reservoir, sewage & water treatment plant, tunnels/ subway and bridge deck etc., prepared by mixing in the ratio of 5 : 2 (5 parts integral crystalline slurry : 2 parts water) for vertical surfaces and 3 : 1 (3 parts integral crystalline slurry : 1 part water) for horizontal surfaces and applying the same from negative (internal) side with the help of synthetic fiber brush. The material shall meet the requirements as specified in ACI-212-3R-2010 i.e by reducing permeability of concrete by more than 90% compared with control concrete as per DIN 1048 and resistant to 16 bar hydrostatic pressure on negative side. The crystalline slurry shall be capable of self-healing of cracks up to a width of 0.50mm. The work shall be carried out all complete as per specification and the direction of the engineer-in-charge. The product performance shall carry guarantee for 10 years against any leakage. For horizontal surface one coat @ 1.10 kg per sqm.</p>							
		1	3.14/4	3*3			7.065	
	Total Quantity						7.065 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						7.065 sqm	
	Say 7.065 sqm @ Rs 431.28 / sqm						Rs 3046.99	
17	<p>100.36.1</p> <p>Filling water with 5000 litre tankers fitted in lorry and conveying water from a distance of 5 km (average) to the reservoir site and pumping the water into the reservoir of height not less than 3 m using 5 HP diesel engine pump set, hire for tanker lorry, tools and other appliances and cost of water etc. complete. "(Ref. No. 000, Technical Circular)"</p>							
		1	3.14/4	3*3	2.350		16.603	
	Total Quantity						16.603 Kilo litre	
	Total Deducted Quantity						0.000 Kilo litre	
	Net Total Quantity						16.603 Kilo litre	
	Say 16.603 Kilo litre @ Rs 182.79 / Kilo litre						Rs 3034.86	
Sl No	Description	No	L	B	D	CF	Quantity	Remark
8 SLUDGE THICKNER (Cost Index: 33.05 %)								
1	<p>2.6.1</p> <p>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</p>							

		1	3.14/4	9.4*9.4	1.000		69.363		
	Total Quantity						69.363 cum		
	Total Deducted Quantity						0.000 cum		
	Net Total Quantity						69.363 cum		
	Say 69.363 cum @ Rs 210.02 / cum						Rs 14567.62		
2	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)								
		1	3.14/4	9.4*9.4	0.200	1.15	15.954		
	Total Quantity						15.954 cum		
	Total Deducted Quantity						0.000 cum		
	Net Total Quantity						15.954 cum		
	Say 15.954 cum @ Rs 7229.54 / cum						Rs 115340.08		
3	5.37.1 Providing and laying in position ready mixed M-25 grade concrete for reinforced cement concrete work, using cement content as per approved design mix, manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for reinforced cement concrete work including pumping of R.M.C. from transit mixer to site of laying, excluding the cost of centering, shuttering finishing and reinforcement including cost of 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 the Engineer - in -charge. Note:- Cement content considered in this item is @330 kg/cum. Excess /less cement used as per design mix is payable/recoverable separately.All work upto plinth level								
	Base slab	1	3.14/4	9.2*9.2	0.300	1.15	22.923		
	Total Quantity						22.923 cum		
	Total Deducted Quantity						0.000 cum		
	Net Total Quantity						22.923 cum		
	Say 22.923 cum @ Rs 9700.81 / cum						Rs 222371.67		
4	5.37.2 Providing and laying in position ready mixed M-25 grade concrete for reinforced cement concrete work, using cement content as per approved design mix, manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for reinforced cement concrete work including pumping of R.M.C. from transit mixer to site of laying, excluding the cost of centering, shuttering finishing and reinforcement including cost of 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 the Engineer - in -charge. Note:- Cement content considered in this item is @330 kg/cum. Excess /less cement used as per design mix is payable/recoverable separately.All work above plinth level upto floor V level								

	Wall around	1	3.14*8.3	0.300	3.350		26.193		
	RCC trough	1	3.14*7.5	0.750	0.150		2.650		
	Walkway	1	3.14*9.6	1.000	0.150		4.522		
	Connecting structure - Beam	2	5.000	0.250	0.350		0.875		
	Connecting structure-slab	1	5.000	1.500	0.150		1.125		
	Total Quantity						35.365 cum		
	Total Deducted Quantity						0.000 cum		
	Net Total Quantity						35.365 cum		
	Say 35.365 cum @ Rs 11321.96 / cum						Rs 400401.12		
5	5.34.1 Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately. Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).								
	Base slab	1	3.14/4	9.2*9.2	0.300	1.15	22.923		
	Wall around	1	3.14*8.3	0.300	3.350		26.193		
	RCC trough	1	3.14*7.5	0.750	0.150		2.650		
	Walkway	1	3.14*9.6	1.000	0.150		4.522		
	Connecting structure - Beam	2	5.000	0.250	0.350		0.875		
	Connecting structure-slab	1	5.000	1.500	0.150		1.125		
	Total Quantity						58.288 cum		
	Total Deducted Quantity						0.000 cum		
	Net Total Quantity						58.288 cum		
	Say 58.288 cum @ Rs 80.56 / cum						Rs 4695.68		
6	4.12 Extra for providing and mixing water proofing material in cement concrete work in doses by weight of cement as per manufacturer's specification .								
	Qty vide item No-5	1	58.288	340.000			19817.920		
	Total Quantity						19817.920 kg		
	Total Deducted Quantity						0.000 kg		
	Net Total Quantity						19817.920 kg		
	Say 19817.920 kg @ Rs 1.33 / kg						Rs 26357.83		
7	5.22.6								

	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth level Thermo - Mechanically Treated bars of grade Fe-500D or more							
	Qty vide item No-5 @ 120kg/m ³ CC	1	58.288	120.000			6994.560	
	Total Quantity						6994.560 kilogram	
	Total Deducted Quantity						0.000 kilogram	
	Net Total Quantity						6994.560 kilogram	
	Say 6994.560 kilogram @ Rs 96.46 / kilogram						Rs 674695.26	
8	od353220/2021_2022 Extra for providing epoxy coating for reinforcement bars.							
	Qty vide item No-5 @ 120kg/m ³ CC	1	58.288	120.000			6994.560	
	Total Quantity						6994.560 kg	
	Total Deducted Quantity						0.000 kg	
	Net Total Quantity						6994.560 kg	
	Say 6994.560 kg @ Rs 2.32 / kg						Rs 16227.38	
9	5.9.1 Centering and shuttering including strutting, etc. and removal of form for: Foundations, footings, bases of columns, etc for mass concrete							
	Base slab	1	3.140	9.200	0.300		8.667	
	Total Quantity						8.667 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						8.667 sqm	
	Say 8.667 sqm @ Rs 329.03 / sqm						Rs 2851.70	
10	5.9.2 Centering and shuttering including strutting, etc. and removal of form for: Walls (any thickness) including attached pilasters, buttersesses, plinth and string courses etc.							
	Wall Inside&outside	2	3.14*8.3		3.350		174.616	
	Total Quantity						174.616 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						174.616 sqm	
	Say 174.616 sqm @ Rs 703.77 / sqm						Rs 122889.50	
11	5.9.3 Centering and shuttering including strutting, etc. and removal of form for: Suspended floors, roofs, landings, balconies and access platform							
	RCC trough	1	3.14*7.5	0.750			17.663	

	Walkway	1	3.14*9.6	1.000			30.144		
	Connecting structure - Beam	2	5.000	0.250+0.3 5*2			9.500		
	Connecting structure-slab	1	5.000	1.500			7.500		
	Total Quantity						64.807 sqm		
	Total Deducted Quantity						0.000 sqm		
	Net Total Quantity						64.807 sqm		
	Say 64.807 sqm @ Rs 800.50 / sqm						Rs 51878.00		
12	13.7.1 12 mm cement plaster finished with a floating coat of neat cement of mix:1:3 (1 cement : 3 fine sand)								
	Base slab	1	3.140/4	8*8		1.15	57.776		
	cover slab	2	3.140/4	8.6*8.6			116.118		
	Wall Inside&outside	2	3.14*8.3		3.350		174.616		
	RCC trough inside and out side	2	3.14*7.5	0.750			35.325		
	Walkway inside and out side	2	3.14*9.6	1.000			60.288		
	Connecting structure - Beam	2	5.000	0.250+0.3 5*2			9.500		
	Connecting structure slab -inside and out side	2	5.000	1.500			15.000		
	Total Quantity						468.623 sqm		
	Total Deducted Quantity						0.000 sqm		
	Net Total Quantity						468.623 sqm		
	Say 468.623 sqm @ Rs 393.69 / sqm						Rs 184492.19		
13	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								
	Wall outside	1	3.14*8.3		3.350		87.308		
	Walkway	1	3.14*9.6	1.000			30.144		
	Connecting structure - Beam	2	5.000	0.250+0.3 5*2			9.500		
	Connecting structure slab	1	5.000	1.500			7.500		

		Total Quantity					134.452 sqm	
		Total Deducted Quantity					0.000 sqm	
		Net Total Quantity					134.452 sqm	
		Say 134.452 sqm @ Rs 218.73 / sqm					Rs 29408.69	
14	22.23.1	<p>Providing and applying integral crystalline slurry of hydrophilic in nature for waterproofing treatment to the RCC structures like retaining walls of the basement, water tanks, roof slabs, podiums, reservoir, sewage & water treatment plant, tunnels/ subway and bridge deck etc., prepared by mixing in the ratio of 5 : 2 (5 parts integral crystalline slurry : 2 parts water) for vertical surfaces and 3 : 1 (3 parts integral crystalline slurry : 1 part water) for horizontal surfaces and applying the same from negative (internal) side with the help of synthetic fiber brush. The material shall meet the requirements as specified in ACI-212-3R-2010 i.e by reducing permeability of concrete by more than 90% compared with control concrete as per DIN 1048 and resistant to 16 bar hydrostatic pressure on negative side. The crystalline slurry shall be capable of self-healing of cracks up to a width of 0.50mm. The work shall be carried out all complete as per specification and the direction of the engineer in-charge. The product performance shall carry guarantee for 10 years against any leakage. For vertical surface two coats @ 0.70 kg per sqm</p>						
	Wall Inside & outside	2	3.14*8.3		3.350		174.616	
	RCC trough inside and out side	2	3.14*7.5	0.750			35.325	
		Total Quantity					209.941 sqm	
		Total Deducted Quantity					0.000 sqm	
		Net Total Quantity					209.941 sqm	
		Say 209.941 sqm @ Rs 559.61 / sqm					Rs 117485.08	
15	22.23.2	<p>Providing and applying integral crystalline slurry of hydrophilic in nature for waterproofing treatment to the RCC structures like retaining walls of the basement, water tanks, roof slabs, podiums, reservoir, sewage & water treatment plant, tunnels/ subway and bridge deck etc., prepared by mixing in the ratio of 5 : 2 (5 parts integral crystalline slurry : 2 parts water) for vertical surfaces and 3 : 1 (3 parts integral crystalline slurry : 1 part water) for horizontal surfaces and applying the same from negative (internal) side with the help of synthetic fiber brush. The material shall meet the requirements as specified in ACI-212-3R-2010 i.e by reducing permeability of concrete by more than 90% compared with control concrete as per DIN 1048 and resistant to 16 bar hydrostatic pressure on negative side. The crystalline slurry shall be capable of self-healing of cracks up to a width of 0.50mm. The work shall be carried out all complete as per specification and the direction of the engineer in-charge. The product performance shall carry guarantee for 10 years against any leakage. For horizontal surface one coat @ 1.10 kg per sqm.</p>						
	Base slab	1	3.140/4	8*8		1.15	57.776	
	cover slab bottom side	1	3.140/4	8.6*8.6			58.059	
		Total Quantity					115.835 sqm	
		Total Deducted Quantity					0.000 sqm	
		Net Total Quantity					115.835 sqm	

	Say 115.835 sqm @ Rs 431.28 / sqm						Rs 49957.32	
16	13.65.1 Painting with black anti- corrosive bitumastic paint of approved brand and manufacture to give an even shade:Two or more coats on new work							
	Wall Inside&outside	2	3.14*8.3		3.350		174.616	
	RCC trough inside and out side	2	3.14*7.5	0.750			35.325	
	Base slab	1	3.140/4	8*8		1.15	57.776	
	cover slab bottom side	1	3.140/4	8.6*8.6			58.059	
	Total Quantity						325.776 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						325.776 sqm	
	Say 325.776 sqm @ Rs 122.47 / sqm						Rs 39897.79	
17	100.36.1 Filling water with 5000 litre tankers fitted in lorry and conveying water from a distance of 5 km (average) to the reservoir site and pumping the water into the reservoir of height not less than 3 m using 5 HP diesel engine pump set , hire for tanker lorry, tools and other appliances and cost of water etc. complete. "(Ref. No. 000, Technical Circular)"							
		1	3.14/4	8*8	3.350		168.304	
	Kerala Water Authority Total Quantity						168.304 Kilo litre	
	Total Deducted Quantity						0.000 Kilo litre	
	Net Total Quantity						168.304 Kilo litre	
	Say 168.304 Kilo litre @ Rs 182.79 / Kilo litre						Rs 30764.29	
18	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							
		1	600.000				600.000	
	Total Quantity						600.000 kg	
	Total Deducted Quantity						0.000 kg	
	Net Total Quantity						600.000 kg	
	Say 600.000 kg @ Rs 186.34 / kg						Rs 111804.00	
SI No	Description	No	L	B	D	CF	Quantity	Remark
9THICKENED SLUDGE SUMP (Cost Index:33.05 %)								

1	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		3.14/4	4.600	4.600	1.000		16.611	
		Total Quantity						16.611 cum	
		Total Deducted Quantity						0.000 cum	
		Net Total Quantity						16.611 cum	
		Say 16.611 cum @ Rs 210.02 / cum						Rs 3488.64	
2	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)		1	3.14/4	4.6*4.6	0.200		3.323	
		Total Quantity						3.323 cum	
		Total Deducted Quantity						0.000 cum	
		Net Total Quantity						3.323 cum	
		Say 3.323 cum @ Rs 7229.54 / cum						Rs 24023.76	
3	5.37.1 Providing and laying in position ready mixed M-25 grade concrete for reinforced cement concrete work, using cement content as per approved design mix, manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for reinforced cement concrete work including pumping of R.M.C. from transit mixer to site of laying, excluding the cost of centering, shuttering finishing and reinforcement including cost of 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 the Engineer - in -charge. Note:- Cement content considered in this item is @330 kg/cum. Excess /less cement used as per design mix is payable/recoverable separately.All work upto plinth level		1	3.14/4	4.4*4.4	0.300		4.560	
		Total Quantity						4.560 cum	
		Total Deducted Quantity						0.000 cum	
		Net Total Quantity						4.560 cum	
		Say 4.560 cum @ Rs 9700.81 / cum						Rs 44235.69	
4	5.37.2 Providing and laying in position ready mixed M-25 grade concrete for reinforced cement concrete work, using cement content as per approved design mix, manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for reinforced cement concrete work including pumping of R.M.C.								

	from transit mixer to site of laying, excluding the cost of centering, shuttering finishing and reinforcement including cost of 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 the Engineer - in -charge. Note:- Cement content considered in this item is @330 kg/cum. Excess /less cement used as per design mix is payable/recoverable separately.All work above plinth level upto floor V level						
	Cover slab	1	3.14/4	3.8*3.8	0.150		1.701
	Side wall	1	3.14*3.5	0.300	2.500		8.243
	Manhole	1	0.500	0.500	0.150		-0.037
	Total Quantity						9.944 cum
	Total Deducted Quantity						-0.037 cum
	Net Total Quantity						9.907 cum
	Say 9.907 cum @ Rs 11321.96 / cum						Rs 112166.66
5	5.34.1 Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately.Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).						
	base slab	1	3.14/4	4.4*4.4	0.300		4.560
	Cover slab	1	3.14/4	3.8*3.8	0.150		1.701
	Side wall	1	3.14*3.5	0.300	2.500		8.243
	Manhole	1	0.500	0.500	0.150		-0.037
	Total Quantity						14.504 cum
	Total Deducted Quantity						-0.037 cum
	Net Total Quantity						14.467 cum
	Say 14.467 cum @ Rs 80.56 / cum						Rs 1165.46
6	4.12 Extra for providing and mixing water proofing material in cement concrete work in doses by weight of cement as per manufacturer's specification .						
	Qty vide item No.5	1	14.467	340.000			4918.780
	Total Quantity						4918.780 kg
	Total Deducted Quantity						0.000 kg
	Net Total Quantity						4918.780 kg
	Say 4918.780 kg @ Rs 1.33 / kg						Rs 6541.98
7	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						

	Qty vide item no-5 *@120kg/m3	1	14.467	120.000			1736.040		
	Total Quantity						1736.040 kilogram		
	Total Deducted Quantity						0.000 kilogram		
	Net Total Quantity						1736.040 kilogram		
	Say 1736.040 kilogram @ Rs 96.46 / kilogram						Rs 167458.42		
8	od353220/2021_2022 Extra for providing epoxy coating for reinforcement bars.								
	Qty vide item no-5 *@120kg/m3	1	14.467	120.000			1736.040		
	Total Quantity						1736.040 kg		
	Total Deducted Quantity						0.000 kg		
	Net Total Quantity						1736.040 kg		
	Say 1736.040 kg @ Rs 2.32 / kg						Rs 4027.61		
9	5.9.1 Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete								
	Base slab	1	3.14*4.4		0.200		2.764		
	Total Quantity						2.764 sqm		
	Total Deducted Quantity						0.000 sqm		
	Net Total Quantity						2.764 sqm		
	Say 2.764 sqm @ Rs 329.03 / sqm						Rs 909.44		
10	5.9.2 Centering and shuttering including strutting, etc. and removal of form for:Walls (any thickness) including attached pilasters, buttersesses, plinth and string courses etc.								
	Side wall inside and out side	2	3.14*3.5		2.500		54.950		
	Total Quantity						54.950 sqm		
	Total Deducted Quantity						0.000 sqm		
	Net Total Quantity						54.950 sqm		
	Say 54.950 sqm @ Rs 703.77 / sqm						Rs 38672.16		
11	5.9.3 Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform								
	Cover slab	1	3.14/4	3.8*3.8			11.336		
	Manhole	1	0.500	0.500			-0.250		

						Total Quantity	11.336 sqm	
						Total Deducted Quantity	-0.250 sqm	
						Net Total Quantity	11.086 sqm	
						Say 11.086 sqm @ Rs 800.50 / sqm	Rs 8874.34	
12	13.7.1	12 mm cement plaster finished with a floating coat of neat cement of mix:1:3 (1 cement : 3 fine sand)						
	Base slab	1	3.14/4	3.2*3.2			8.039	
	Side wall inside and out side	2	3.14*3.5		2.500		54.950	
	Cover slab(inside &out side)	2	3.14/4	3.8*3.8			22.671	
	Manhole	1	0.500	0.500			-0.250	
						Total Quantity	85.660 sqm	
						Total Deducted Quantity	-0.250 sqm	
						Net Total Quantity	85.410 sqm	
						Say 85.410 sqm @ Rs 393.69 / sqm	Rs 33625.06	
13	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						
	Side wall -out side	1	3.14*3.5		2.500		27.475	
	Cover slab-out side	1	3.14/4	3.8*3.8			11.336	
						Total Quantity	38.811 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	38.811 sqm	
						Say 38.811 sqm @ Rs 218.73 / sqm	Rs 8489.13	
14	13.65.1	Painting with black anti- corrosive bitumastic paint of approved brand and manufacture to give an even shade:Two or more coats on new work						
	Base slab	1	3.14/4	3.2*3.2			8.039	
	Side wall- inside	1	3.14*3.5		2.500		27.475	
	Cover slab- inside	1	3.14/4	3.8*3.8			11.336	
						Total Quantity	46.850 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	46.850 sqm	

	Say 46.850 sqm @ Rs 122.47 / sqm						Rs 5737.72	
15	<p>22.23.1</p> <p>Providing and applying integral crystalline slurry of hydrophilic in nature for waterproofing treatment to the RCC structures like retaining walls of the basement, water tanks, roof slabs, podiums, reservoir, sewage & water treatment plant, tunnels/ subway and bridge deck etc., prepared by mixing in the ratio of 5 : 2 (5 parts integral crystalline slurry : 2 parts water) for vertical surfaces and 3 : 1 (3 parts integral crystalline slurry : 1 part water) for horizontal surfaces and applying the same from negative (internal) side with the help of synthetic fiber brush. The material shall meet the requirements as specified in ACI-212-3R-2010 i.e. by reducing permeability of concrete by more than 90% compared with control concrete as per DIN 1048 and resistant to 16 bar hydrostatic pressure on negative side. The crystalline slurry shall be capable of self-healing of cracks up to a width of 0.50mm. The work shall be carried out all complete as per specification and the direction of the engineer in-charge. The product performance shall carry guarantee for 10 years against any leakage. For vertical surface two coats @ 0.70 kg per sqm</p>							
	Side wall inside	1	3.14*3.5		2.500		27.475	
	Total Quantity						27.475 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						27.475 sqm	
	Say 27.475 sqm @ Rs 559.61 / sqm						Rs 15375.28	
16	<p>22.23.2</p> <p>Providing and applying integral crystalline slurry of hydrophilic in nature for waterproofing treatment to the RCC structures like retaining walls of the basement, water tanks, roof slabs, podiums, reservoir, sewage & water treatment plant, tunnels/ subway and bridge deck etc., prepared by mixing in the ratio of 5 : 2 (5 parts integral crystalline slurry : 2 parts water) for vertical surfaces and 3 : 1 (3 parts integral crystalline slurry : 1 part water) for horizontal surfaces and applying the same from negative (internal) side with the help of synthetic fiber brush. The material shall meet the requirements as specified in ACI-212-3R-2010 i.e. by reducing permeability of concrete by more than 90% compared with control concrete as per DIN 1048 and resistant to 16 bar hydrostatic pressure on negative side. The crystalline slurry shall be capable of self-healing of cracks up to a width of 0.50mm. The work shall be carried out all complete as per specification and the direction of the engineer in-charge. The product performance shall carry guarantee for 10 years against any leakage. For horizontal surface one coat @ 1.10 kg per sqm.</p>							
	Base slab	1	3.14/4	3.2*3.2			8.039	
	Cover slab- inside	1	3.14/4	3.8*3.8			11.336	
	Total Quantity						19.375 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						19.375 sqm	
	Say 19.375 sqm @ Rs 431.28 / sqm						Rs 8356.05	
17	<p>100.36.1</p> <p>Filling water with 5000 litre tankers fitted in lorry and conveying water from a distance of 5 km (average) to the reservoir site and pumping the water into the reservoir of height not less than 3 m using 5 HP diesel engine pump set, hire for tanker lorry, tools and other appliances and cost of water etc. complete.</p>							

SI No	Description	No	L	B	D	CF	Quantity	Remark
"(Ref. No. 000, Technical Circular)"								
		1	3.14/4	3.2*3.2	2.500		20.097	
							Total Quantity	20.097 Kilo litre
							Total Deducted Quantity	0.000 Kilo litre
							Net Total Quantity	20.097 Kilo litre
							Say 20.097 Kilo litre @ Rs 182.79 / Kilo litre	Rs 3673.53
10FILTER FEED TANK (Cost Index:33.05 %)								
1	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							
		1	6.800	6.800	1.000		46.240	
							Total Quantity	46.240 cum
							Total Deducted Quantity	0.000 cum
							Net Total Quantity	46.240 cum
							Say 46.240 cum @ Rs 210.02 / cum	Rs 9711.32
2	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	6.800	6.800	0.200		9.248	
							Total Quantity	9.248 cum
							Total Deducted Quantity	0.000 cum
							Net Total Quantity	9.248 cum
							Say 9.248 cum @ Rs 7229.54 / cum	Rs 66858.79
3	5.37.1 Providing and laying in position ready mixed M-25 grade concrete for reinforced cement concrete work, using cement content as per approved design mix, manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for reinforced cement concrete work including pumping of R.M.C. from transit mixer to site of laying, excluding the cost of centering, shuttering finishing and reinforcement including cost of 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 the Engineer - in-charge. Note:- Cement content considered in this item is @330 kg/cum. Excess /less cement used as per design mix is payable/recoverable separately.All work upto plinth level							
	Base slab	1	6.600	6.600	0.300		13.068	

						Total Quantity	13.068 cum
						Total Deducted Quantity	0.000 cum
						Net Total Quantity	13.068 cum
						Say 13.068 cum @ Rs 9700.81 / cum	Rs 126770.19
4	5.37.2	<p>Providing and laying in position ready mixed M-25 grade concrete for reinforced cement concrete work, using cement content as per approved design mix, manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for reinforced cement concrete work including pumping of R.M.C. from transit mixer to site of laying, excluding the cost of centering, shuttering finishing and reinforcement including cost of 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 the Engineer - in -charge. Note:- Cement content considered in this item is @330 kg/cum. Excess /less cement used as per design mix is payable/recoverable separately.All work above plinth level upto floor V level</p>					
	Side Wall- Allround	1	22.800	0.300	3.850		26.334
						Total Quantity	26.334 cum
						Total Deducted Quantity	0.000 cum
						Net Total Quantity	26.334 cum
						Say 26.334 cum @ Rs 11321.96 / cum	Rs 298152.49
5	5.34.1	<p>Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately.Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).</p>					
	Base slab	1	6.600	6.600	0.300		13.068
	Side Wall- Allround	1	22.800	0.300	3.850		26.334
						Total Quantity	39.402 cum
						Total Deducted Quantity	0.000 cum
						Net Total Quantity	39.402 cum
						Say 39.402 cum @ Rs 80.56 / cum	Rs 3174.23
6	4.12	<p>Extra for providing and mixing water proofing material in cement concrete work in doses by weight of cement as per manufacturer's specification .</p>					
	Qty vide no-5	1	39.402		340.000		13396.680
						Total Quantity	13396.680 kg
						Total Deducted Quantity	0.000 kg
						Net Total Quantity	13396.680 kg
						Say 13396.680 kg @ Rs 1.33 / kg	Rs 17817.58

7	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						
	Qty vide no- 5 * @ 120 kg/m 3	1	39.402	120.000			4728.240
	Total Quantity						4728.240 kilogram
	Total Deducted Quantity						0.000 kilogram
	Net Total Quantity						4728.240 kilogram
	Say 4728.240 kilogram @ Rs 96.46 / kilogram						Rs 456086.03
8	od353220/2021_2022 Extra for providing epoxy coating for reinforcement bars.						
	Qty vide no- 5 * @ 120 kg/m 3	1	39.402	120.000			4728.240
	Total Quantity						4728.240 kg
	Total Deducted Quantity						0.000 kg
	Net Total Quantity						4728.240 kg
	Say 4728.240 kg @ Rs 2.32 / kg						Rs 10969.52
9	5.9.1 Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete						
	PCC	1	6.800*4		0.200		5.440
	Base slab	1	6.600*4		0.300		7.920
	Total Quantity						13.360 sqm
	Total Deducted Quantity						0.000 sqm
	Net Total Quantity						13.360 sqm
	Say 13.360 sqm @ Rs 329.03 / sqm						Rs 4395.84
10	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.						
	side wall all round	2	22.800		3.850		175.560
	Total Quantity						175.560 sqm
	Total Deducted Quantity						0.000 sqm
	Net Total Quantity						175.560 sqm
	Say 175.560 sqm @ Rs 703.77 / sqm						Rs 123553.86
11	13.7.1 12 mm cement plaster finished with a floating coat of neat cement of mix:1:3 (1 cement : 3 fine sand)						

	Side wall allround	2	22.800		3.850		175.560	
	base slab	1	5.400	5.400			29.161	
	Total Quantity						204.721 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						204.721 sqm	
	Say 204.721 sqm @ Rs 393.69 / sqm						Rs 80596.61	
12	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							
	Wall out side	1	6*4		3.850		92.400	
	Total Quantity						92.400 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						92.400 sqm	
	Say 92.400 sqm @ Rs 218.73 / sqm						Rs 20210.65	
13	13.65.1 Painting with black anti- corrosive bitumastic paint of approved brand and manufacture to give an even shade:Two or more coats on new work							
	Tank inside	1	5.4*4		3.850		83.161	
	Total Quantity						83.161 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						83.161 sqm	
	Say 83.161 sqm @ Rs 122.47 / sqm						Rs 10184.73	
14	22.23.1 Providing and applying integral crystalline slurry of hydrophilic in nature for waterproofing treatment to the RCC structures like retaining walls of the basement, water tanks, roof slabs, podiums, reservoir, sewage & water treatment plant, tunnels/ subway and bridge deck etc., prepared by mixing in the ratio of 5 : 2 (5 parts integral crystalline slurry : 2 parts water) for vertical surfaces and 3 : 1 (3 parts integral crystalline slurry : 1 part water) for horizontal surfaces and applying the same from negative (internal) side with the help of synthetic fiber brush. The material shall meet the requirements as specified in ACI-212-3R-2010 i.e by reducing permeability of concrete by more than 90% compared with control concrete as per DIN 1048 and resistant to 16 bar hydrostatic pressure on negative side. The crystalline slurry shall be capable of self-healing of cracks up to a width of 0.50mm. The work shall be carried out all complete as per specification and the direction of the engineer in-charge. The product performance shall carry guarantee for 10 years against any leakage. For vertical surface two coats @ 0.70 kg per sqm							
	Side wall allround	2	22.800		3.850		175.560	
	Total Quantity						175.560 sqm	

							Total Deducted Quantity	0.000 sqm
							Net Total Quantity	175.560 sqm
							Say 175.560 sqm @ Rs 559.61 / sqm	Rs 98245.13
15	22.23.2	<p>Providing and applying integral crystalline slurry of hydrophilic in nature for waterproofing treatment to the RCC structures like retaining walls of the basement, water tanks, roof slabs, podiums, reservoir, sewage & water treatment plant, tunnels/ subway and bridge deck etc., prepared by mixing in the ratio of 5 : 2 (5 parts integral crystalline slurry : 2 parts water) for vertical surfaces and 3 : 1 (3 parts integral crystalline slurry : 1 part water) for horizontal surfaces and applying the same from negative (internal) side with the help of synthetic fiber brush. The material shall meet the requirements as specified in ACI-212-3R-2010 i.e. by reducing permeability of concrete by more than 90% compared with control concrete as per DIN 1048 and resistant to 16 bar hydrostatic pressure on negative side. The crystalline slurry shall be capable of self-healing of cracks up to a width of 0.50mm. The work shall be carried out all complete as per specification and the direction of the engineer-in-charge. The product performance shall carry guarantee for 10 years against any leakage. For horizontal surface one coat @ 1.10 kg per sqm.</p>						
	Base slab	1	5.400	5.400			29.161	
							Total Quantity	29.161 sqm
							Total Deducted Quantity	0.000 sqm
							Net Total Quantity	29.161 sqm
							Say 29.161 sqm @ Rs 431.28 / sqm	Rs 12576.56
16	100.36.1	<p>Kerala Water Authority Filling water with 5000 litre tankers fitted in lorry and conveying water from a distance of 5 km (average) to the reservoir site and pumping the water into the reservoir of height not less than 3 m using 5 HP diesel engine pump set, hire for tanker lorry, tools and other appliances and cost of water etc. complete. "(Ref. No. 000, Technical Circular)"</p>						
		1	5.400	5.400	3.850		112.267	
							Total Quantity	112.267 Kilo litre
							Total Deducted Quantity	0.000 Kilo litre
							Net Total Quantity	112.267 Kilo litre
							Say 112.267 Kilo litre @ Rs 182.79 / Kilo litre	Rs 20521.28
SI No	Description	No	L	B	D	CF	Quantity	Remark
11 TREATED WATER TANK (Cost Index: 33.05 %)								
1	2.6.1	<p>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</p>						
		1	10.800	10.800	1.000		116.641	
							Total Quantity	116.641 cum

Total Deducted Quantity							0.000 cum
Net Total Quantity							116.641 cum
Say 116.641 cum @ Rs 210.02 / cum							Rs 24496.94
2	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	10.800	10.800	0.200		23.329
Total Quantity							23.329 cum
Total Deducted Quantity							0.000 cum
Net Total Quantity							23.329 cum
Say 23.329 cum @ Rs 7229.54 / cum							Rs 168657.94
3	5.37.1	Providing and laying in position ready mixed M-25 grade concrete for reinforced cement concrete work, using cement content as per approved design mix, manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for reinforced cement concrete work including pumping of R.M.C. from transit mixer to site of laying, excluding the cost of centering, shuttering finishing and reinforcement including cost of 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 the Engineer - in -charge. Note:- Cement content considered in this item is @330 kg/cum. Excess /less cement used as per design mix is payable/recoverable separately.All work upto plinth level					
	Base Slab	1	10.600	10.600	0.300		33.708
Total Quantity							33.708 cum
Total Deducted Quantity							0.000 cum
Net Total Quantity							33.708 cum
Say 33.708 cum @ Rs 9700.81 / cum							Rs 326994.90
4	5.37.2	Providing and laying in position ready mixed M-25 grade concrete for reinforced cement concrete work, using cement content as per approved design mix, manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for reinforced cement concrete work including pumping of R.M.C. from transit mixer to site of laying, excluding the cost of centering, shuttering finishing and reinforcement including cost of 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 the Engineer - in -charge. Note:- Cement content considered in this item is @330 kg/cum. Excess /less cement used as per design mix is payable/recoverable separately.All work above plinth level upto floor V level					
	Side wall Around	1	9.7*4	0.300	3.850		44.814
Total Quantity							44.814 cum

		Total Deducted Quantity				0.000 cum	
		Net Total Quantity				44.814 cum	
		Say 44.814 cum @ Rs 11321.96 / cum				Rs 507382.32	
5	5.34.1 Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately. Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).						
	Base Slab	1	10.600	10.600	0.300		33.708
	Side wall Around	1	9.7*4	0.300	3.850		44.814
		Total Quantity				78.522 cum	
		Total Deducted Quantity				0.000 cum	
		Net Total Quantity				78.522 cum	
		Say 78.522 cum @ Rs 80.56 / cum				Rs 6325.73	
6	4.12 Extra for providing and mixing water proofing material in cement concrete work in doses by weight of cement as per manufacturer's specification .						
	Qty vide item no-5	1	78.522		340.000		26697.481
		Total Quantity				26697.481 kg	
		Total Deducted Quantity				0.000 kg	
		Net Total Quantity				26697.481 kg	
		Say 26697.481 kg @ Rs 1.33 / kg				Rs 35507.65	
7	5.22.6 Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth level Thermo - Mechanically Treated bars of grade Fe-500D or more						
	Qty vide item no-5* @ 120kg/m3	1	78.522	120.000			9422.641
		Total Quantity				9422.641 kilogram	
		Total Deducted Quantity				0.000 kilogram	
		Net Total Quantity				9422.641 kilogram	
		Say 9422.641 kilogram @ Rs 96.46 / kilogram				Rs 908907.95	
8	od353220/2021_2022 Extra for providing epoxy coating for reinforcement bars.						
	Qty vide item no-5* @ 120kg/m3	1	78.522	120.000			9422.641
		Total Quantity				9422.641 kg	
		Total Deducted Quantity				0.000 kg	

	Net Total Quantity							9422.641 kg
	Say 9422.641 kg @ Rs 2.32 / kg							Rs 21860.53
9	5.9.1 Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete							
	PCC Wall Allround	1	10.8*4		0.200		8.640	
	Base slab Alround	1	10.6*4		0.300		12.720	
	Total Quantity							21.360 sqm
	Total Deducted Quantity							0.000 sqm
	Net Total Quantity							21.360 sqm
	Say 21.360 sqm @ Rs 329.03 / sqm							Rs 7028.08
10	5.9.2 Centering and shuttering including strutting, etc. and removal of form for:Walls (any thickness) including attached pilasters, buttersesses, plinth and string courses etc.							
	Side wall allround - inside	1	9.4*4		3.850		144.761	
	Side wall allround - outside	1	10*4		3.850		154.000	
	Total Quantity							298.761 sqm
	Total Deducted Quantity							0.000 sqm
	Net Total Quantity							298.761 sqm
	Say 298.761 sqm @ Rs 703.77 / sqm							Rs 210259.03
11	13.7.1 12 mm cement plaster finished with a floating coat of neat cement of mix:1:3 (1 cement : 3 fine sand)							
	PCC Wall Allround	1	10.8*4		0.200		8.640	
	Base slab Alround	1	10.6*4		0.300		12.720	
	Base slab top	1	9.400	9.400			88.361	
	Side wall allround - inside	1	9.4*4		3.850		144.761	
	Side wall allround - outside	1	10*4		3.850		154.000	
	Total Quantity							408.482 sqm
	Total Deducted Quantity							0.000 sqm
	Net Total Quantity							408.482 sqm
	Say 408.482 sqm @ Rs 393.69 / sqm							Rs 160815.28
12	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							
	Side wall out side	1	10.4*4		3.850		160.160	
	Total Quantity						160.160 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						160.160 sqm	
	Say 160.160 sqm @ Rs 218.73 / sqm						Rs 35031.80	
13	13.65.1 Painting with black anti- corrosive bitumastic paint of approved brand and manufacture to give an even shade:Two or more coats on new work							
	Base slab top	1	9.400	9.400			88.361	
	Side wall allround - inside	1	9.4*4		3.850		144.761	
	Total Quantity						233.122 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						233.122 sqm	
	Say 233.122 sqm @ Rs 122.47 / sqm						Rs 28550.45	
14	22.23.1 Providing and applying integral crystalline slurry of hydrophilic in-nature for waterproofing treatment to the RCC structures like retaining walls of the basement, water tanks, roof slabs, podiums, reservoir, sewage & water treatment plant, tunnels/ subway and bridge deck etc., prepared by mixing in the ratio of 5 : 2 (5 parts integral crystalline slurry : 2 parts water) for vertical surfaces and 3 : 1 (3 parts integral crystalline slurry : 1 part water) for horizontal surfaces and applying the same from negative (internal) side with the help of synthetic fiber brush. The material shall meet the requirements as specified in ACI-212-3R-2010 i.e by reducing permeability of concrete by more than 90% compared with control concrete as per DIN 1048 and resistant to 16 bar hydrostatic pressure on negative side. The crystalline slurry shall be capable of self-healing of cracks up to a width of 0.50mm. The work shall be carried out all complete as per specification and the direction of the engineer in-charge. The product performance shall carry guarantee for 10 years against any leakage. For vertical surface two coats @ 0.70 kg per sqm							
	Side wall allround - inside	1	9.4*4		3.850		144.761	
	Side wall allround - outside	1	10*4		3.850		154.000	
	Total Quantity						298.761 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						298.761 sqm	
	Say 298.761 sqm @ Rs 559.61 / sqm						Rs 167189.64	

15	22.23.2 Providing and applying integral crystalline slurry of hydrophilic in nature for waterproofing treatment to the RCC structures like retaining walls of the basement, water tanks, roof slabs, podiums, reservoir, sewage & water treatment plant, tunnels/ subway and bridge deck etc., prepared by mixing in the ratio of 5 : 2 (5 parts integral crystalline slurry : 2 parts water) for vertical surfaces and 3 : 1 (3 parts integral crystalline slurry : 1 part water) for horizontal surfaces and applying the same from negative (internal) side with the help of synthetic fiber brush. The material shall meet the requirements as specified in ACI-212-3R-2010 i.e. by reducing permeability of concrete by more than 90% compared with control concrete as per DIN 1048 and resistant to 16 bar hydrostatic pressure on negative side. The crystalline slurry shall be capable of self-healing of cracks up to a width of 0.50mm. The work shall be carried out all complete as per specification and the direction of the engineer-in-charge. The product performance shall carry guarantee for 10 years against any leakage. For horizontal surface one coat @ 1.10 kg per sqm.							
	Base slab top	1	9.400	9.400			88.361	
	Total Quantity						88.361 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						88.361 sqm	
	Say 88.361 sqm @ Rs 431.28 / sqm						Rs 38108.33	
16	100.36.1 Filling water with 5000 litre tankers fitted in lorry and conveying water from a distance of 5 km (average) to the reservoir site and pumping the water into the reservoir of height not less than 3 m using 5 HP diesel engine pump set, hire for tanker lorry, tools and other appliances and cost of water etc. complete. "(Ref. No. 000, Technical Circular)"							
		1	9.400	9.400	3.850		340.187	
	Total Quantity						340.187 Kilo litre	
	Total Deducted Quantity						0.000 Kilo litre	
	Net Total Quantity						340.187 Kilo litre	
	Say 340.187 Kilo litre @ Rs 182.79 / Kilo litre						Rs 62182.78	
Sl No	Description	No	L	B	D	CF	Quantity	Remark
12Centrate Sump (Cost Index:33.05 %)								
1	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							
		3.14/4	3.600	3.600	1.000		10.174	
	Total Quantity						10.174 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						10.174 cum	
	Say 10.174 cum @ Rs 210.02 / cum						Rs 2136.74	

2	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	3.14/4	3.6*3.6	0.200		2.035		
	Total Quantity						2.035 cum		
	Total Deducted Quantity						0.000 cum		
	Net Total Quantity						2.035 cum		
	Say 2.035 cum @ Rs 7229.54 / cum							Rs 14712.11	
3	5.37.1 Providing and laying in position ready mixed M-25 grade concrete for reinforced cement concrete work, using cement content as per approved design mix, manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for reinforced cement concrete work including pumping of R.M.C. from transit mixer to site of laying, excluding the cost of centering, shuttering finishing and reinforcement including cost of 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 the Engineer - in -charge. Note:- Cement content considered in this item is @330 kg/cum. Excess /less cement used as per design mix is payable/recoverable separately.All work upto plinth level								
	Base slab	1	3.14/4	3.4*3.4	0.300		2.723		
	Total Quantity						2.723 cum		
	Total Deducted Quantity						0.000 cum		
	Net Total Quantity						2.723 cum		
	Say 2.723 cum @ Rs 9700.81 / cum							Rs 26415.31	
4	5.37.2 Providing and laying in position ready mixed M-25 grade concrete for reinforced cement concrete work, using cement content as per approved design mix, manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for reinforced cement concrete work including pumping of R.M.C. from transit mixer to site of laying, excluding the cost of centering, shuttering finishing and reinforcement including cost of 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 the Engineer - in -charge. Note:- Cement content considered in this item is @330 kg/cum. Excess /less cement used as per design mix is payable/recoverable separately.All work above plinth level upto floor V level								
	Cover slab	1	3.14/4	2.8*2.8	0.150		0.924		
	Side wall	1	3.14*2.5	0.300	2.500		5.888		
	Manhole	1	0.500	0.500	0.150		-0.037		
	Total Quantity						6.812 cum		
	Total Deducted Quantity						-0.037 cum		

	Net Total Quantity						6.775 cum	
	Say 6.775 cum @ Rs 11321.96 / cum						Rs 76706.28	
5	5.34.1 Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately. Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).							
	Base slab	1	3.14/4	3.4*3.4	0.300		2.723	
	Cover slab	1	3.14/4	2.8*2.8	0.150		0.924	
	Side wall	1	3.14*2.5	0.300	2.500		5.888	
	Manhole	1	0.500	0.500	0.150		-0.037	
	Total Quantity						9.535 cum	
	Total Deducted Quantity						-0.037 cum	
	Net Total Quantity						9.498 cum	
	Say 9.498 cum @ Rs 80.56 / cum						Rs 765.16	
6	4.12 Extra for providing and mixing water proofing material in cement concrete work in doses by weight of cement as per manufacturer's specification .							
	Qty vide item no-5	1	9.498		340.000		3229.320	
	Total Quantity						3229.320 kg	
	Total Deducted Quantity						0.000 kg	
	Net Total Quantity						3229.320 kg	
	Say 3229.320 kg @ Rs 1.33 / kg						Rs 4295.00	
7	5.22.6 Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth level Thermo - Mechanically Treated bars of grade Fe-500D or more							
	QTY Vide item no-5* @ 120kg/m3	1	9.498	120.000			1139.760	
	Total Quantity						1139.760 kilogram	
	Total Deducted Quantity						0.000 kilogram	
	Net Total Quantity						1139.760 kilogram	
	Say 1139.760 kilogram @ Rs 96.46 / kilogram						Rs 109941.25	
8	od353220/2021_2022 Extra for providing epoxy coating for reinforcement bars.							
	QTY Vide item no-5* @ 120kg/m3	1	9.498	120.000			1139.760	
	Total Quantity						1139.760 kg	

		Total Deducted Quantity					0.000 kg	
		Net Total Quantity					1139.760 kg	
		Say 1139.760 kg @ Rs 2.32 / kg					Rs 2644.24	
9	5.9.1 Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete							
	PCC	1	3.14*3.6		0.200		2.261	
	Base slab	1	3.14*3.4		0.300		3.203	
		Total Quantity					5.464 sqm	
		Total Deducted Quantity					0.000 sqm	
		Net Total Quantity					5.464 sqm	
		Say 5.464 sqm @ Rs 329.03 / sqm					Rs 1797.82	
10	5.9.2 Centering and shuttering including strutting, etc. and removal of form for:Walls (any thickness) including attached pilasters, buttersesses, plinth and string courses etc.							
	Wall inside	1	3.14*2.2		2.500		17.271	
	Wall out side	1	3.14*2.8		2.500		21.980	
		Total Quantity					39.251 sqm	
		Total Deducted Quantity					0.000 sqm	
		Net Total Quantity					39.251 sqm	
		Say 39.251 sqm @ Rs 703.77 / sqm					Rs 27623.68	
11	5.9.3 Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform							
	Cover Slab	1	3.14/4	2.8*2.8			6.155	
		Total Quantity					6.155 sqm	
		Total Deducted Quantity					0.000 sqm	
		Net Total Quantity					6.155 sqm	
		Say 6.155 sqm @ Rs 800.50 / sqm					Rs 4927.08	
12	13.7.1 12 mm cement plaster finished with a floating coat of neat cement of mix:1:3 (1 cement : 3 fine sand)							
	PCC	1	3.14*3.6		0.200		2.261	
	Base slab	1	3.14*3.4		0.300		3.203	
	Wall inside	1	3.14*2.2		2.500		17.271	
	Wall out side	1	3.14*2.8		2.500		21.980	

	Cover Slab	2	3.14/4	2.8*2.8			12.309	
	Base slab	1	3.14/4	2.2*2.2			3.800	
	Total Quantity						60.824 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						60.824 sqm	
	Say 60.824 sqm @ Rs 393.69 / sqm						Rs 23945.80	
13	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							
	Side wall out side	1	3.14*2.8		2.500		21.980	
	Total Quantity						21.980 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						21.980 sqm	
	Say 21.980 sqm @ Rs 218.73 / sqm						Rs 4807.69	
14	13.65.1 Painting with black anti- corrosive bitumastic paint of approved brand and manufacture to give an even shade:Two or more coats on new work							
	Wall inside	1	3.14*2.2		2.500		17.271	
	Cover Slab inside	1	3.14/4	2.8*2.8			6.155	
	Base slab	1	3.14/4	2.2*2.2			3.800	
	Total Quantity						27.226 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						27.226 sqm	
	Say 27.226 sqm @ Rs 122.47 / sqm						Rs 3334.37	
15	22.23.1 Providing and applying integral crystalline slurry of hydrophilic in nature for waterproofing treatment to the RCC structures like retaining walls of the basement, water tanks, roof slabs, podiums, reservoir, sewage & water treatment plant, tunnels/ subway and bridge deck etc., prepared by mixing in the ratio of 5 : 2 (5 parts integral crystalline slurry : 2 parts water) for vertical surfaces and 3 : 1 (3 parts integral crystalline slurry : 1 part water) for horizontal surfaces and applying the same from negative (internal) side with the help of synthetic fiber brush. The material shall meet the requirements as specified in ACI-212-3R-2010 i.e by reducing permeability of concrete by more than 90% compared with control concrete as per DIN 1048 and resistant to 16 bar hydrostatic pressure on negative side. The crystalline slurry shall be capable of self-healing of cracks up to a width of 0.50mm. The work shall be carried out all complete as per specification and the direction of the engineer in-charge. The product performance shall carry guarantee for 10 years against any leakage. For vertical surface two coats @ 0.70 kg per sqm							

	Wall inside&out side	2	3.14*2.5		2.500		39.250	
	Total Quantity						39.250 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						39.250 sqm	
	Say 39.250 sqm @ Rs 559.61 / sqm						Rs 21964.69	
16	<p>22.23.2</p> <p>Providing and applying integral crystalline slurry of hydrophilic in nature for waterproofing treatment to the RCC structures like retaining walls of the basement, water tanks, roof slabs, podiums, reservoir, sewage & water treatment plant, tunnels/ subway and bridge deck etc., prepared by mixing in the ratio of 5 : 2 (5 parts integral crystalline slurry : 2 parts water) for vertical surfaces and 3 : 1 (3 parts integral crystalline slurry : 1 part water) for horizontal surfaces and applying the same from negative (internal) side with the help of synthetic fiber brush. The material shall meet the requirements as specified in ACI-212-3R-2010 i.e by reducing permeability of concrete by more than 90% compared with control concrete as per DIN 1048 and resistant to 16 bar hydrostatic pressure on negative side. The crystalline slurry shall be capable of self-healing of cracks up to a width of 0.50mm. The work shall be carried out all complete as per specification and the direction of the engineer in-charge. The product performance shall carry guarantee for 10 years against any leakage. For horizontal surface one coat @ 1.10 kg per sqm.</p>							
	Cover Slab inside	1	3.14/4	2.8*2.8			6.155	
	Base slab	1	3.14/4	2.2*2.2			3.800	
	Total Quantity						9.955 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						9.955 sqm	
	Say 9.955 sqm @ Rs 431.28 / sqm						Rs 4293.39	
17	<p>100.36.1</p> <p>Filling water with 5000 litre tankers fitted in lorry and conveying water from a distance of 5 km (average) to the reservoir site and pumping the water into the reservoir of height not less than 3 m using 5 HP diesel engine pump set, hire for tanker lorry, tools and other appliances and cost of water etc. complete. "(Ref. No. 000, Technical Circular)"</p>							
		1	3.14/4	2.2*2.2	2.500		9.499	
	Total Quantity						9.499 Kilo litre	
	Total Deducted Quantity						0.000 Kilo litre	
	Net Total Quantity						9.499 Kilo litre	
	Say 9.499 Kilo litre @ Rs 182.79 / Kilo litre						Rs 1736.32	
SI No	Description	No	L	B	D	CF	Quantity	Remark
13 Administrative/Laboratory/Chemical House / Control Room Building (Cost Index:33.05 %)								

1	2.8.1 Earth work in excavation by mechanical means (Hydraulic excavator) /manual means in foundation trenches or drains (not exceeding 1.5 m in width or 10 sqm on plan), including dressing of sides and ramming of bottoms, lift up to 1.5 m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50 m.All kinds of soil								
	FOR FOOTING	16	1.500	1.500	1.500		54.000		
	FOR STEP	1	2.000	2.000	0.200		0.800		
	FOR RAMP	1	3.000	1.500	0.150		0.675		
	Total Quantity						55.475 cum		
	Total Deducted Quantity						0.000 cum		
	Net Total Quantity						55.475 cum		
	Say 55.475 cum @ Rs 291.38 / cum						Rs 16164.31		
2	4.1.3 Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:2:4 (cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size)								
	FOR RAMP	1	3.000	1.500	0.150		0.675		
	Total Quantity						0.675 cum		
	Total Deducted Quantity						0.000 cum		
	Net Total Quantity						0.675 cum		
	Say 0.675 cum @ Rs 7841.17 / cum						Rs 5292.79		
3	4.1.8 Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)								
	FOR FOOTING	16	1.500	1.500	0.100		3.600		
	FOR STEP	1	2.000	2.000	0.100		0.400		
	FOR RAMP	1	3.000	1.500	0.150		0.675		
	Total Quantity						4.675 cum		
	Total Deducted Quantity						0.000 cum		
	Net Total Quantity						4.675 cum		
	Say 4.675 cum @ Rs 6687.23 / cum						Rs 31262.80		
4	50.2.25.1 Filling with contractor's own earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift up to 1.5 m as per direction of site Engineer-in-charge								
	Office Room	1	7.000	5.000	0.500		17.500		

	stair	1	7.000	3.000	0.500		10.500		
	chemical room	1	6.000	4.000	0.500		12.000		
	visitors room	1	4.000	4.000	0.500		8.000		
	Ramp	1*0.50	2.000	1.500	0.600		0.900		
	Total Quantity						48.900 cum		
	Total Deducted Quantity						0.000 cum		
	Net Total Quantity						48.900 cum		
	Say 48.900 cum @ Rs 515.97 / cum							Rs 25230.93	
5	<p>5.37.1 Providing and laying in position ready mixed M-25 grade concrete for reinforced cement concrete work, using cement content as per approved design mix, manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for reinforced cement concrete work including pumping of R.M.C. from transit mixer to site of laying, excluding the cost of centering, shuttering finishing and reinforcement including cost of 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 the Engineer - in -charge. Note:- Cement content considered in this item is @330 kg/cum. Excess /less cement used as per design mix is payable/recoverable separately.All work upto plinth level</p>								
	FOR FIRST FOOTING	16	1.400	1.400	0.250		7.840		
	FOR SECOND FOOTING	16	0.167	3.920	0.350		3.666		
	COLUMN UP TO PLINTH BEAM	16	0.400	0.200	0.800		1.025		
	PLINTH BEAMS	3	11.100	0.200	0.450		2.998		
	„	4	10.400	0.200	0.450		3.744		
	„	1	3.200	0.200	0.450		0.289		
	FLOOR SLAB	1	11.300	10.600	0.100		11.979		
	Total Quantity						31.541 cum		
	Total Deducted Quantity						0.000 cum		
	Net Total Quantity						31.541 cum		
	Say 31.541 cum @ Rs 9700.81 / cum							Rs 305973.25	
6	<p>5.37.2 Providing and laying in position ready mixed M-25 grade concrete for reinforced cement concrete work, using cement content as per approved design mix, manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for reinforced cement concrete work including pumping of R.M.C. from transit mixer to site of laying, excluding the cost of centering, shuttering finishing and reinforcement</p>								

including cost of 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 the Engineer - in -charge. Note:- Cement content considered in this item is @330 kg/cum. Excess /less cement used as per design mix is payable/recoverable separately.All work above plinth level upto floor V level							
Column Above Plinth	16	0.400	0.200	3.250		4.161	
SUN SHADE DOOR	2	2.000	1.200	0.080		0.384	
SUN SHADE W3	7	1.900	0.600	0.080		0.639	
SUN SHADE RS	1	3.400	1.200	0.080		0.327	
SUN SHADE V	1	1.000	0.600	0.080		0.048	
LINTELS	3	11.100	0.200	0.150		1.000	
„	3	10.400	0.200	0.150		0.936	
„	1	3.200	0.200	0.150		0.097	
BEAMS	6	3.100	0.200	0.450		1.675	
„	2	4.000	0.200	0.450		0.721	
„	2	3.200	0.200	0.450		0.577	
„	2	4.200	0.200	0.450		0.757	
„	4	5.500	0.200	0.450		1.981	
„	4	1.700	0.200	0.450		0.613	
„	4	4.200	0.200	0.450		1.513	
STAIR CASE WAIST SLAB	2	3.700	1.500	0.125		1.388	
LANDING	1	3.000	1.500	0.125		0.563	
STEPS	22*.50	1.500	0.300	0.150		0.743	
ROOF SLAB	1	11.300	10.600	0.125		14.973	
First Floor - COLUMN UP TO ROOF SLAB	16	0.400	0.200	3.250		4.161	
LINTELS	2	11.100	0.200	0.150		0.666	
„	4	10.400	0.200	0.150		1.248	
„	1	1.700	0.200	0.150		0.052	
SUN SHADE	8	2.000	0.600	0.080		0.768	
„	1	1.000	0.600	0.080		0.048	
Beams	6	3.100	0.200	0.450		1.675	
„	2	4.000	0.200	0.450		0.721	
„	2	3.200	0.200	0.450		0.577	

	„	2	4.200	0.200	0.450		0.757	
	„	4	5.500	0.200	0.450		1.981	
	„	4	1.700	0.200	0.450		0.613	
	„	4	4.200	0.200	0.450		1.513	
	Roof slab	1	11.900	11.200	0.125		16.660	
	Column	16	0.200	0.400	0.600		-0.768	
	OPENING	1	1.500	0.200	0.150		-0.045	
						Total Quantity	64.536 cum	
						Total Deducted Quantity	-0.813 cum	
						Net Total Quantity	63.723 cum	
						Say 63.723 cum @ Rs 11321.96 / cum	Rs 721469.26	
7	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							
	@ 100 Kg/ Cum of CC - Footing	1	31.541			100.0	3154.100	
	@ 100 Kg/ Cum of CC	1	63.723			100.0	6372.300	
						Total Quantity	9526.400 kilogram	
						Total Deducted Quantity	0.000 kilogram	
						Net Total Quantity	9526.400 kilogram	
						Say 9526.400 kilogram @ Rs 96.46 / kilogram	Rs 918916.54	
8	14.12 Providing and fixing 16 mm M.S. Fan clamps of standard shape and size in existing R.C.C. slab, including cutting chase, anchoring clamp to reinforcement bar, including cleaning, refilling, making good the chase with matching concrete, plastering and painting the exposed portion of the clamps complete.							
	Fixing on ceiling	6					6.000	
						Total Quantity	6.000 No	
						Total Deducted Quantity	0.000 No	
						Net Total Quantity	6.000 No	
						Say 6.000 No @ Rs 491.02 / No	Rs 2946.12	
9	5.9.1 Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete							
	FOR FIRST FOOTING	16*4	1.400		0.250		22.400	
						Total Quantity	22.400 sqm	

	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						22.400 sqm	
	Say 22.400 sqm @ Rs 329.03 / sqm						Rs 7370.27	
10	5.9.3 Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform							
	GF Slab	1	11.300	10.600			119.780	
	Slab Edge	1	43.800		0.125		5.475	
	FF slab	1	11.900	11.200			133.280	
	Slab Edge	1	46.200		0.125		5.775	
	Total Quantity						264.310 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						264.310 sqm	
	Say 264.310 sqm @ Rs 800.50 / sqm						Rs 211580.16	
11	5.9.5 Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers							
	SUN SHADE DOOR	2	2.000	1.200			4.800	
	SUN SHADE W3	7	1.900	0.600			7.980	
	SUN SHADE RS	1	3.400	1.200			4.080	
	SUN SHADE V	1	1.000	0.600			0.600	
	Shade side	24	0.600		0.100		1.440	
	LINTELS	3*2	11.100		0.150		9.990	
	„	3*2	10.400		0.150		9.360	
	„	1*2	3.200		0.150		0.960	
	Op. Bottom	1	0.600	0.200			0.120	
		7	1.500	0.200			2.101	
		1	3.000	0.200			0.601	
	BEAMS	6	3.100		1.100		20.461	
	„	2	4.000		1.100		8.800	
	„	2	3.200		1.100		7.041	
	„	2	4.200		1.100		9.241	
	„	4	5.500		1.100		24.201	
	„	4	1.700		1.100		7.480	

	„	4	4.200		1.100		18.481	
	STAIR CASE WAIST SLAB	2	3.700	1.500			11.101	
	Side	2	3.700		0.125		0.925	
	LANDING	1	3.000	1.500			4.500	
	Side	1	6.000		0.150		0.900	
	STEPS	22	1.500		0.150		4.950	
	Side	44*0.50	0.300	0.150			0.990	
	LINTELS	2*2	11.100		0.150		6.660	
	„	4*2	10.400		0.150		12.480	
	„	1*2	1.700		0.150		0.510	
	SUN SHADE	8	2.000	0.600			9.600	
	„	1	1.000	0.600			0.600	
	Edge	8*2	1.500		0.100		2.401	
		1*2	0.600		0.100		0.120	
	Beams	6	3.100		1.100		20.461	
	„	2	4.000		1.100		8.800	
	„	2	3.200		1.100		7.041	
	„	2	4.200		1.100		9.241	
	„	4	5.500		1.100		24.201	
	„	4	1.700		1.100		7.480	
	„	4	4.200		1.100		18.481	
	PLINTH BEAMS	3*2	11.100		0.450		29.970	
	„	4*2	10.400		0.450		37.441	
	„	1*2	3.200		0.450		2.881	
						Total Quantity	359.471 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	359.471 sqm	
						Say 359.471 sqm @ Rs 637.64 / sqm	Rs 229213.09	
12	5.9.6 Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts							
	COLUMN UP TO PLINTH BEAM	16	1.200		0.800		15.360	

	GF Column	16	1.200		3.250		62.400		
	FF Columns	16	1.200	3.250			62.400		
	Total Quantity						140.160 sqm		
	Total Deducted Quantity						0.000 sqm		
	Net Total Quantity						140.160 sqm		
	Say 140.160 sqm @ Rs 847.46 / sqm							Rs 118779.99	
13	50.6.7.2 Laterate masonry with neatly dressed laterate stone of size 40x20x15cm or nearest size in cement mortar 1:6 for super structure above plinth level up to floor two level including all cost of materials, labour charges etc.								
	GF Walls	3	11.100	0.200	3.200		21.313		
	„	3	10.400	0.200	3.200		19.969		
	„	1	3.200	0.200	3.200		2.049		
	FF - Walls	2	11.100	0.200	3.200		14.209		
	„	4	10.400	0.200	3.200		26.625		
	„	1	7.000	0.200	3.200		4.480		
	Parapet	1	45.400	0.200	0.600		5.448		
	Doors	1	1.200	0.200	2.100		-0.504		
	„	4	1.000	0.200	2.100		-1.680		
	„	2	0.800	0.200	2.100		-0.672		
	W	15	1.500	0.200	1.500		-6.750		
	V	2	0.600	0.200	0.500		-0.120		
	Rolling Shutter	1	2.000	0.200	2.400		-0.960		
	Column	2*16	0.200	0.400	3.200		-8.192		
	Total Quantity						94.093 cum		
	Total Deducted Quantity						-18.878 cum		
	Net Total Quantity						75.215 cum		
	Say 75.215 cum @ Rs 7872.98 / cum							Rs 592166.19	
14	13.1.1 12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)								
	Building Outside-Long Wall	2	11.300		3.900		88.140		
	Short Wall	2	10.600		3.900		82.680		
	Building inside-Long Wall	4	10.900		3.300		143.880		

	Short Wall	4	10.000		3.300		132.000	
	Toilet out side	2	1.600		3.300		10.560	
	Toilet in side	2	1.500		3.300		9.900	
	Sun shade	7	2.100		0.700		10.290	
	„	2	2.200		1.300		5.721	
	„	1	1.200		0.700		0.840	
	Step top	1	1.500		1.500		2.250	
	„ Side	2	0.900		0.300		0.540	
	Ramp	2*0.50	0.300		1.500		0.450	
	FF - Outside wall	2	11.300		3.300		74.580	
	„	2	10.600		3.300		69.960	
	FF - inside	2	10.700		3.300		70.620	
	„	4	10.000		3.300		132.000	
	„	1	5.700		3.300		18.810	
	„	1	7.000		3.300		23.100	
	Toilet inside	2	1.500		3.300		9.900	
	Parapet wall	1	45.400		1.400		63.560	
	Door	1	1.200		2.100		-2.520	
	„	4	1.000		2.100		-8.400	
	„	8	0.800		2.100		-13.440	
	Window	15	1.500		1.500		-33.750	
	ventilator	2	0.600		0.500		-0.600	
	Rs	1*2	2.000		2.400		-9.600	
						Total Quantity	949.781 sqm	
						Total Deducted Quantity	-68.310 sqm	
						Net Total Quantity	881.471 sqm	
						Say 881.471 sqm @ Rs 308.21 / sqm	Rs 271678.18	
15	13.16.1 6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)							
	GF- slab-Bottom	1	10.700		10.000		107.000	
	Beam Bottom	1	82.800		0.850		70.380	
	Sun shad Door	2	2.000		1.200		4.800	
	„ W	7	1.900		0.600		7.980	

	„ V	1	0.900		0.600		0.540	
	Sun shad edge	1	30.200		0.100		3.020	
	Stair Waist Slab	2	3.700		1.700		12.580	
	Landing	1	3.000		1.500		4.500	
	FF - Roof slab-Bottom	1	10.700		10.000		107.000	
	Beam Bottom	1	82.800		0.850		70.380	
	Shade , W	8	1.900		0.600		9.120	
	„ V	1	0.900		0.600		0.540	
	Roof Slab Edge	1	33.700		0.300		10.111	
	Shade Edge	1	30.200		0.100		3.020	
						Total Quantity	410.971 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	410.971 sqm	
						Say 410.971 sqm @ Rs 262.57 / sqm	Rs 107908.66	
16	13.7.1 12 mm cement plaster finished with a floating coat of neat cement of mix:1:3 (1 cement : 3 fine sand)							
	Roof top	1	11.900	11.200			133.280	
						Total Quantity	133.280 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	133.280 sqm	
						Say 133.280 sqm @ Rs 393.69 / sqm	Rs 52471.00	
17	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.							
	Office room	1	7.000	7.000			49.000	
	Skirting-office room	1	26.500	0.100			2.651	
	Vistors room	1	4.000	4.000			16.000	
	Skirting-	1	14.200	0.100			1.420	
	Chemical Room	1	6.000	4.000			24.000	
	Skirting-	1	20.000	0.100			2.000	
	Stair Case Room	1	3.000	7.000			21.000	
	Step	22	1.500	0.450			14.851	

	Landing	1	3.000	1.500			4.500		
	Controll Room	1	7.000	5.000			35.000		
	Laboratory Room	1	10.200	4.000			40.800		
	Passage	1	7.000	1.500			10.500		
	Total Quantity						221.722 sqm		
	Total Deducted Quantity						0.000 sqm		
	Net Total Quantity						221.722 sqm		
	Say 221.722 sqm @ Rs 1733.18 / sqm						Rs 384284.14		
18	11.37 Providing and laying Ceramic glazed floor tiles of size 300x300 mm (thickness to be specified by the manufacturer), of 1st quality conforming to IS : 15622, of approved make, in colours such as White, Ivory, Grey, Fume Red Brown, laid on 20 mm thick cement mortar 1:4 (1 Cement : 4 Coarse sand), including pointing the joints with white cement and matching pigment etc., complete.								
	Passage	1	1.500	1.500			2.250		
	„	1	3.000	1.500			4.500		
	Total Quantity						6.750 sqm		
	Total Deducted Quantity						0.000 sqm		
	Net Total Quantity						6.750 sqm		
	Say 6.750 sqm @ Rs 1070.59 / sqm						Rs 7226.48		
19	11.38 Providing and laying Ceramic glazed floor tiles of size 300x300 mm (thickness to be specified by the manufacturer), of 1st quality conforming to IS : 15622, of approved make, in all colours, shades, except White, Ivory, Grey, Fume Red Brown, laid on 20 mm thick bed of cement mortar 1:4 (1 cement : 4 Coarse sand), including pointing the joints with white cement and matching pigments etc., complete.								
	Wall Tile	1	6.000	2.100			12.601		
	„	1	9.000	2.100			18.901		
	Door	2	0.800	2.100			-3.360		
	Total Quantity						31.502 sqm		
	Total Deducted Quantity						-3.360 sqm		
	Net Total Quantity						28.142 sqm		
	Say 28.142 sqm @ Rs 1151.22 / sqm						Rs 32397.63		
20	10.6.1 Supplying and fixing rolling shutters of approved make, made of required size M.S. laths, interlocked together through their entire length and jointed together at the end by end locks, mounted on specially designed pipe shaft with brackets, side guides and arrangements for inside and outside locking with push and pull operation complete, including the cost of providing and fixing necessary 27.5 cm long wire springs manufactured from high tensile steel wire of adequate strength conforming to IS: 4454 - part 1								

	and M.S. top cover of required thickness for rolling shutters.80x1.25 mm M.S. laths with 1.25 mm thick top cover						
	RS	1	2.000	2.400			4.800
	Total Quantity						4.800 sqm
	Total Deducted Quantity						0.000 sqm
	Net Total Quantity						4.800 sqm
	Say 4.800 sqm @ Rs 3400.56 / sqm						Rs 16322.69
21	10.7 Providing and fixing ball bearing for rolling shutters.						
	For Rs	1					1.000
	Total Quantity						1.000 Nos
	Total Deducted Quantity						0.000 Nos
	Net Total Quantity						1.000 Nos
	Say 1.000 Nos @ Rs 484.97 / Nos						Rs 484.97
22	10.3 Providing and fixing in position collapsible steel shutters with vertical channels 20x10x2 mm and braced with flat iron diagonals 20x5 mm size, with top and bottom rail of T-iron 40x40x6 mm, with 40 mm dia steel pulleys, complete with bolts, nuts,locking arrangement, stoppers, handles, including applying a priming coat of approved steel primer .						
		1	1.500	2.100			3.151
	Total Quantity						3.151 sqm
	Total Deducted Quantity						0.000 sqm
	Net Total Quantity						3.151 sqm
	Say 3.151 sqm @ Rs 10014.74 / sqm						Rs 31556.45
23	13.43.1 Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer						
	Building Outside-Long Wall	2	11.300		3.900		88.140
	Short Wall	2	10.600		3.900		82.680
	Building inside-Long Wall	4	10.900		3.300		143.880
	Short Wall	4	10.000		3.300		132.000
	Toilet out side	2	1.600		3.300		10.560
	Toilet in side	2	1.500		3.300		9.900
	Sun shade	7	2.100		0.700		10.290

„	2	2.200		1.300		5.721	
„	1	1.200		0.700		0.840	
Step top	1	1.500		1.500		2.250	
„ Side	2	0.900		0.300		0.540	
Ramp	2*0.50	0.300		1.500		0.450	
FF - Outside wall	2	11.300		3.300		74.580	
„	2	10.600		3.300		69.960	
FF - inside	2	10.700		3.300		70.620	
„	4	10.000		3.300		132.000	
„	1	5.700		3.300		18.810	
„	1	7.000		3.300		23.100	
Toilet inside	2	1.500		3.300		9.900	
Parapet wall	1	45.400		1.400		63.560	
Door	1	1.200		2.100		-2.520	
„	4	1.000		2.100		-8.400	
„	8	0.800		2.100		-13.440	
Window	15	1.500		1.500		-33.750	
ventilator	2	0.600		0.500		-0.600	
Rs	1*2	2.000		2.400		-9.600	
GF- slab-Bottom	1	10.700		10.000		107.000	
Beam Bottom	1	82.800		0.850		70.380	
Sun shad Door	2	2.000		1.200		4.800	
„ W	7	1.900		0.600		7.980	
„ V	1	0.900		0.600		0.540	
Sun shad edge	1	30.200		0.100		3.020	
Stair Waist Slab	2	3.700		1.700		12.580	
Landing	1	3.000		1.500		4.500	
FF - Roof slab-Bottom	1	10.700		10.000		107.000	
Beam Bottom	1	82.800		0.850		70.380	
Shade , W	8	1.900		0.600		9.120	
„ V	1	0.900		0.600		0.540	
Roof Slab Edge	1	33.700		0.300		10.111	
Shade Edge	1	30.200		0.100		3.020	

						Total Quantity	1360.752 sqm	
						Total Deducted Quantity	-68.310 sqm	
						Net Total Quantity	1292.442 sqm	
						Say 1292.442 sqm @ Rs 69.32 / sqm	Rs 89592.08	
24	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						
	Building Outside-Long Wall	2	11.300		3.900		88.140	
	Short Wall	2	10.600		3.900		82.680	
	Building inside-Long Wall	4	10.900		3.300		143.880	
	Short Wall	4	10.000		3.300		132.000	
	Toilet out side	2	1.600		3.300		10.560	
	Toilet in side	2	1.500		3.300		9.900	
	Sun shade	7	2.100		0.700		10.290	
	„	2	2.200		1.300		5.721	
	„	1	1.200		0.700		0.840	
	Step top	1	1.500		1.500		2.250	
	„ Side	2	0.900		0.300		0.540	
	Ramp	2*0.50	0.300		1.500		0.450	
	FF - Outside wall	2	11.300		3.300		74.580	
	„	2	10.600		3.300		69.960	
	FF - inside	2	10.700		3.300		70.620	
	„	4	10.000		3.300		132.000	
	„	1	5.700		3.300		18.810	
	„	1	7.000		3.300		23.100	
	Toilet inside	2	1.500		3.300		9.900	
	Parapet wall	1	45.400		1.400		63.560	
	Door	1	1.200		2.100		-2.520	
	„	4	1.000		2.100		-8.400	
	„	8	0.800		2.100		-13.440	
	Window	15	1.500		1.500		-33.750	
	ventilator	2	0.600		0.500		-0.600	

	Rs	1*2	2.000		2.400		-9.600	
	GF- slab-Bottom	1	10.700		10.000		107.000	
	Beam Bottom	1	82.800		0.850		70.380	
	Sun shad Door	2	2.000		1.200		4.800	
	„ W	7	1.900		0.600		7.980	
	„ V	1	0.900		0.600		0.540	
	Sun shad edge	1	30.200		0.100		3.020	
	Stair Waist Slab	2	3.700		1.700		12.580	
	Landing	1	3.000		1.500		4.500	
	FF - Roof slab-Bottom	1	10.700		10.000		107.000	
	Beam Bottom	1	82.800		0.850		70.380	
	Shade , W	8	1.900		0.600		9.120	
	„ V	1	0.900		0.600		0.540	
	Roof Slab Edge	1	33.700		0.300		10.111	
	Shade Edge	1	30.200		0.100		3.020	
						Total Quantity	1360.752 sqm	
						Total Deducted Quantity	-68.310 sqm	
						Net Total Quantity	1292.442 sqm	
						Say 1292.442 sqm @ Rs 148.55 / sqm	Rs 191992.26	
25	13.61.1 Painting with synthetic enamel paint of approved brand and manufacture to give an even shade:Two or more coats on new work							
	Widow grill	15	1.500	1.500			33.750	
	Ventilator	2	0.600	0.500			0.600	
	Rolling shutter	1	2.000	2.400		2.5	12.000	
	CG	1	1.500	2.100			3.151	
						Total Quantity	49.501 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	49.501 sqm	
						Say 49.501 sqm @ Rs 140.37 / sqm	Rs 6948.46	
26	21.1.1.1 Providing and fixing aluminium work for doors, windows, ventilators and partitions with extruded built up standard tubular sections/ appropriate Z sections and other sections of approved make conforming to IS : 733 and IS: 1285, fixing with dash fasteners of required dia and size, including necessary filling up the gaps at junctions, i.e. at top, bottom and sides with required EPDM rubber/ neoprene gasket etc.							

	Aluminium sections shall be smooth, rust free, straight, mitred and jointed mechanically wherever required including cleat angle, Aluminium snap beading for glazing /paneling, C.P. brass/ stainless steel screws, all complete as per architectural drawings and the directions of Engineer-in-charge.(Glazing, paneling and dash fasteners to be paid for separately):For fixed portionAnodised aluminium (anodised transparent or dyed to required shade according to IS : 1868, Minimum anodic coating of grade AC 15)								
	For window frames	15	1.500	1.500		4.5	151.875		
	Ventilator	2	0.600	0.500		4.5	2.700		
	Doors	1	1.200	2.100		4.5	11.340		
	„	4	1.000	2.100			8.400		
	Total Quantity						174.315 kg		
	Total Deducted Quantity						0.000 kg		
	Net Total Quantity						174.315 kg		
	Say 174.315 kg @ Rs 489.69 / kg						Rs 85360.31		
27	21.1.2.1 For shutters of doors, windows & ventilators including providing and fixing hinges / pivots and making provision for fixing of fittings wherever required including the cost of EPDM rubber/ neoprene gasket required (Fittings shall be paid for separately)Anodised aluminium (anodised transparent or dyed to required shade according to IS : 1868, Minimum anodic coating of grade AC 15)								
	For window Shutter	15*3	0.470	1.440		3.0	91.368		
	Ventilator	2	0.570	0.470		3.0	1.608		
	Doors	1	1.060	1.960		4.5	9.350		
	„	4	0.860	1.960			6.743		
	Total Quantity						109.069 kg		
	Total Deducted Quantity						0.000 kg		
	Net Total Quantity						109.069 kg		
	Say 109.069 kg @ Rs 593.00 / kg						Rs 64677.92		
28	21.3.1 Providing and fixing glazing in aluminium door, window, ventilator shutters and partitions etc. with EPDM rubber / neoprene gasket etc. complete as per the architectural drawings and the directions of Engineer - in -Charge. (Cost of aluminium snap beading shall be paid in basic item):With float glass panes of 4.0 mm thickness								
	For window Shutter	15*3	0.460	1.430		3.0	88.804		
	Ventilator	2	0.560	0.460		3.0	1.546		
	Doors	1*2	0.980	0.900		4.5	7.938		
	„	4*2	0.780	0.900			5.617		
	Total Quantity						103.905 sqm		

		Total Deducted Quantity					0.000 sqm	
		Net Total Quantity					103.905 sqm	
		Say 103.905 sqm @ Rs 1154.61 / sqm					Rs 119969.75	
29	9.48.2	Providing and fixing M.S. Grills of required pattern in frames of windows etc. with M.S. flats, square or round bars etc. including priming coat with approved steel primer all complete. Fixed to openings/ wooden frames with rawl plugs screws etc						
	For window frames	15	1.500	1.500		20.0	675.000	
	Ventilator	2	0.600	0.500		20.0	12.000	
		Total Quantity					687.000 kg	
		Total Deducted Quantity					0.000 kg	
		Net Total Quantity					687.000 kg	
		Say 687.000 kg @ Rs 211.95 / kg					Rs 145609.65	
30	10.28	Providing and fixing stainless steel (Grade 304) railing made of Hollow tubes, channels, plates etc., including welding, grinding, buffing, polishing and making curvature (wherever required) and fitting the same with necessary stainless steel nuts and bolts complete, i/c fixing the railing with necessary accessories & stainless steel dash fasteners, stainless steel bolts etc., of required size on the top of the floor or the side of waist slab with suitable arrangement as per approval of Engineer-in-charge, (for payment purpose only weight of stainless steel members shall be considered excluding fixing accessories such as nuts, bolts, fasteners etc.)						
	Stair hand rail	1	22.000	0.800		14.0	246.401	
	Ramp Hand rail	2	3.000	0.800		14.0	67.201	
		Total Quantity					313.602 kg	
		Total Deducted Quantity					0.000 kg	
		Net Total Quantity					313.602 kg	
		Say 313.602 kg @ Rs 664.65 / kg					Rs 208435.57	
31	9.117.1	Providing and fixing factory made uPVC door frame made of uPVC extruded sections having an overall dimension as below (tolerance ± 1 mm), with wall thickness 2.0mm (± 0.2 mm), corners of the door frame to be jointed with galvanized brackets and stainless steel screws, joints mitred and plastic welded. The hinge side vertical of the frames reinforced by galvanized M.S. tube of size 19 x 19 mm and 1 mm (± 0.1 mm) wall thickness and 3 nos. stainless steel hinges fixed to the frame complete as per manufacturer's specification and direction of Engineer-in-charge Extruded section profile size 48x40 mm						
	Toilet door frame	2	5.000				10.000	
		Total Quantity					10.000 metre	
		Total Deducted Quantity					0.000 metre	
		Net Total Quantity					10.000 metre	

	Say 10.000 metre @ Rs 256.05 / metre						Rs 2560.50	
32	<p>9.118.3 Providing and fixing to existing door frames 25 mm thick PVC flush door shutters made out of a one piece Multi chamber extruded PVC section of the size of 762 mm x 25 mm or less as per requirement with and average wall thickness of 1 mm (± 0.3 mm). PVC foam end cap of size 23x10 mm area provided on both vertical edges to ensure the overall thickness of 25 mm. An M.S. tube having dimensions 19 mm x 19 mm and 1.0 mm (± 0.1 mm) is inserted along the hinge side of the door. Core of the door shutter should be filled with High Density Polyurethane foam. The Top & Bottom edges of the shutter are covered with an end -cap of the size 25 mm x 11 mm. Door shutter shall be reinforced with special polymeric reinforcements as per manufacturer,s specification and direction of Engineer-in-charge to take up necessary hardware and fixtures. Stickers indicating the locations of hardware will be pasted at appropriate places.</p>							
	Toilet door Shutter	2	0.750		2.000		3.000	
	Total Quantity						3.000 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						3.000 sqm	
	Say 3.000 sqm @ Rs 2982.65 / sqm						Rs 8947.95	
33	<p>17.2.1 Providing and fixing white vitreous china pedestal type water closet (European type W.C. pan) with seat and lid, 10 litre low level white P.V.C. flushing cistern, including flush pipe, with 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 required:W.C. pan with ISI marked white solid plastic seat and lid</p>							
	For Toilet	2					2.000	
	Total Quantity						2.000 No	
	Total Deducted Quantity						0.000 No	
	Net Total Quantity						2.000 No	
	Say 2.000 No @ Rs 6076.66 / No						Rs 12153.32	
34	<p>17.7.2 Providing and fixing wash basin with C.I. brackets, 15 mm C.P. brass pillar taps, 32 mm C.P. brass waste of standard pattern, including painting of fittings and brackets, cutting and making good the walls wherever require:White Vitreous China Wash basin size 630 x 450 mm with a single 15 mm C.P. brass pillar tap</p>							
	For toilet	2					2.000	
	Out side	1					1.000	
	Total Quantity						3.000 No	
	Total Deducted Quantity						0.000 No	
	Net Total Quantity						3.000 No	

								Say 3.000 No @ Rs 3177.83 / No	Rs 9533.49
35	18.9.2	Providing and fixing Chlorinated Polyvinyl Chloride (CPVC) pipes, having thermal stability for hot & cold water supply including all CPVC plain & brass threaded fittings. This includes jointing of pipes & fittings with one step CPVC solvent cement, trenching , refilling & testing of joints complete as per direction of Engineer- in-Charge. External work20 mm nominal outer dia pipes							
		1	45.000					45.000	
		Total Quantity							45.000 metre
		Total Deducted Quantity							0.000 metre
		Net Total Quantity							45.000 metre
		Say 45.000 metre @ Rs 293.04 / metre							Rs 13186.80
36	18.9.3	Providing and fixing Chlorinated Polyvinyl Chloride (CPVC) pipes, having thermal stability for hot & cold water supply including all CPVC plain & brass threaded fittings. This includes jointing of pipes & fittings with one step CPVC solvent cement, trenching , refilling & testing of joints complete as per direction of Engineer- in-Charge. External work25 mm nominal outer dia pipes							
		1	25.000					25.000	
		Total Quantity							25.000 metre
		Total Deducted Quantity							0.000 metre
		Net Total Quantity							25.000 metre
		Say 25.000 metre @ Rs 377.26 / metre							Rs 9431.50
37	18.9.4	Providing and fixing Chlorinated Polyvinyl Chloride (CPVC) pipes, having thermal stability for hot & cold water supply including all CPVC plain & brass threaded fittings. This includes jointing of pipes & fittings with one step CPVC solvent cement, trenching , refilling & testing of joints complete as per direction of Engineer- in-Charge. External work32 mm nominal outer dia pipes							
		1	50.000					50.000	
		Total Quantity							50.000 metre
		Total Deducted Quantity							0.000 metre
		Net Total Quantity							50.000 metre
		Say 50.000 metre @ Rs 477.85 / metre							Rs 23892.50
38	18.19.1.2	Providing and fixing gun metal non-return valve of approved quality (screwed end):25 mm nominal boreVertical							
		1						1.000	
		Total Quantity							1.000 No
		Total Deducted Quantity							0.000 No

		Net Total Quantity					1.000 No	
		Say 1.000 No @ Rs 582.69 / No					Rs 582.69	
39	18.49.1	Providing and fixing C.P brass bib cock of approved quality conforming to IS: 8931.15 mm nominal bore						
		2					2.000	
		Total Quantity					2.000 No	
		Total Deducted Quantity					0.000 No	
		Net Total Quantity					2.000 No	
		Say 2.000 No @ Rs 483.90 / No					Rs 967.80	
40	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						
		2					2.000	
		Total Quantity					2.000 No	
		Total Deducted Quantity					0.000 No	
		Net Total Quantity					2.000 No	
		Say 2.000 No @ Rs 195.18 / No					Rs 390.36	
41	17.31	Providing and fixing 600x450 mm beveled edge mirror of superior glass (of approved quality) complete with 6 mm thick hard board ground fixed to wooden cleats with C.P. brass screws and washers complete.						
		2					2.000	
		Total Quantity					2.000 No	
		Total Deducted Quantity					0.000 No	
		Net Total Quantity					2.000 No	
		Say 2.000 No @ Rs 1482.11 / No					Rs 2964.22	
42	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.						
	at roof	1	1000.000				1000.000	
		Total Quantity					1000.000 Litre	
		Total Deducted Quantity					0.000 Litre	
		Net Total Quantity					1000.000 Litre	
		Say 1000.000 Litre @ Rs 10.18 / Litre					Rs 10180.00	
SI No	Description	No	L	B	D	CF	Quantity	Remark

14Security Cabin (Cost Index:33.05 %)									
1	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								
	Foundation	2	3.150	0.600	0.700		2.646		
	„	2	1.950	0.600	0.700		1.638		
	Step	1	1.000	0.700	0.100		0.070		
	Total Quantity						4.354 cum		
	Total Deducted Quantity						0.000 cum		
	Net Total Quantity						4.354 cum		
	Say 4.354 cum @ Rs 291.38 / cum						Rs 1268.67		
2	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)								
	Foundation	2	3.150	0.600	0.100		0.378		
	„	2	1.950	0.600	0.100		0.234		
	Step	1	1.000	0.700	0.100		0.070		
	Floor	1	2.500	2.500	0.080		0.500		
	Total Quantity						1.182 cum		
	Total Deducted Quantity						0.000 cum		
	Net Total Quantity						1.182 cum		
	Say 1.182 cum @ Rs 6687.23 / cum						Rs 7904.31		
3	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)								
	Foundation	2	3.150	0.600	0.600		2.268		
	„	2	1.950	0.600	0.600		1.404		
	Step	1	3.000	0.450	0.450		0.608		
	Floor	1	2.100	0.450	0.450		0.426		
	Total Quantity						4.706 cum		
	Total Deducted Quantity						0.000 cum		
	Net Total Quantity						4.706 cum		

	Say 4.706 cum @ Rs 7069.81 / cum						Rs 33270.53	
4	50.6.7.2 Laterate masonry with neatly dressed laterate stone of size 40x20x15cm or nearest size in cement mortar 1:6 for super structure above plinth level up to floor two level including all cost of materials, labour charges etc.							
	Wall	4	2.700	0.200	2.850		6.157	
	Parapet	4	3.200	0.200	0.300		0.769	
	Step	1	1.000	0.600	0.200		0.120	
	„	1	1.000	0.300	0.200		0.060	
	Door	1	1.000	0.200	2.100		-0.420	
	Window	2	1.500	0.200	1.500		-0.900	
	Total Quantity						7.106 cum	
	Total Deducted Quantity						-1.320 cum	
	Net Total Quantity						5.786 cum	
	Say 5.786 cum @ Rs 7872.98 / cum						Rs 45553.06	
5	5.37.1 Providing and laying in position ready mixed M-25 grade concrete for reinforced cement concrete work, using cement content as per approved design mix, manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for reinforced cement concrete work including pumping of R.M.C. from transit mixer to site of laying, excluding the cost of centering, shuttering finishing and reinforcement including cost of 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 the Engineer - in -charge. Note:- Cement content considered in this item is @330 kg/cum. Excess /less cement used as per design mix is payable/recoverable separately.All work upto plinth level							
	Plinth Belt	4	2.750	0.250	0.150		0.413	
	Total Quantity						0.413 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						0.413 cum	
	Say 0.413 cum @ Rs 9700.81 / cum						Rs 4006.43	
6	5.37.2 Providing and laying in position ready mixed M-25 grade concrete for reinforced cement concrete work, using cement content as per approved design mix, manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for reinforced cement concrete work including pumping of R.M.C. from transit mixer to site of laying, excluding the cost of centering, shuttering finishing and reinforcement including cost of 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 the Engineer - in -charge. Note:- Cement content considered in this item is @330 kg/cum. Excess /less cement used as							

	per design mix is payable/recoverable separately.All work above plinth level upto floor V level							
	Lintel	4	2.700	0.200	0.150		0.324	
	Shade	1	2.900	0.600	0.100		0.175	
	„	2	1.900	0.600	0.100		0.228	
	Roof slab	1	3.500	3.500	0.120		1.470	
	Total Quantity						2.197 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						2.197 cum	
	Say 2.197 cum @ Rs 11321.96 / cum						Rs 24874.35	
7	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							
	@80 Kg/ 1Cum of CC	1	2.197+41 3			80.0	208.800	
	Total Quantity						208.800 kilogram	
	Total Deducted Quantity						0.000 kilogram	
	Net Total Quantity						208.800 kilogram	
	Say 208.800 kilogram @ Rs 96.46 / kilogram						Rs 20140.85	
8	5.9.3 Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform							
	Lintel	4	2.500		0.150		1.500	
	„	4	2.900		0.150		1.740	
	Bottom	1	1.000	0.200			0.200	
	Bottom	2	1.500	0.200			0.601	
	p-Beam	4	2.500		0.150		1.500	
	„	4	3.000		0.150		1.800	
	Shade	2	2.100	0.600			2.520	
	„	1	3.100	0.600			1.860	
	Side	6	0.600	0.100			0.360	
	Total Quantity						12.081 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						12.081 sqm	
	Say 12.081 sqm @ Rs 800.50 / sqm						Rs 9670.84	

9	5.9.5 Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers							
	Slab Bott.	1	2.500	2.500			6.250	
	Proj.	4	3.200	0.300			3.840	
	Edge	4	3.500	0.120			1.680	
	Total Quantity						11.770 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						11.770 sqm	
	Say 11.770 sqm @ Rs 637.64 / sqm						Rs 7505.02	
10	13.1.1 12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)							
	inside wall	4	2.500		3.000		30.000	
	out side	4	2.900		3.000		34.800	
	Basement	4	3.000		0.600		7.200	
	parapet	4	3.300		0.850		11.220	
	Door	1	1.000	2.100			-2.100	
	Window	2	1.500	1.500			-4.500	
	Kerala Water Authority Total Quantity						83.220 sqm	
	Total Deducted Quantity						-6.600 sqm	
	Net Total Quantity						76.620 sqm	
	Say 76.620 sqm @ Rs 308.21 / sqm						Rs 23615.05	
11	13.7.1 12 mm cement plaster finished with a floating coat of neat cement of mix:1:3 (1 cement : 3 fine sand)							
	Roof top	3.1	3.100				9.611	
	Total Quantity						9.611 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						9.611 sqm	
	Say 9.611 sqm @ Rs 393.69 / sqm						Rs 3783.75	
12	13.16.1 6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)							
	Slab bott.	1	2.500	2.500			6.250	
	,, proj.	4	3.200	0.300			3.840	
	Slab edge	4	3.500	0.120			1.680	

	Shade	2*2	1.900	0.600			4.560		
	„	2	3.000	0.600			3.600		
	Shade edge	6	0.600	0.100			0.360		
	Total Quantity						20.290 sqm		
	Total Deducted Quantity						0.000 sqm		
	Net Total Quantity						20.290 sqm		
	Say 20.290 sqm @ Rs 262.57 / sqm						Rs 5327.55		
13	<p>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.</p>								
	Floor	1	2.500	2.500			6.250		
	Skirting	1	10.000	0.100			1.000		
	Step	1	1.000	0.600			0.600		
	„ side	2	0.600	0.200			0.240		
	„	2	0.300	0.200			0.120		
	Rise	1	1.000	0.600			0.600		
	Total Quantity						8.810 sqm		
	Total Deducted Quantity						0.000 sqm		
	Net Total Quantity						8.810 sqm		
	Say 8.810 sqm @ Rs 1733.18 / sqm						Rs 15269.32		
14	<p>21.1.1.1 Providing and fixing aluminium work for doors, windows, ventilators and partitions with extruded built up standard tubular sections/ appropriate Z sections and other sections of approved make conforming to IS : 733 and IS: 1285, fixing with dash fasteners of required dia and size, including necessary filling up the gaps at junctions, i.e. at top, bottom and sides with required EPDM rubber/ neoprene gasket etc. Aluminium sections shall be smooth, rust free, straight, mitred and jointed mechanically wherever required including cleat angle, Aluminium snap beading for glazing /paneling, C.P. brass/ stainless steel screws, all complete as per architectural drawings and the directions of Engineer-in-charge.(Glazing, paneling and dash fasteners to be paid for separately):For fixed portion Anodised aluminium (anodised transparent or dyed to required shade according to IS : 1868, Minimum anodic coating of grade AC 15)</p>								
	Door	1	1.000	2.100		4.5	9.451		
	window	2	1.500	1.500		4.5	20.250		
	Total Quantity						29.701 kg		
	Total Deducted Quantity						0.000 kg		
	Net Total Quantity						29.701 kg		

	Say 29.701 kg @ Rs 489.69 / kg						Rs 14544.28	
15	21.3.1 Providing and fixing glazing in aluminium door, window, ventilator shutters and partitions etc. with EPDM rubber / neoprene gasket etc. complete as per the architectural drawings and the directions of Engineer - in -Charge. (Cost of aluminium snap beading shall be paid in basic item):With float glass panes of 4.0 mm thickness							
	Door	1*2	0.880	0.900			1.584	
	window	2*2	0.920	1.430			5.263	
	Total Quantity						6.847 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						6.847 sqm	
	Say 6.847 sqm @ Rs 1154.61 / sqm						Rs 7905.61	
16	9.48.2 Providing and fixing M.S. Grills of required pattern in frames of windows etc. with M.S. flats, square or round bars etc. including priming coat with approved steel primer all complete.Fixed to openings/ wooden frames with rawl plugs screws etc							
	Window grill	2	1.500	1.500		20.0	90.000	
	Total Quantity						90.000 kg	
	Total Deducted Quantity						0.000 kg	
	Net Total Quantity						90.000 kg	
	Say 90.000 kg @ Rs 211.95 / kg						Rs 19075.50	
17	13.43.1 Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer							
	inside wall	4	2.500		3.000		30.000	
	out side	4	2.900		3.000		34.800	
	Basement	4	3.000		0.600		7.200	
	parapet	4	3.300		0.850		11.220	
	Slab bott.	1	2.500	2.500			6.250	
	„ proj.	4	3.200	0.300			3.840	
	Slab edge	4	3.500	0.120			1.680	
	Shade	2*2	1.900	0.600			4.560	
	„	2	3.000	0.600			3.600	
	Shade edge	6	0.600	0.100			0.360	
	Total Quantity						103.510 sqm	

		Total Deducted Quantity					0.000 sqm	
		Net Total Quantity					103.510 sqm	
		Say 103.510 sqm @ Rs 69.32 / sqm					Rs 7175.31	
18	<p>13.82.2 Wall painting with acrylic emulsion paint, having VOC (Volatile Organic Compound) content less than 50 grams/ litre, of approved brand and manufacture including applying additional coats wherever required, to achieve even shade and colour.Two coats</p>							
	inside wall	4	2.500		3.000		30.000	
	out side	4	2.900		3.000		34.800	
	Basement	4	3.000		0.600		7.200	
	parapet	4	3.300		0.850		11.220	
	Slab bott.	1	2.500	2.500			6.250	
	„ proj.	4	3.200	0.300			3.840	
	Slab edge	4	3.500	0.120			1.680	
	Shade	2*2	1.900	0.600			4.560	
	„	2	3.000	0.600			3.600	
	Shade edge	6	0.600	0.100			0.360	
		Total Quantity					103.510 sqm	
		Total Deducted Quantity					0.000 sqm	
		Net Total Quantity					103.510 sqm	
		Say 103.510 sqm @ Rs 123.40 / sqm					Rs 12773.13	
19	<p>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 .</p>							
	Window grill	2	1.500	1.500			4.500	
		Total Quantity					4.500 sqm	
		Total Deducted Quantity					0.000 sqm	
		Net Total Quantity					4.500 sqm	
		Say 4.500 sqm @ Rs 204.63 / sqm					Rs 920.84	
20	<p>17.7.2 Providing and fixing wash basin with C.I. brackets, 15 mm C.P. brass pillar taps, 32 mm C.P. brass waste of standard pattern, including painting of fittings and brackets, cutting and making good the walls wherever require:White Vitreous China Wash basin size 630 x 450 mm with a single 15 mm C.P. brass pillar tap</p>							
	on out side wall	1					1.000	

SI No	Description	No	L	B	D	CF	Quantity	Remark	
		1					1.000		
		Total Quantity						1.000 No	
		Total Deducted Quantity						0.000 No	
		Net Total Quantity						1.000 No	
		Say 1.000 No @ Rs 1482.11 / No						Rs 1482.11	
15Air Blower Building (Cost Index:33.05 %)									
1	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								
	Column	12	1.900	1.900	1.500		64.981		
		4	1.600	1.600	1.500		15.361		
	Ramp	1	2.500	2.000	0.150		0.750		
		Total Quantity						81.092 cum	
		Total Deducted Quantity						0.000 cum	
		Net Total Quantity						81.092 cum	
		Say 81.092 cum @ Rs 291.38 / cum						Rs 23628.59	
2	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)								
	Footing	12	1.900	1.900	0.100		4.332		
	„	4	1.600	1.600	0.100		1.025		
	Ramp	1	2.500	2.000	0.150		0.750		
		Total Quantity						6.107 cum	
		Total Deducted Quantity						0.000 cum	
		Net Total Quantity						6.107 cum	
		Say 6.107 cum @ Rs 7229.54 / cum						Rs 44150.80	
3	5.9.1 Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete								
	Footing - at corner	4*4	1.400		0.150		3.360		
	„ at intermediate	8*4	1.700		0.150		8.160		
	„ inside	4*4	1.700		0.150		4.080		

6	5.9.6 Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts							
	Column Pedestal	16	1.400		0.500		11.200	
	column	16	1.400	5.200			116.480	
	Total Quantity						127.680 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						127.680 sqm	
	Say 127.680 sqm @ Rs 847.46 / sqm						Rs 108203.69	
7	5.37.1 Providing and laying in position ready mixed M-25 grade concrete for reinforced cement concrete work, using cement content as per approved design mix, manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for reinforced cement concrete work including pumping of R.M.C. from transit mixer to site of laying, excluding the cost of centering, shuttering finishing and reinforcement including cost of 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 the Engineer - in -charge. Note:- Cement content considered in this item is @330 kg/cum. Excess /less cement used as per design mix is payable/recoverable separately.All work upto plinth level							
	Column footing	4	1.400	1.400	0.150		1.176	
	,, Sloped Portion	4	1.400	1.400	0.75/3		1.960	
	Column footing	8	1.700	1.700	0.150		3.468	
	,, Sloped Portion	8	1.700	1.700	0.75/3		5.780	
	Column footing	4	1.700	1.700	0.150		1.734	
	,, Sloped Portion	4	1.700	1.700	0.75/3		2.890	
	Column Pedestal	16	0.500	0.200	0.500		0.800	
	Plinth beam	1	37.800	0.200	0.500		3.780	
	Grade slab	1	10.400	8.400	0.200		17.473	
	Total Quantity						39.061 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						39.061 cum	
	Say 39.061 cum @ Rs 9700.81 / cum						Rs 378923.34	
8	5.37.2 Providing and laying in position ready mixed M-25 grade concrete for reinforced cement concrete work, using cement content as per approved design mix, manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for reinforced cement concrete work including pumping of R.M.C. from transit mixer to site of laying, excluding the cost of centering, shuttering finishing and reinforcement							

	including cost of 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 the Engineer - in-charge. Note:- Cement content considered in this item is @330 kg/cum. Excess /less cement used as per design mix is payable/recoverable separately.All work above plinth level upto floor V level						
	Lintel	1	37.600	0.200	0.200		1.505
	Shade	1	3.670	0.750	0.100		0.276
	Shade	1	36.330	0.600	0.100		2.180
	Ramp	1	5.000	2.000	0.200		2.000
	Column	16	0.200	0.500	5.200		8.320
	Beam	4	8.200	0.200	0.500		3.280
	„	4	10.200	0.200	0.500		4.080
	Slab	1	11.000	9.000	0.120		11.880
	Total Quantity						33.521 cum
	Total Deducted Quantity						0.000 cum
	Net Total Quantity						33.521 cum
	Say 33.521 cum @ Rs 11321.96 / cum						Rs 379523.42
9	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						
	@ 100 Kg / 1 Cum of CC	1	39.061+33.52		100.0		7258.100
	Total Quantity						7258.100 kilogram
	Total Deducted Quantity						0.000 kilogram
	Net Total Quantity						7258.100 kilogram
	Say 7258.100 kilogram @ Rs 96.46 / kilogram						Rs 700116.33
10	50.2.26.1 Filling with contractor own earth (excluding rock) in open areas in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift up to 1.5 m as per direction of site Engineer-in-charge.						
	Basement Filling	1	10.000	8.000	0.500		40.000
	Total Quantity						40.000 cum
	Total Deducted Quantity						0.000 cum
	Net Total Quantity						40.000 cum
	Say 40.000 cum @ Rs 289.98 / cum						Rs 11599.20
11	50.6.7.2 Laterate masonry with neatly dressed laterate stone of size 40x20x15cm or nearest size in cement						

	mortar 1:6 for super structure above plinth level up to floor two level including all cost of materials, labour charges etc.								
	wall	6	2.670	0.200	4.500		14.418		
	„	6	2.330	0.200	4.500		12.582		
	Window	11	1.500	0.200	1.500		-4.950		
	Rs	1	2.000	0.200	2.400		-0.960		
	Total Quantity						27.000 cum		
	Total Deducted Quantity						-5.910 cum		
	Net Total Quantity						21.090 cum		
	Say 21.090 cum @ Rs 7872.98 / cum						Rs 166041.15		
12	13.1.1 12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)								
	Outside	2	10.400		5.200		108.161		
	„	2	8.400		5.200		87.361		
	Inside	1	36.000		5.200		187.201		
	Column	4	1.400		5.200		29.120		
	Opening side	1	6.800		0.230		1.564		
	Parapet	1	39.600		0.850		33.661		
	Shade Top	1	36.330		0.600		21.798		
	„	1	3.670		0.750		2.753		
	Window	11	1.500		1.500		-24.750		
	Rs	1*2	2.000		2.400		-9.600		
	Total Quantity						471.619 sqm		
	Total Deducted Quantity						-34.350 sqm		
	Net Total Quantity						437.269 sqm		
	Say 437.269 sqm @ Rs 308.21 / sqm						Rs 134770.68		
13	13.16.1 6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)								
	Ceiling	1	10.000	8.000			80.000		
	Beam side	2*2	10.000		0.500		20.000		
	„	2*2	8.000		0.500		16.000		
	Shade Bott.	1	36.330		0.600		21.798		
	„	1	3.670		0.750		2.753		
	Slab Proj.	2	8.400	0.300			5.040		

	„	2	11.000	0.300			6.600	
	Edge	1	40.000	0.120			4.800	
	Total Quantity						156.991 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						156.991 sqm	
	Say 156.991 sqm @ Rs 262.57 / sqm						Rs 41221.13	
14	13.43.1 Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer							
	Outside	2	10.400		5.200		108.161	
	„	2	8.400		5.200		87.361	
	Inside	1	36.000		5.200		187.201	
	Column	4	1.400		5.200		29.120	
	Opening side	1	6.800		0.230		1.564	
	Parapet	1	39.600		0.850		33.661	
	Shade Top	1	36.330		0.600		21.798	
	„	1	3.670		0.750		2.753	
	Window	11	1.500		1.500		-24.750	
	Rs	1*2	2.000		2.400		-9.600	
	Ceiling	1	10.000	8.000			80.000	
	Beam side	2*2	10.000		0.500		20.000	
	„	2*2	8.000		0.500		16.000	
	Shade Bott.	1	36.330		0.600		21.798	
	„	1	3.670		0.750		2.753	
	Slab Proj.	2	8.400	0.300			5.040	
	„	2	11.000	0.300			6.600	
	Edge	1	40.000	0.120			4.800	
	Total Quantity						628.610 sqm	
	Total Deducted Quantity						-34.350 sqm	
	Net Total Quantity						594.260 sqm	
	Say 594.260 sqm @ Rs 69.32 / sqm						Rs 41194.10	
15	13.82.2 Wall painting with acrylic emulsion paint, having VOC (Volatile Organic Compound) content less than 50 grams/ litre, of approved brand and manufacture including applying additional coats wherever required, to							

	achieve even shade and colour.Two coats							
	Outside	2	10.400		5.200		108.161	
	„	2	8.400		5.200		87.361	
	Inside	1	36.000		5.200		187.201	
	Column	4	1.400		5.200		29.120	
	Opening side	1	6.800		0.230		1.564	
	Parapet	1	39.600		0.850		33.661	
	Shade Top	1	36.330		0.600		21.798	
	„	1	3.670		0.750		2.753	
	Window	11	1.500		1.500		-24.750	
	Rs	1*2	2.000		2.400		-9.600	
	Ceiling	1	10.000	8.000			80.000	
	Beam side	2*2	10.000		0.500		20.000	
	„	2*2	8.000		0.500		16.000	
	Shade Bott.	1	36.330		0.600		21.798	
	„	1	3.670		0.750		2.753	
	Slab Proj.	2	8.400	0.300			5.040	
	„	2	11.000	0.300			6.600	
	Edge	1	40.000	0.120			4.800	
						Total Quantity	628.610 sqm	
						Total Deducted Quantity	-34.350 sqm	
						Net Total Quantity	594.260 sqm	
						Say 594.260 sqm @ Rs 123.40 / sqm	Rs 73331.68	
16	11.41.2 Providing and laying vitrified floor tiles in different sizes (thickness to be specified by the manufacturer) with water absorption less than 0.08% and conforming to IS : 15622, of approved make, in all colours and shades, laid on 20 mm thick cement mortar 1:4(1 cement : 4 coarse sand), including grouting the joints with white cement and matching pigments etc., complete.Size of Tile 600 x 600 mm.							
	Floor finishing	1	10.000	8.000			80.000	
	Skirting	1	36.000	0.100			3.600	
						Total Quantity	83.600 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	83.600 sqm	
						Say 83.600 sqm @ Rs 1733.18 / sqm	Rs 144893.85	

17	10.4 Providing and fixing 1 mm thick M.S. sheet sliding- shutters, with frame and diagonal braces of 40x40x6 mm angle iron, 3 mm M.S. gusset plates at the junction and corners, 25 mm dia pulley, 40x40x6 mm angle and T-iron guide at the top and bottom respectively, including applying a priming coat of approved steel primer.								
	Windows	11	1.500		1.500		24.750		
		Total Quantity					24.750 sqm		
		Total Deducted Quantity					0.000 sqm		
		Net Total Quantity					24.750 sqm		
		Say 24.750 sqm @ Rs 5765.99 / sqm					Rs 142708.25		
18	10.6.1 Supplying and fixing rolling shutters of approved make, made of required size M.S. laths, interlocked together through their entire length and jointed together at the end by end locks, mounted on specially designed pipe shaft with brackets, side guides and arrangements for inside and outside locking with push and pull operation complete, including the cost of providing and fixing necessary 27.5 cm long wire springs manufactured from high tensile steel wire of adequate strength conforming to IS: 4454 - part 1 and M.S. top cover of required thickness for rolling shutters.80x1.25 mm M.S. laths with 1.25 mm thick top cover								
	Front Op.	1	2.000		2.400		4.800		
		Total Quantity					4.800 sqm		
		Total Deducted Quantity					0.000 sqm		
		Net Total Quantity					4.800 sqm		
		Say 4.800 sqm @ Rs 3400.56 / sqm					Rs 16322.69		
19	13.61.1 Painting with synthetic enamel paint of approved brand and manufacture to give an even shade:Two or more coats on new work								
	Windows	11	1.500		1.500	2.0	49.500		
	Rs	1	2.000		2.400	2.5	12.000		
		Total Quantity					61.500 sqm		
		Total Deducted Quantity					0.000 sqm		
		Net Total Quantity					61.500 sqm		
		Say 61.500 sqm @ Rs 140.37 / sqm					Rs 8632.76		
SI No	Description	No	L	B	D	CF	Quantity	Remark	
16Chlorination Building (Cost Index:33.05 %)									

1	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							
	Column Footing	10	1.700	1.700	1.500		43.350	
	Ramp	1	3.000	3.000	0.150		1.350	
	Neutralization pit	1	3.100	3.100	1.800		17.298	
	Total Quantity						61.998 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						61.998 cum	
	Say 61.998 cum @ Rs 291.38 / cum						Rs 18064.98	
2	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)							
	Column Footing	10	1.700	1.700	0.100		2.890	
	Ramp	1	3.000	3.000	0.150		1.350	
	Neutralization pit	1	3.100	3.100	0.100		0.962	
	Flooring	1	10.000	8.000	0.100		8.000	
	Total Quantity						13.202 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						13.202 cum	
	Say 13.202 cum @ Rs 7229.54 / cum						Rs 95444.39	
3	5.9.1 Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete							
	Footing	10*4	1.500	1.500	0.200		18.000	
	Total Quantity						18.000 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						18.000 sqm	
	Say 18.000 sqm @ Rs 329.03 / sqm						Rs 5922.54	
4	5.9.3 Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform							
	Shade	1	36.330	0.600			21.798	

	„	1	3.670	0.750			2.753	
	Slab	1	11.000	9.000			99.000	
	Slab edge	1	40.000		0.120		4.800	
							Total Quantity	128.351 sqm
							Total Deducted Quantity	0.000 sqm
							Net Total Quantity	128.351 sqm
							Say 128.351 sqm @ Rs 800.50 / sqm	Rs 102744.98
5	5.9.5							
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers							
	Plinth beam- outer	1	37.600		0.450		16.920	
	„	1	36.000		0.450		16.200	
	Ramp	2*0.5	3.000		0.450		1.350	
	Lintel	6*2	3.000		0.150		5.400	
	„	4*2	3.450		0.150		4.140	
	Beam	6*2	3.000		0.300		10.800	
	„	4*2	3.450		0.300		8.280	
	„	2*2	8.000		0.600		19.200	
	„	6*2	3.000		0.300		10.800	
	Tunner support	2*2	1.500		0.450		2.700	
	„	2*2	5.000		0.450		9.000	
							Total Quantity	104.790 sqm
							Total Deducted Quantity	0.000 sqm
							Net Total Quantity	104.790 sqm
							Say 104.790 sqm @ Rs 637.64 / sqm	Rs 66818.30
6	5.9.6							
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts							
	Column Pedestal	10	1.400		0.700		9.800	
	Column above Plinth	10	1.400		5.000		70.000	
	Neutralization pit outer	4	2.900		1.700		19.720	
	„ inner	4	2.500		1.500		15.000	
							Total Quantity	114.520 sqm
							Total Deducted Quantity	0.000 sqm

	Net Total Quantity						114.520 sqm	
	Say 114.520 sqm @ Rs 847.46 / sqm						Rs 97051.12	
7	50.2.26.1 Filling with contractor own earth (excluding rock) in open areas in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift up to 1.5 m as per direction of site Engineer-in-charge.							
	Basement inside	1	10.000	8.000	0.400		32.000	
	Pit	1	2.900	2.900	0.400		-3.364	
	Total Quantity						32.000 cum	
	Total Deducted Quantity						-3.364 cum	
	Net Total Quantity						28.636 cum	
	Say 28.636 cum @ Rs 289.98 / cum						Rs 8303.87	
8	5.37.1 Providing and laying in position ready mixed M-25 grade concrete for reinforced cement concrete work, using cement content as per approved design mix, manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for reinforced cement concrete work including pumping of R.M.C. from transit mixer to site of laying, excluding the cost of centering, shuttering finishing and reinforcement including cost of 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 the Engineer - in -charge. Note:- Cement content considered in this item is @330 kg/cum. Excess /less cement used as per design mix is payable/recoverable separately.All work upto plinth level							
	Footing	10	1.500	1.500	0.200		4.500	
	,, Sloped portion	10/3	1.500	1.500	0.500		3.750	
	Column Pedestal	10	0.200	0.500	0.700		0.700	
	Plinth beam	2	10.400	0.200	0.450		1.872	
	,,	2	8.000	0.200	0.450		1.441	
	Ramp	1/2	3.000	2.000	0.450		1.350	
	Naturalization pit	1	2.900	2.900	0.200		1.683	
	,, wall	4	2.700	0.200	1.500		3.240	
	Total Quantity						18.536 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						18.536 cum	
	Say 18.536 cum @ Rs 9700.81 / cum						Rs 179814.21	
9	5.37.2 Providing and laying in position ready mixed M-25 grade concrete for reinforced cement concrete work, using cement content as per approved design mix, manufactured in fully automatic batching plant and							

	transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for reinforced cement concrete work including pumping of R.M.C. from transit mixer to site of laying, excluding the cost of centering, shuttering finishing and reinforcement including cost of 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 the Engineer - in-charge. Note:- Cement content considered in this item is @330 kg/cum. Excess /less cement used as per design mix is payable/recoverable separately.All work above plinth level upto floor V level								
	Column above plinth	10	0.200	0.500	4.900		4.900		
	Lintel	6	3.000	0.200	0.150		0.540		
	„	4	3.450	0.200	0.150		0.415		
	Shade	1	36.330	0.600	0.100		2.180		
	„	1	3.670	0.750	0.100		0.276		
	Beam	6	3.000	0.200	0.300		1.080		
	„	4	3.450	0.200	0.300		0.829		
	„	2	8.000	0.200	0.600		1.920		
	„	6	3.000	0.200	0.300		1.080		
	Slab	1	11.000	9.000	0.120		11.880		
	Tunner support	2	1.500	0.300	0.450		0.405		
	„	2	5.000	0.300	0.450		1.350		
	Kerala Water Authority						Total Quantity	26.855 cum	
	PRICE						Total Deducted Quantity	0.000 cum	
	Net Total Quantity						26.855 cum		
	Say 26.855 cum @ Rs 11321.96 / cum						Rs 304051.24		
10	5.22.6 Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth level Thermo - Mechanically Treated bars of grade Fe-500D or more								
	@100 Kg 1Cum of CC	1	26.855+18.536			100.0	4539.100		
	Total Quantity						4539.100 kilogram		
	Total Deducted Quantity						0.000 kilogram		
	Net Total Quantity						4539.100 kilogram		
	Say 4539.100 kilogram @ Rs 96.46 / kilogram						Rs 437841.59		
11	50.6.7.2 Laterate masonry with neatly dressed laterate stone of size 40x20x15cm or nearest size in cement mortar 1:6 for super structure above plinth level up to floor two level including all cost of materials, labour charges etc.								

	wall	6	3.000	0.200	4.500		16.201		
	„	4	3.450	0.200	4.500		12.421		
	Ramp side	2*1/2	3.000	0.200	0.450		0.271		
	Parapet	1	39.200	0.200	0.300		2.353		
	Window	3	1.500	0.200	1.500		-1.350		
	Opening	4	2.000	0.200	2.100		-3.360		
	Door	1	1.000	0.200	2.400		-0.480		
	Rs	1	3.000	0.200	3.000		-1.800		
	Total Quantity							31.246 cum	
	Total Deducted Quantity							-6.990 cum	
	Net Total Quantity							24.256 cum	
	Say 24.256 cum @ Rs 7872.98 / cum							Rs 190967.00	
12	13.1.1 12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)								
	Outer wall	1	37.600		5.000		188.000		
	inner wall	1	36.000		5.000		180.000		
	pit inside	1	2.500	2.500			6.250		
	„	4	2.500	1.500			15.000		
	Tunnr Stand	2	1.500	1.200			3.600		
	„	2	5.000	1.200			12.000		
	side	2*4	0.300	0.450			1.080		
	Parapet	1	39.200	0.850			33.320		
	Shade top	1	36.330	0.600			21.798		
	„	1	3.670	0.750			2.753		
	Edge	8	0.600	0.100			0.480		
	Window	3	1.500		1.500		-6.750		
	Door	1	1.000		2.400		-2.400		
	Rs	1*2	3.000		3.000		-18.000		
	Op	4*2	2.000		2.100		-33.600		
	Total Quantity							464.281 sqm	
	Total Deducted Quantity							-60.750 sqm	
	Net Total Quantity							403.531 sqm	
	Say 403.531 sqm @ Rs 308.21 / sqm							Rs 124372.29	

13	13.16.1 6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)								
	Shade	1	36.330	0.600			21.798		
	„	1	3.670	0.750			2.753		
	Ceiling	1	10.000	8.000			80.000		
	Beam	2*2	8.000	0.600			19.200		
	„	2*2	10.000	0.300			12.000		
	Slab Proj.	1	38.800	0.300			11.640		
	Slab Edge	1	40.000	0.120			4.800		
	Total Quantity						152.191 sqm		
	Total Deducted Quantity						0.000 sqm		
	Net Total Quantity						152.191 sqm		
	Say 152.191 sqm @ Rs 262.57 / sqm						Rs 39960.79		
14	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.								
	Flor finishing	1	10.000	8.000			80.000		
	Skirting	1	36.000	0.100			3.600		
	Total Quantity						83.600 sqm		
	Total Deducted Quantity						0.000 sqm		
	Net Total Quantity						83.600 sqm		
	Say 83.600 sqm @ Rs 1733.18 / sqm						Rs 144893.85		
15	13.43.1 Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer								
	Outer wall	1	37.600		5.000		188.000		
	inner wall	1	36.000		5.000		180.000		
	pit inside	1	2.500	2.500			6.250		
	„	4	2.500	1.500			15.000		
	Tunnr Stand	2	1.500	1.200			3.600		
	„	2	5.000	1.200			12.000		
	side	2*4	0.300	0.450			1.080		
	Parapet	1	39.200	0.850			33.320		

	Shade top	1	36.330	0.600			21.798	
	„	1	3.670	0.750			2.753	
	Edge	8	0.600	0.100			0.480	
	Window	3	1.500		1.500		-6.750	
	Door	1	1.000		2.400		-2.400	
	Rs	1*2	3.000		3.000		-18.000	
	Op	4*2	2.000		2.100		-33.600	
	Shade	1	36.330	0.600			21.798	
	„	1	3.670	0.750			2.753	
	Ceiling	1	10.000	8.000			80.000	
	Beam	2*2	8.000	0.600			19.200	
	„	2*2	10.000	0.300			12.000	
	Slab Proj.	1	38.800	0.300			11.640	
	Slab Edge	1	40.000	0.120			4.800	
						Total Quantity	616.472 sqm	
						Total Deducted Quantity	-60.750 sqm	
						Net Total Quantity	555.722 sqm	
						Kerala Water Authority Say 555.722 sqm @ Rs 69.32 / sqm	Rs 38522.65	
16	13.82.2 Wall painting with acrylic emulsion paint, having VOC (Volatile Organic Compound) content less than 50 grams/ litre, of approved brand and manufacture including applying additional coats wherever required, to achieve even shade and colour.Two coats							
	Outer wall	1	37.600		5.000		188.000	
	inner wall	1	36.000		5.000		180.000	
	pit inside	1	2.500	2.500			6.250	
	„	4	2.500	1.500			15.000	
	Tunnr Stand	2	1.500	1.200			3.600	
	„	2	5.000	1.200			12.000	
	side	2*4	0.300	0.450			1.080	
	Parapet	1	39.200	0.850			33.320	
	Shade top	1	36.330	0.600			21.798	
	„	1	3.670	0.750			2.753	
	Edge	8	0.600	0.100			0.480	
	Window	3	1.500		1.500		-6.750	

	Door	1	1.000		2.400		-2.400	
	Rs	1*2	3.000		3.000		-18.000	
	Op	4*2	2.000		2.100		-33.600	
	Shade	1	36.330	0.600			21.798	
	„	1	3.670	0.750			2.753	
	Ceiling	1	10.000	8.000			80.000	
	Beam	2*2	8.000	0.600			19.200	
	„	2*2	10.000	0.300			12.000	
	Slab Proj.	1	38.800	0.300			11.640	
	Slab Edge	1	40.000	0.120			4.800	
						Total Quantity	616.472 sqm	
						Total Deducted Quantity	-60.750 sqm	
						Net Total Quantity	555.722 sqm	
						Say 555.722 sqm @ Rs 123.40 / sqm	Rs 68576.09	
17	10.4	Providing and fixing 1 mm thick M.S. sheet sliding- shutters, with frame and diagonal braces of 40x40x6 mm angle iron, 3 mm M.S. gusset plates at the junction and corners, 25 mm dia pulley, 40x40x6 mm angle and T-iron guide at the top and bottom respectively, including applying a priming coat of approved steel primer.						
	Window	3	1.500		1.500		6.750	
						Total Quantity	6.750 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	6.750 sqm	
						Say 6.750 sqm @ Rs 5765.99 / sqm	Rs 38920.43	
18	10.5.1	Providing and fixing 1 mm thick M.S. sheet door with frame of 40x40x6 mm angle iron and 3 mm M.S. gusset plates at the junctions and corners, all necessary fittings complete, including applying a priming coat of approved steel primer.Using M.S. angels 40x40x6 mm for diagonal braces						
	Door	1	1.000	2.400			2.400	
						Total Quantity	2.400 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	2.400 sqm	
						Say 2.400 sqm @ Rs 5114.64 / sqm	Rs 12275.14	
19	10.6.1	Supplying and fixing rolling shutters of approved make, made of required size M.S. laths, interlocked together through their entire length and jointed together at the end by end locks, mounted on specially						

	designed pipe shaft with brackets, side guides and arrangements for inside and outside locking with push and pull operation complete, including the cost of providing and fixing necessary 27.5 cm long wire springs manufactured from high tensile steel wire of adequate strength conforming to IS: 4454 - part 1 and M.S. top cover of required thickness for rolling shutters.80x1.25 mm M.S. laths with 1.25 mm thick top cover							
	Front gate	1	3.000		3.000		9.000	
	Total Quantity						9.000 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						9.000 sqm	
	Say 9.000 sqm @ Rs 3400.56 / sqm						Rs 30605.04	
20	13.61.1 Painting with synthetic enamel paint of approved brand and manufacture to give an even shade:Two or more coats on new work							
	Door	1	1.000		2.400	2.25	5.400	
	Window	3	1.500		1.500	2.0	13.500	
	Rs	1	3.000		3.000	2.5	22.500	
	Total Quantity						41.400 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						41.400 sqm	
	Say 41.400 sqm @ Rs 140.37 / sqm						Rs 5811.32	
SI No	Description	No	L	B	D	CF	Quantity	Remark
17Transformer Building (Cost Index:33.05 %)								
1	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							
	Column Footing	15	1.900	1.900	1.500		81.225	
	Ramp	3	3.000	2.000	0.150		2.700	
	Cable Trench	1	20.000	1.000	0.850		17.000	
	Total Quantity						100.925 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						100.925 cum	
	Say 100.925 cum @ Rs 291.38 / cum						Rs 29407.53	
2	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)							
	Column Footing	15	1.900	1.900	0.100		5.415	
	Ramp	3	3.000	2.000	0.100		1.801	
	Cable Trench	1	20.000	1.000	0.100		2.000	
	Total Quantity						9.216 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						9.216 cum	
	Say 9.216 cum @ Rs 6687.23 / cum						Rs 61629.51	
3	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							
	Column Footing	15	1.700	1.700	0.250		10.838	
	Trapezoidal Portion	15/3	1.700	1.700	0.500		7.225	
	Column pedestal	15	0.200	0.500	1.100		1.651	
	Plinth Beam	2	3.700	0.200	0.450		0.667	
	„	3	4.900	0.200	0.450		1.324	
	„	3*4	3.150	0.200	0.450		3.402	
	Ramp Top	3	3.000	3.000	0.100		2.700	
	Total Quantity						27.807 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						27.807 cum	
	Say 27.807 cum @ Rs 8914.95 / cum						Rs 247898.01	
4	50.5.33.2 Providing and laying in position machine batched and machine mixed design mix M-20 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer-in-charge.Note:- Cement content considered in this item is @ 330 kg/cum. Excess or less cement used as per design mix is payable or recoverable separately. All work above plinth level upto floor V level							
	Column Above plinth	15	0.200	0.500	5.000		7.500	
	Lintel	2	8.600	0.200	0.200		0.688	
	„	12	3.150	0.200	0.200		1.512	
	Shade	1	14.800	0.600	0.100		0.889	

	„	2	10.100	0.600	0.100		1.212		
	„	1	14.800	0.750	0.100		1.110		
	Girder Beam	2	13.200	0.300	0.300		2.376		
	Corbell	2*5	0.200	0.400	0.450		0.361		
	Roof beam	2	8.600	0.200	0.500		1.720		
	„	12	3.150	0.200	0.300		2.268		
	Roof slab	1	14.200	10.700	0.120		18.233		
	Total Quantity						37.869 cum		
	Total Deducted Quantity						0.000 cum		
	Net Total Quantity						37.869 cum		
	Say 37.869 cum @ Rs 10858.34 / cum						Rs 411194.48		
5	5.9.1 Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete								
	Footing Side	15*4	1.700		0.250		25.500		
	Ramb side	3*2	3.000	0.100			1.801		
	Total Quantity						27.301 sqm		
	Total Deducted Quantity						0.000 sqm		
	Net Total Quantity						27.301 sqm		
	Say 27.301 sqm @ Rs 329.03 / sqm						Rs 8982.85		
6	5.9.3 Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform								
	Shade	1	14.800	0.600			8.880		
	„	2	10.100	0.600			12.120		
	„	1	14.800	0.750			11.101		
	Edge	1	36.200	0.100			3.621		
	„	1	16.000	0.100			1.600		
	Roof Slab	4	3.150	4.000			50.400		
	„	4	3.150	5.500			69.300		
	Slab Pro.	1	48.600	0.300			14.580		
	Slab edge	1	49.800	0.120			5.976		
	Total Quantity						177.578 sqm		
	Total Deducted Quantity						0.000 sqm		

	Net Total Quantity							177.578 sqm
	Say 177.578 sqm @ Rs 800.50 / sqm							Rs 142151.19
7	5.9.5 Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers							
	lintel	12*2	3.150	0.200			15.121	
	„	2*2	8.600	0.200			6.880	
	Girder beam	2*1	13.200	0.900			23.760	
	Roof Beem	12*2	3.150	0.300			22.680	
	„	2*2	8.600	0.500			17.200	
	Plinth beam	12*2	3.150	0.450			34.020	
	„	2*2	3.700	0.450			6.660	
	„	3*2	4.900	0.450			13.230	
	Total Quantity							139.551 sqm
	Total Deducted Quantity							0.000 sqm
	Net Total Quantity							139.551 sqm
	Say 139.551 sqm @ Rs 637.64 / sqm							Rs 88983.30
8	5.9.6 Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts							
	Column Pedestal	15	1.400	1.100			23.100	
	„,Colun	15	1.400	5.000			105.000	
	Corbel	10	0.400	1.100			4.400	
	„	10	0.200	0.450			0.901	
	Total Quantity							133.401 sqm
	Total Deducted Quantity							0.000 sqm
	Net Total Quantity							133.401 sqm
	Say 133.401 sqm @ Rs 847.46 / sqm							Rs 113052.01
9	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							
	@ 100Kg of Steel per 1Cum of cc	1	27.807+37.869			100.0	6567.600	
	Total Quantity							6567.600 kilogram
	Total Deducted Quantity							0.000 kilogram

		Net Total Quantity					6567.600 kilogram	
		Say 6567.600 kilogram @ Rs 96.46 / kilogram					Rs 633510.70	
10	50.6.7.2 Laterate masonry with neatly dressed laterate stone of size 40x20x15cm or nearest size in cement mortar 1:6 for super structure above plinth level up to floor two level including all cost of materials, labour charges etc.							
	Wall	12	3.150	0.200	4.700		35.532	
	„	2	3.700	0.200	4.500		6.661	
	„	3	4.900	0.200	4.500		13.230	
	cable trench	2	20.000	0.200	0.750		6.000	
	ramp side	6*1/2	3.000	0.200	0.400		0.721	
	parapet	1	49.000	0.200	0.400		3.921	
	Window	9	1.500	0.200	1.500		-4.050	
	Rs	2	3.000	0.200	3.000		-3.600	
	„	1	3.000	0.200	2.400		-1.440	
	Op	2	1.500	0.200	2.400		-1.440	
	„	1	4.900	0.200	1.500		-1.470	
						Total Quantity	66.065 cum	
						Total Deducted Quantity	-12.000 cum	
						Net Total Quantity	54.065 cum	
						Say 54.065 cum @ Rs 7872.98 / cum	Rs 425652.66	
11	13.1.1 12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)							
	Inside	2	13.200	5.000			132.000	
	„	2	4.000	5.000			40.000	
	„	4	6.500	5.000			130.000	
		4	5.500	5.000			110.000	
	Column	7	0.800	5.000			28.000	
	Cable trench	2	20.000	0.750			30.000	
	„	4	0.600	0.750			1.800	
	„ Top	2	42.400	0.230			19.504	
	Out side	2	13.600	5.450			148.240	
	„	2	10.100	5.450			110.090	
	Ramp side	6*1/2	3.000	0.450			4.051	

	parapet	1	49.000	1.000			49.000	
	Window	9	1.500	1.500			-20.250	
	Rs	2*2	3.000	3.000			-36.000	
	„	1*2	3.000	2.400			-14.399	
	Ope	2*2	1.500	2.400			-14.399	
	„	1	4.900	1.500			-7.350	
	Ventilator	14	0.900	0.600			-7.560	
							Total Quantity	802.685 sqm
							Total Deducted Quantity	-99.958 sqm
							Net Total Quantity	702.727 sqm
							Say 702.727 sqm @ Rs 308.21 / sqm	Rs 216587.49
12	13.7.1 12 mm cement plaster finished with a floating coat of neat cement of mix:1:3 (1 cement : 3 fine sand)							
	roof top	1	13.800	10.300			142.141	
	Shade top	1	14.800	0.600			8.880	
	„	1	14.800	0.750			11.101	
	„	2	10.100	0.600			12.120	
	Ramp top	3	3.000	3.000			27.000	
							Total Quantity	201.242 sqm
							Total Deducted Quantity	0.000 sqm
							Net Total Quantity	201.242 sqm
							Say 201.242 sqm @ Rs 393.69 / sqm	Rs 79226.96
13	13.16.1 6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)							
	Roof Bottom	1	13.200	4.000			52.800	
	„	2	6.500	5.500			71.500	
	Beam	3*2	3.700	0.500			11.101	
	„	3*2	4.900	0.500			14.701	
	Shade Bott.	1	14.800	0.600			8.880	
	„	1	14.800	0.750			11.101	
	„	2	10.100	0.600			12.120	
							Total Quantity	182.203 sqm
							Total Deducted Quantity	0.000 sqm

		Net Total Quantity					182.203 sqm	
		Say 182.203 sqm @ Rs 262.57 / sqm					Rs 47841.04	
14	11.41.2 Providing and laying vitrified floor tiles in different sizes (thickness to be specified by the manufacturer) with water absorption less than 0.08% and conforming to IS : 15622, of approved make, in all colours and shades, laid on 20 mm thick cement mortar 1:4(1 cement : 4 coarse sand), including grouting the joints with white cement and matching pigments etc., complete. Size of Tile 600 x 600 mm.							
	Floor	1	13.200	4.000			52.800	
	Skirting	1	34.400	0.100			3.440	
	Flor	2	5.500	6.500			71.500	
	Skirting	2	24.000	0.100			4.801	
	Cable Trench	1	20.000	0.600			-12.000	
		Total Quantity					132.541 sqm	
		Total Deducted Quantity					-12.000 sqm	
		Net Total Quantity					120.541 sqm	
		Say 120.541 sqm @ Rs 1733.18 / sqm					Rs 208919.25	
15	10.6.1 Supplying and fixing rolling shutters of approved make, made of required size M.S. laths, interlocked together through their entire length and jointed together at the end by end locks, mounted on specially designed pipe shaft with brackets, side guides and arrangements for inside and outside locking with push and pull operation complete, including the cost of providing and fixing necessary 27.5 cm long wire springs manufactured from high tensile steel wire of adequate strength conforming to IS: 4454 - part 1 and M.S. top cover of required thickness for rolling shutters.80x1.25 mm M.S. laths with 1.25 mm thick top cover							
	Rolling shutter	2	3.000	3.000			18.000	
	„	1	3.000	2.400			7.200	
		Total Quantity					25.200 sqm	
		Total Deducted Quantity					0.000 sqm	
		Net Total Quantity					25.200 sqm	
		Say 25.200 sqm @ Rs 3400.56 / sqm					Rs 85694.11	
16	9.48.1 Providing and fixing M.S. Grills of required pattern in frames of windows etc. with M.S. flats, square or round bars etc. including priming coat with approved steel primer all complete.Fixed to steel windows by welding							
	Window grill	9	1.500	1.500		16.0	324.000	
	Ventilator	14	0.900	0.600		16.0	120.961	
		Total Quantity					444.961 kg	

		Total Deducted Quantity				0.000 kg	
		Net Total Quantity				444.961 kg	
		Say 444.961 kg @ Rs 190.93 / kg				Rs 84956.40	
17	21.1.1.1 Providing and fixing aluminium work for doors, windows, ventilators and partitions with extruded built up standard tubular sections/ appropriate Z sections and other sections of approved make conforming to IS : 733 and IS: 1285, fixing with dash fasteners of required dia and size, including necessary filling up the gaps at junctions, i.e. at top, bottom and sides with required EPDM rubber/ neoprene gasket etc. Aluminium sections shall be smooth, rust free, straight, mitred and jointed mechanically wherever required including cleat angle, Aluminium snap beading for glazing /paneling, C.P. brass/ stainless steel screws, all complete as per architectural drawings and the directions of Engineer-in-charge.(Glazing, paneling and dash fasteners to be paid for separately):For fixed portionAnodised aluminium (anodised transparent or dyed to required shade according to IS : 1868, Minimum anodic coating of grade AC 15)						
	Window	9	1.500	1.500		4.5	91.125
	Ventilator	14	0.900	0.600		4.5	34.020
		Total Quantity				125.145 kg	
		Total Deducted Quantity				0.000 kg	
		Net Total Quantity				125.145 kg	
		Say 125.145 kg @ Rs 489.69 / kg				Rs 61282.26	
18	21.3.1 Providing and fixing glazing in aluminium door, window, ventilator shutters and partitions etc. with EPDM rubber / neoprene gasket etc. complete as per the architectural drawings and the directions of Engineer - in -Charge. (Cost of aluminium snap beading shall be paid in basic item):With float glass panes of 4.0 mm thickness						
	Window	9*2	0.720	1.420			18.404
	Venti	14	0.820	0.520			5.970
		Total Quantity				24.374 sqm	
		Total Deducted Quantity				0.000 sqm	
		Net Total Quantity				24.374 sqm	
		Say 24.374 sqm @ Rs 1154.61 / sqm				Rs 28142.46	
19	13.43.1 Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer						
	Inside	2	13.200	5.000			132.000
	„	2	4.000	5.000			40.000
	„	4	6.500	5.000			130.000
	„	4	5.500	5.000			110.000

	Column	7	0.800	5.000			28.000	
	„ Top	2	42.400	0.230			19.504	
	Out side	2	13.600	5.450			148.240	
	„	2	10.100	5.450			110.090	
	Ramp side	6*1/2	3.000	0.450			4.051	
	parapet	1	49.000	1.000			49.000	
	Window	9	1.500	1.500			-20.250	
	Rs	2*2	3.000	3.000			-36.000	
	„	1*2	3.000	2.400			-14.399	
	Ope	2*2	1.500	2.400			-14.399	
	„	1	4.900	1.500			-7.350	
	Ventilator	14	0.900	0.600			-7.560	
	Roof Bottom	1	13.200	4.000			52.800	
	„	2	6.500	5.500			71.500	
	Beam	3*2	3.700	0.500			11.101	
	„	3*2	4.900	0.500			14.701	
	Shade Bott.	1	14.800	0.600			8.880	
	„	1	14.800	0.750			11.101	
	„	2	10.100	0.600			12.120	
						Total Quantity	953.088 sqm	
						Total Deducted Quantity	-99.958 sqm	
						Net Total Quantity	853.130 sqm	
						Say 853.130 sqm @ Rs 69.32 / sqm	Rs 59138.97	
20	13.61.1 Painting with synthetic enamel paint of approved brand and manufacture to give an even shade:Two or more coats on new work							
	Window	9	1.500	1.500			20.250	
	Vent.	14	0.900	0.600			7.561	
	Rs	2	3.000	3.000		2.5	45.000	
	„	1	3.000	2.400		2.5	18.000	
						Total Quantity	90.811 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	90.811 sqm	

SI No	Description	No	L	B	D	CF	Quantity	Remark
Say 90.811 sqm @ Rs 140.37 / sqm							Rs 12747.14	
21	13.82.2 Wall painting with acrylic emulsion paint, having VOC (Volatile Organic Compound) content less than 50 grams/ litre, of approved brand and manufacture including applying additional coats wherever required, to achieve even shade and colour.Two coats							
	Inside	2	13.200	5.000			132.000	
	„	2	4.000	5.000			40.000	
	„	4	6.500	5.000			130.000	
	„	4	5.500	5.000			110.000	
	Column	7	0.800	5.000			28.000	
	„ Top	2	42.400	0.230			19.504	
	Out side	2	13.600	5.450			148.240	
	„	2	10.100	5.450			110.090	
	Ramp side	6*1/2	3.000	0.450			4.051	
	parapet	1	49.000	1.000			49.000	
	Window	9	1.500	1.500			-20.250	
	Rs	2*2	3.000	3.000			-36.000	
	„	1*2	3.000	2.400			-14.399	
	Ope	2*2	1.500	2.400			-14.399	
	„	1	4.900	1.500			-7.350	
	Ventilator	14	0.900	0.600			-7.560	
	Roof Bottom	1	13.200	4.000			52.800	
	„	2	6.500	5.500			71.500	
	Beam	3*2	3.700	0.500			11.101	
	„	3*2	4.900	0.500			14.701	
	Shade Bott.	1	14.800	0.600			8.880	
	„	1	14.800	0.750			11.101	
	„	2	10.100	0.600			12.120	
							Total Quantity	953.088 sqm
							Total Deducted Quantity	-99.958 sqm
							Net Total Quantity	853.130 sqm
							Say 853.130 sqm @ Rs 123.40 / sqm	Rs 105276.24
18	Centrifuge Building							(Cost Index:33.05 %)

1	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							
	Footing	10	2.000	2.000	1.600		64.000	
	Ramp	1	3.000	3.000	0.150		1.350	
	Total Quantity						65.350 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						65.350 cum	
	Say 65.350 cum @ Rs 291.38 / cum						Rs 19041.68	
2	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)							
	Footing	10	2.000	2.000	0.100		4.000	
	Plinth Bottom	9	3.130	0.350	0.100		0.986	
	„	4	2.800	0.350	0.100		0.392	
	„	4	2.980	0.350	0.100		0.418	
	Floor PCC	6	3.130	3.330	0.100		6.254	
	Ramp	1	3.000	3.000	0.100		0.900	
	Total Quantity						12.950 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						12.950 cum	
	Say 12.950 cum @ Rs 6687.23 / cum						Rs 86599.63	
3	2.25 Filling available excavated earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift up to 1.5 m.							
	Plinth inside	6	3.130	3.330	0.350		21.889	
	Ramp	1/2	3.000	3.000	0.300		1.350	
	Total Quantity						23.239 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						23.239 cum	
	Say 23.239 cum @ Rs 253.73 / cum						Rs 5896.43	
4	5.1.3							

	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:1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size)						
	Ramp	1	3.000	3.000	0.100		0.900
	Total Quantity						0.900 cum
	Total Deducted Quantity						0.000 cum
	Net Total Quantity						0.900 cum
	Say 0.900 cum @ Rs 8427.59 / cum						Rs 7584.83
5	<p>5.37.1</p> <p>Providing and laying in position ready mixed M-25 grade concrete for reinforced cement concrete work, using cement content as per approved design mix, manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for reinforced cement concrete work including pumping of R.M.C. from transit mixer to site of laying, excluding the cost of centering, shuttering finishing and reinforcement including cost of 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 the Engineer - in -charge. Note:- Cement content considered in this item is @330 kg/cum. Excess /less cement used as per design mix is payable/recoverable separately.All work upto plinth level</p>						
	Column Footing	10	1.800	1.800	0.200		6.481
	„	10/3	1.800	1.800	0.700		7.560
	Grade slab	6	3.130	3.330	0.120		7.505
	Column pedestal	10	0.250	0.600	0.400		0.600
	Plinth beam	9	3.130	0.250	0.450		3.170
	„	4	2.800	0.250	0.450		1.260
	„	4	3.980	0.250	0.450		1.791
	Total Quantity						28.367 cum
	Total Deducted Quantity						0.000 cum
	Net Total Quantity						28.367 cum
	Say 28.367 cum @ Rs 9700.81 / cum						Rs 275182.88
6	<p>50.5.33.2</p> <p>Providing and laying in position machine batched and machine mixed design mix M-20 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer-in-charge.Note:- Cement content considered in this item is @ 330 kg/cum. Excess or less cement used as per design mix is payable or recoverable separately. All work above plinth level upto floor V level</p>						

	GF Column	10	0.250	0.600	4.000		6.000	
	„Beam Bi	9	3.130	0.250	0.350		2.465	
	„	4	2.800	0.250	0.350		0.980	
	„	2	6.200	0.250	0.550		1.706	
	GF Slab	1	10.800	7.800	0.120		10.109	
	FF Column	10	0.250	0.600	4.000		6.000	
	Beam	9	3.130	0.250	0.350		2.465	
		4	2.800	0.250	0.350		0.980	
		4	2.980	0.250	0.550		1.639	
	FF Slab	1	11.000	8.000	0.120		10.560	
	Lintel	1	3.330	0.200	0.400		0.267	
	Shade	1	3.500	0.750	0.100		0.263	
	Stair Opening	1	2.000	3.330	0.120		-0.799	
						Total Quantity	43.434 cum	
						Total Deducted Quantity	-0.799 cum	
						Net Total Quantity	42.635 cum	
						Say 42.635 cum @ Rs 10858.34 / cum	Rs 462945.33	
7	5.9.1	Kerala Water Authority Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete						
	Column Footing	10*4	1.800	1.800	0.200		25.921	
						Total Quantity	25.921 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	25.921 sqm	
						Say 25.921 sqm @ Rs 329.03 / sqm	Rs 8528.79	
8	5.9.3	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform						
	Floor slab	6	3.130	3.330			62.538	
	Op Side	1	8.660	0.120			1.040	
	FF Slab	6	3.130	3.330			62.538	
	Proj	2	11.000	0.300			6.600	
	„	2	7.400	0.300			4.440	
	Proj. GF	2	10.800	0.200			4.320	

	„	2	7.400	0.200			2.961	
	Slab edge	1	37.200	0.120			4.464	
	„	1	38.000	0.120			4.560	
	Shade	1	3.500	0.750			2.625	
	„ Edge	2	0.750	0.100			0.151	
							Total Quantity	156.237 sqm
							Total Deducted Quantity	0.000 sqm
							Net Total Quantity	156.237 sqm
							Say 156.237 sqm @ Rs 800.50 / sqm	Rs 125067.72
9	5.9.5 Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers							
	Plinth Beam	9*2	3.130	0.450			25.353	
	„	4*2	2.800	0.450			10.080	
	„	4*2	2.980	0.450			10.728	
	Lintel	1*2	3.330	0.400			2.664	
	Op Bottom	1	3.330	0.200			0.666	
	Beam GF & FF	18*2	3.130	0.350			39.438	
	„	8*2	2.800	0.350			15.680	
	„	4*2	6.200	0.550			27.281	
							Total Quantity	131.890 sqm
							Total Deducted Quantity	0.000 sqm
							Net Total Quantity	131.890 sqm
							Say 131.890 sqm @ Rs 637.64 / sqm	Rs 84098.34
10	5.9.6 Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts							
	Column Pedestal	10	1.700		0.850		14.450	
	GF Column	10	1.700		4.000		68.000	
	FF Column	10	1.700		4.000		68.000	
							Total Quantity	150.450 sqm
							Total Deducted Quantity	0.000 sqm
							Net Total Quantity	150.450 sqm
							Say 150.450 sqm @ Rs 847.46 / sqm	Rs 127500.36

11	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							
	@120kg / 1Cum CC	1	28.37+42. 57			120.0	8512.800	
	Total Quantity						8512.800 kilogram	
	Total Deducted Quantity						0.000 kilogram	
	Net Total Quantity						8512.800 kilogram	
	Say 8512.800 kilogram @ Rs 96.46 / kilogram						Rs 821144.69	
12	50.6.7.2 Laterate masonry with neatly dressed laterate stone of size 40x20x15cm or nearest size in cement mortar 1:6 for super structure above plinth level up to floor two level including all cost of materials, labour charges etc.							
	Wall	5	3.130	0.200	3.650		11.425	
	„	4	2.800	0.200	3.650		8.176	
	Over RS	1	3.130	0.200	0.350		0.220	
	FF wall	6	3.130	0.200	3.650		13.710	
	„	4	2.800	0.200	3.650		8.176	
	Total Quantity						41.707 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						41.707 cum	
	Say 41.707 cum @ Rs 7872.98 / cum						Rs 328358.38	
13	13.1.1 12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)							
	inside	2	7.000		4.000		56.000	
	„	2	10.000		4.000		80.000	
	column	2*4	0.350		4.000		11.200	
	FF inside	2	7.000		4.000		56.000	
	„	2	10.000		4.000		80.000	
	Column	2*4	0.350		4.000		11.200	
	Out side wall	1	35.600		8.450		300.820	
	parapt	1	37.200		1.000		37.200	
	Rolling Shutter	1*2	3.000	3.000			-18.000	
	Total Quantity						632.420 sqm	
	Total Deducted Quantity						-18.000 sqm	

	Net Total Quantity						614.420 sqm	
	Say 614.420 sqm @ Rs 308.21 / sqm						Rs 189370.39	
14	13.7.1 12 mm cement plaster finished with a floating coat of neat cement of mix:1:3 (1 cement : 3 fine sand)							
	Roof top	1	10.600	7.600			80.560	
	Shade toop	1	3.500	0.750			2.625	
	Ramp	1	3.000	3.000			9.000	
	Total Quantity						92.185 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						92.185 sqm	
	Say 92.185 sqm @ Rs 393.69 / sqm						Rs 36292.31	
15	13.16.1 6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)							
	Slab Bott	2	10.000	7.000			140.000	
	Beam	4*2	6.200	0.550			27.281	
	„	2*2	9.400	0.350			13.160	
	Proj GF	1	36.400	0.550			20.020	
	„ FF	1	36.800	0.450			16.560	
	Shade	1	3.500	0.750			2.625	
	Ramp side	2*1/2	3.000	0.450			1.350	
	Total Quantity						220.996 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						220.996 sqm	
	Say 220.996 sqm @ Rs 262.57 / sqm						Rs 58026.92	
16	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.							
	GF & FF Floor	2	10.000	7.000			140.000	
	Skirting	2	34.000	0.100			6.801	
	Stair Portion	1	3.130	2.000			-6.260	
	Total Quantity						146.801 sqm	
	Total Deducted Quantity						-6.260 sqm	
	Net Total Quantity						140.541 sqm	

	Say 140.541 sqm @ Rs 1733.18 / sqm						Rs 243582.85	
17	<p>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</p>							
	Roling Shuter	1	3.000	3.000			9.000	
	Total Quantity						9.000 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						9.000 sqm	
	Say 9.000 sqm @ Rs 3238.30 / sqm						Rs 29144.70	
18	<p>10.25.1 Item Shifted to Sub head 14 as item 14.73Item Shifted to head 14 as item 14.74Steel 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 stringers, treads,landings etc. of stair cases, including use of chequered plate wherever required, all complete</p>							
	Stair	2	2.500	0.900		30.0	135.000	
	Landing	1	2.000	1.000		30.0	60.000	
	Hand rail	1	9.000	0.900	0.900	15.0	121.500	
	„	1	5.500	0.900	0.900	15.0	74.250	
	Total Quantity						390.750 kg	
	Total Deducted Quantity						0.000 kg	
	Net Total Quantity						390.750 kg	
	Say 390.750 kg @ Rs 108.17 / kg						Rs 42267.43	
19	<p>13.43.1 Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer</p>							
	inside	2	7.000		4.000		56.000	
	„	2	10.000		4.000		80.000	
	column	2*4	0.350		4.000		11.200	
	FF inside	2	7.000		4.000		56.000	
	„	2	10.000		4.000		80.000	
	Column	2*4	0.350		4.000		11.200	
	Out side wall	1	35.600		8.450		300.820	

	parapt	1	37.200		1.000		37.200	
	Rolling Shutter	1*2	3.000	3.000			-18.000	
	Slab Bott	2	10.000	7.000			140.000	
	Beam	4*2	6.200	0.550			27.281	
	„	2*2	9.400	0.350			13.160	
	Proj GF	1	36.400	0.550			20.020	
	„ FF	1	36.800	0.450			16.560	
	Shade	1	3.500	0.750			2.625	
	Ramp side	2*1/2	3.000	0.450			1.350	
							Total Quantity	853.416 sqm
							Total Deducted Quantity	-18.000 sqm
							Net Total Quantity	835.416 sqm
							Say 835.416 sqm @ Rs 69.32 / sqm	Rs 57911.04
20	13.61.1 Painting with synthetic enamel paint of approved brand and manufacture to give an even shade:Two or more coats on new work							
	Rolling Shutter	1	3.000	3.000		2.5	22.500	
	Stair	2	2.500	0.900			4.500	
	Landing	1	2.000	1.000			2.000	
	Hand rail	1	14.500	0.900			13.050	
							Total Quantity	42.050 sqm
							Total Deducted Quantity	0.000 sqm
							Net Total Quantity	42.050 sqm
							Say 42.050 sqm @ Rs 140.37 / sqm	Rs 5902.56
21	13.82.2 Wall painting with acrylic emulsion paint, having VOC (Volatile Organic Compound) content less than 50 grams/ litre, of approved brand and manufacture including applying additional coats wherever required, to achieve even shade and colour.Two coats							
	inside	2	7.000		4.000		56.000	
	„	2	10.000		4.000		80.000	
	column	2*4	0.350		4.000		11.200	
	FF inside	2	7.000		4.000		56.000	
	„	2	10.000		4.000		80.000	
	Column	2*4	0.350		4.000		11.200	

	Out side wall	1	35.600		8.450		300.820	
	parapt	1	37.200		1.000		37.200	
	Rolling Shutter	1*2	3.000	3.000			-18.000	
	Slab Bott	2	10.000	7.000			140.000	
	Beam	4*2	6.200	0.550			27.281	
	„	2*2	9.400	0.350			13.160	
	Proj GF	1	36.400	0.550			20.020	
	„ FF	1	36.800	0.450			16.560	
	Shade	1	3.500	0.750			2.625	
	Ramp side	2*1/2	3.000	0.450			1.350	
							Total Quantity	853.416 sqm
							Total Deducted Quantity	-18.000 sqm
							Net Total Quantity	835.416 sqm
							Say 835.416 sqm @ Rs 123.40 / sqm	Rs 103090.33
SI No	Description	No	L	B	D	CF	Quantity	Remark
19PSF/ACF Foundation (Cost Index:33.05 %)								
1	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							
		1	16.200	8.200	0.300		39.852	
							Total Quantity	39.852 cum
							Total Deducted Quantity	0.000 cum
							Net Total Quantity	39.852 cum
							Say 39.852 cum @ Rs 210.02 / cum	Rs 8369.72
2	4.1.6 Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size)							
		1	16.200	8.200	0.150		19.926	
							Total Quantity	19.926 cum
							Total Deducted Quantity	0.000 cum
							Net Total Quantity	19.926 cum
							Say 19.926 cum @ Rs 7076.06 / cum	Rs 140997.57

3	5.37.1 Providing and laying in position ready mixed M-25 grade concrete for reinforced cement concrete work, using cement content as per approved design mix, manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for reinforced cement concrete work including pumping of R.M.C. from transit mixer to site of laying, excluding the cost of centering, shuttering finishing and reinforcement including cost of 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 the Engineer - in -charge. Note:- Cement content considered in this item is @330 kg/cum. Excess /less cement used as per design mix is payable/recoverable separately.All work upto plinth level								
		1	16.000	8.000	0.300		38.400		
		Total Quantity					38.400 cum		
		Total Deducted Quantity					0.000 cum		
		Net Total Quantity					38.400 cum		
		Say 38.400 cum @ Rs 9700.81 / cum					Rs 372511.10		
4	5.9.1 Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete								
		1	48.000		0.300		14.400		
		Total Quantity					14.400 sqm		
		Total Deducted Quantity					0.000 sqm		
		Net Total Quantity					14.400 sqm		
		Say 14.400 sqm @ Rs 329.03 / sqm					Rs 4738.03		
5	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								
		1	38.400			40.0	1536.000		
		Total Quantity					1536.000 kilogram		
		Total Deducted Quantity					0.000 kilogram		
		Net Total Quantity					1536.000 kilogram		
		Say 1536.000 kilogram @ Rs 96.46 / kilogram					Rs 148162.56		
6	13.7.1 12 mm cement plaster finished with a floating coat of neat cement of mix:1:3 (1 cement : 3 fine sand)								
		1	16.000	8.000			128.000		
		1	48.000		0.300		14.400		
		Total Quantity					142.400 sqm		
		Total Deducted Quantity					0.000 sqm		

SI No	Description	No	L	B	D	CF	Quantity	Remark
Net Total Quantity							142.400 sqm	
Say 142.400 sqm @ Rs 393.69 / sqm								Rs 56061.46
20Sludge Shed (Cost Index:33.05 %)								
1	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							
		4	1.700	1.700	1.600		18.496	
Total Quantity							18.496 cum	
Total Deducted Quantity							0.000 cum	
Net Total Quantity							18.496 cum	
Say 18.496 cum @ Rs 291.38 / cum								Rs 5389.36
2	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)							
	Column Footing	4	1.700	1.700	0.100		1.156	
	Floor PCC	1	5.000	5.000	0.100		2.500	
	Plinth Bottom	2	5.000	0.350	0.100		0.351	
		2	4.600	0.350	0.100		0.322	
Total Quantity							4.329 cum	
Total Deducted Quantity							0.000 cum	
Net Total Quantity							4.329 cum	
Say 4.329 cum @ Rs 6687.23 / cum								Rs 28949.02
3	2.25 Filling available excavated earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift up to 1.5 m.							
	Plinth inside filling	1	5.000	5.000	0.350		8.750	
Total Quantity							8.750 cum	
Total Deducted Quantity							0.000 cum	
Net Total Quantity							8.750 cum	
Say 8.750 cum @ Rs 253.73 / cum								Rs 2220.14
4	50.6.7.1							

	Laterate masonry with neatly dressed laterate stone of size 40x20x15cm or nearest size in cement mortar 1:6 for foundation and basement including all cost of materials, labour charges etc.							
	Outer wall	2	5.000	0.200	4.300		8.600	
		2	4.600	0.200	4.300		7.912	
	Rolling shutter	1	2.400	0.200	3.000		-1.440	
	Total Quantity						16.512 cum	
	Total Deducted Quantity						-1.440 cum	
	Net Total Quantity						15.072 cum	
	Say 15.072 cum @ Rs 7139.74 / cum						Rs 107610.16	
5	50.5.33.2 Providing and laying in position machine batched and machine mixed design mix M-20 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer-in-charge. Note:- Cement content considered in this item is @ 330 kg/cum. Excess or less cement used as per design mix is payable or recoverable separately. All work above plinth level upto floor V level							
	Column							
	Column	4	0.200	0.400	4.500		1.441	
	Lintel							
	over wall	2	4.600	0.200	0.200		0.368	
		1	5.000	0.200	0.200		0.200	
		1	5.000	0.200	0.300		0.300	
	shade							
		1	5.400	0.600	0.100		0.325	
	Tie beam							
		2	5.000	0.200	0.200		0.400	
		2	4.600	0.200	0.200		0.368	
	Total Quantity						3.402 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						3.402 cum	
	Say 3.402 cum @ Rs 10858.34 / cum						Rs 36940.07	
6	5.37.1 Providing and laying in position ready mixed M-25 grade concrete for reinforced cement concrete work, using cement content as per approved design mix, manufactured in fully automatic batching plant and							

	transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for reinforced cement concrete work including pumping of R.M.C. from transit mixer to site of laying, excluding the cost of centering, shuttering finishing and reinforcement including cost of 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 the Engineer - in-charge. Note:- Cement content considered in this item is @330 kg/cum. Excess /less cement used as per design mix is payable/recoverable separately.All work upto plinth level							
	Column footing-raft							
	Column Footing	4	1.500	1.500	0.150		1.350	
	Isolated Portion	4/3	1.500	1.500	0.350		1.050	
	Column footing-Column							
	Column Pedestal	4	0.200	0.400	0.900		0.289	
	Plinth beam							
	PB1	2	5.000	0.200	0.450		0.900	
	PB2	2	4.600	0.200	0.450		0.828	
							Total Quantity	4.417 cum
							Total Deducted Quantity	0.000 cum
							Net Total Quantity	4.417 cum
							Say 4.417 cum @ Rs 9700.81 / cum	Rs 42848.48
7	5.22.6 Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth level Thermo - Mechanically Treated bars of grade Fe-500D or more							
	@100 Kg / Cum of Concrete Qty , ie	1	3.402+4.417		100.000		781.900	
							Total Quantity	781.900 kilogram
							Total Deducted Quantity	0.000 kilogram
							Net Total Quantity	781.900 kilogram
							Say 781.900 kilogram @ Rs 96.46 / kilogram	Rs 75422.07
8	5.9.1 Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete							
	Column footing	4*4	1.500		0.150		3.600	
							Total Quantity	3.600 sqm
							Total Deducted Quantity	0.000 sqm
							Net Total Quantity	3.600 sqm
							Say 3.600 sqm @ Rs 329.03 / sqm	Rs 1184.51

9	5.9.6 Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts							
		4	1.200		4.500		21.600	
	Total Quantity						21.600 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						21.600 sqm	
	Say 21.600 sqm @ Rs 847.46 / sqm						Rs 18305.14	
10	5.9.5 Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers							
	Lintel							
	over wall	2*2	4.600		0.200		3.680	
		1*2	5.000		0.200		2.000	
		1*2	5.000		0.300		3.000	
	Bottom	1	2.400	0.200			0.480	
	shade	1	5.600	0.600			3.360	
	Tie beam	2*2	5.000		0.200		4.000	
		2*2	4.600		0.200		3.680	
	Plinth beam							
	PB1	2*2	5.000		0.450		9.000	
	PB2	2*2	4.600		0.450		8.280	
	Total Quantity						37.480 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						37.480 sqm	
	Say 37.480 sqm @ Rs 637.64 / sqm						Rs 23898.75	
11	12.1.1 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.1.00 mm thick with zinc coating not less than 275 gm/m2							
	Roofing	2	4.000	6.600			52.800	
	Total Quantity						52.800 sqm	
	Total Deducted Quantity						0.000 sqm	

	Net Total Quantity						52.800 sqm	
	Say 52.800 sqm @ Rs 1425.63 / sqm						Rs 75273.26	
12	13.1.1 12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)							
	inside wall	4	5.000	4.500			90.000	
	outside wall	4	5.400	4.900			105.841	
	basement	4	5.400	0.300			6.480	
	Tie beam top	4	5.200	0.200			4.160	
	Rolling shutter	2	2.400	3.000			-14.399	
	Total Quantity						206.481 sqm	
	Total Deducted Quantity						-14.399 sqm	
	Net Total Quantity						192.082 sqm	
	Say 192.082 sqm @ Rs 308.21 / sqm						Rs 59201.59	
13	13.9.2 Cement plaster 1:3 (1 cement : 3 coarse sand) finished with a floating coat of neat cement.20 mm cement plaster							
		1	5.000	5.000			25.000	
	Total Quantity						25.000 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						25.000 sqm	
	Say 25.000 sqm @ Rs 532.13 / sqm						Rs 13303.25	
14	10.2 Structural steel work riveted, bolted or welded in built up sections, trusses and framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer all complete.							
	For truss - 75x75mm IS angle	4*2	3.800			6.78	206.112	
	Horizontal Tie,	4*2	5.400			6.78	292.896	
	Brazing 45x45 mm MS Angle	4*2	2.000			3.95	63.200	
		4*4	1.000			3.95	63.200	
	vertical	4*1	2.000			3.95	31.600	
	Purlin 50x50 mm MS Tub 16g	2*5	6.500			4.42	287.300	
	Total Quantity						944.308 kg	
	Total Deducted Quantity						0.000 kg	

	Net Total Quantity							944.308 kg
	Say 944.308 kg @ Rs 117.55 / kg							Rs 111003.41
15	13.43.1 Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer							
	inside wall	4	5.000	4.500			90.000	
	outside wall	4	5.400	4.900			105.841	
	basement	4	5.400	0.300			6.480	
	Tie beam top	4	5.200	0.200			4.160	
	Rolling shutter	2	2.400	3.000			-14.399	
	Total Quantity							206.481 sqm
	Total Deducted Quantity							-14.399 sqm
	Net Total Quantity							192.082 sqm
	Say 192.082 sqm @ Rs 69.32 / sqm							Rs 13315.12
16	13.82.2 Wall painting with acrylic emulsion paint, having VOC (Volatile Organic Compound) content less than 50 grams/ litre, of approved brand and manufacture including applying additional coats wherever required, to achieve even shade and colour.Two coats							
	inside wall	4	5.000	4.500			90.000	
	outside wall	4	5.400	4.900			105.841	
	basement	4	5.400	0.300			6.480	
	Tie beam top	4	5.200	0.200			4.160	
	Rolling shutter	2	2.400	3.000			-14.399	
	Total Quantity							206.481 sqm
	Total Deducted Quantity							-14.399 sqm
	Net Total Quantity							192.082 sqm
	Say 192.082 sqm @ Rs 123.40 / sqm							Rs 23702.92
17	13.48.3 Finishing with Deluxe Multi surface paint system for interiors and exteriors using primer as per manufacturers specifications:Painting Steel work with Deluxe Multi Surface Paint to give an even shade. Two or more coat applied @ 0.90 ltr/10 sqm over an under coat of primer applied @ 0.80 ltr/10 sqm of approved brand and manufacture							
	Rolling Shutter	1	2.400	3.000		2.5	18.000	
	Truss work	4 *1/2	5.400	2.000		0.5	10.800	
	Purline	2*5	5.800	0.200			11.600	
	Total Quantity							40.400 sqm

	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						40.400 sqm	
	Say 40.400 sqm @ Rs 145.36 / sqm						Rs 5872.54	
SI No	Description	No	L	B	D	CF	Quantity	Remark
21STP Land Development & Approach Road and internal Service Roads (Cost Index:33.05 %)								
1	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							
	„Road side Protection wall foundation	1	150.000	0.950	0.700		99.750	
	„	1	150.000	1.400	0.700		147.000	
	Total Quantity						246.750 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						246.750 cum	
	Say 246.750 cum @ Rs 291.38 / cum						Rs 71898.02	
2	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)							
	Road side Protection wall foundation	1	150.000	0.750	0.100		11.250	
	„	1	150.000	1.200	0.100		18.000	
	Total Quantity						29.250 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						29.250 cum	
	Say 29.250 cum @ Rs 6687.23 / cum						Rs 195601.48	
3	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)							
	Road side Protection wall foundation	1	150.000	0.750	0.600		67.500	
	„	1	150.000	1.000	0.600		90.000	
	Total Quantity						157.500 cum	
	Total Deducted Quantity						0.000 cum	

	Net Total Quantity							157.500 cum
	Say 157.500 cum @ Rs 7069.81 / cum							Rs 1113495.08
4	7.2.1 Random rubble masonry with hard stone in superstructure above plinth level and upto floor five level, including leveling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) at window sills, ceiling level and the like.Cement mortar 1:6 (1 cement : 6 coarse sand)							
	Road side Protection wall	1	150.000	$(0.75+0.50)/2$	1.000		93.750	
		1	150.000	$(1.00+0.50)/2$	1.500		168.750	
	Total Quantity							262.500 cum
	Total Deducted Quantity							0.000 cum
	Net Total Quantity							262.500 cum
	Say 262.500 cum @ Rs 8721.89 / cum							Rs 2289496.13
5	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							
	RR Top Belt	2	150.000	0.500	0.100		15.000	
	Total Quantity							15.000 cum
	Total Deducted Quantity							0.000 cum
	Net Total Quantity							15.000 cum
	Say 15.000 cum @ Rs 8914.95 / cum							Rs 133724.25
6	5.9.5 Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers							
	RR Top Belt	2*2	150.000		0.100		60.000	
	Total Quantity							60.000 sqm
	Total Deducted Quantity							0.000 sqm
	Net Total Quantity							60.000 sqm
	Say 60.000 sqm @ Rs 637.64 / sqm							Rs 38258.40
7	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							
	@60Kg/1Cum of CC	1	15.000			60.0	900.000	
	Total Quantity							900.000 kilogram

	Total Deducted Quantity						0.000 kilogram	
	Net Total Quantity						900.000 kilogram	
	Say 900.000 kilogram @ Rs 96.46 / kilogram						Rs 86814.00	
8	2.32 Clearing grass and removal of the rubbish up to a distance of 50 m outside the periphery of the area cleared.							
	STP Site area	1	100.000	80.000			8000.000	
	Total Quantity						8000.000 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						8000.000 sqm	
	Say 8000.000 sqm @ Rs 7.38 / sqm						Rs 59040.00	
9	2.33.3 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. Beyond 120 cm girth up to and including 240 cm girth							
	STP Site	12					12.000	
	Total Quantity						12.000 No	
	Total Deducted Quantity						0.000 No	
	Net Total Quantity						12.000 No	
	Say 12.000 No @ Rs 9079.27 / No						Rs 108951.24	
10	od353221/2021_2022 Filling with contractor own earth (excluding rock) in open areas in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and watering, With all lead and lift as per direction of site Engineer-in-charge.							
	,, Road Formation	1	150.000	5.000	1.0000		750.000	
	STP Site filling(3 acre)	1	110.000	110.400	2.000		24288.000	
	Total Quantity						25038.000 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						25038.000 cum	
	Say 25038.000 cum @ Rs 377.07 / cum						Rs 9441078.66	
11	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.							
	Preparation of new road Base	1	150.000	5.000	0.300		225.000	
	STP Site	1	110.000	110.400	0.300		3643.200	

	Net Total Quantity						1120.000 sqm	
	Say 1120.000 sqm @ Rs 10.41 / sqm						Rs 11659.20	
15	od353225/2021_2022 Providing, laying and rolling of open graded premix carpet of 20 mm thickness with 0.27 cum of 12 mm departmental aggregates premixed with 12.96 kg of bitumen per 10 sqm using penetration grade bitumen to required line, grade and level on a previously prepared base, after priming the existing surface with 5 kg of bitumen (VG 30) 10 sqm including mixing in a suitable plant, laying and rolling with a three wheel static roller of 80-100 KN capacity, finished to required level and grades, followed by a seal coat of 0.09 cum of 6 mm departmental aggregates premixed with 8.64 kg of bitumen per 10 sqm. By Manual Means.							
	Formation of Approach Road	1	150.000	3.200			480.000	
	Internal Roads	1	200.000	3.200			640.000	
	Total Quantity						1120.000 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						1120.000 sqm	
	Say 1120.000 sqm @ Rs 176.52 / sqm						Rs 197702.40	
16	od353226/2021_2022 Seal Coat - Manual Means - Type C - Bitumen S-65 Providing and laying seal coat sealing the voids in a bituminous surface laid to the specified levels, grade and cross fall using Type A, Type B and Type C as per Technical Specification Clause 510 A. By Manual Means:-Case - III : Type C							
	Formation of Approach Road	1	150.000	3.200			480.000	
	Internal Roads	1	200.000	3.200			640.000	
	Total Quantity						1120.000 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						1120.000 sqm	
	Say 1120.000 sqm @ Rs 78.00 / sqm						Rs 87360.00	
SI No	Description	No	L	B	D	CF	Quantity	Remark
22Storm Water Drains (Cost Index:33.05 %)								
1	2.8.1 Earth work in excavation by mechanical means (Hydraulic excavator) /manual means in foundation trenches or drains (not exceeding 1.5 m in width or 10 sqm on plan), including dressing of sides and ramming of bottoms, lift up to 1.5 m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50 m. All kinds of soil							
	For Drain	1	300.000	0.800	0.800		192.000	
	Total Quantity						192.000 cum	
	Total Deducted Quantity						0.000 cum	

	Net Total Quantity						192.000 cum	
	Say 192.000 cum @ Rs 291.38 / cum						Rs 55944.96	
2	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)							
	Drain bottom	1	300.000	0.800	0.100		24.000	
	Total Quantity						24.000 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						24.000 cum	
	Say 24.000 cum @ Rs 6687.23 / cum						Rs 160493.52	
3	4.1.3 Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:2:4 (cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size)							
	Drain Bottom	1	300.000	0.800	0.100		24.000	
	Side wall	2	300.000	0.200	0.600		72.000	
	Total Quantity						96.000 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						96.000 cum	
	Say 96.000 cum @ Rs 7841.17 / cum						Rs 752752.32	
4	5.9.2 Centering and shuttering including strutting, etc. and removal of form for:Walls (any thickness) including attached pilasters, buttersesses, plinth and string courses etc.							
	Drain inside	1*2	300.000	0.600			360.000	
	Total Quantity						360.000 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						360.000 sqm	
	Say 360.000 sqm @ Rs 703.77 / sqm						Rs 253357.20	
5	13.1.1 12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)							
	Drain Bottom and Wall Top	1	300.000	0.800			240.000	
	Side wall	1*2	300.000	0.600			360.000	
	Total Quantity						600.000 sqm	
	Total Deducted Quantity						0.000 sqm	

SI No	Description	No	L	B	D	CF	Quantity	Remark
Net Total Quantity							600.000 sqm	
Say 600.000 sqm @ Rs 308.21 / sqm							Rs 184926.00	
23Compound wall and Gate (Cost Index:33.05 %)								
1	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							
	Compound wall foundation	1	440.000	0.500	0.450		99.000	
	Gate Pillar footing	3	1.000	1.000	0.750		2.250	
Total Quantity							101.250 cum	
Total Deducted Quantity							0.000 cum	
Net Total Quantity							101.250 cum	
Say 101.250 cum @ Rs 291.38 / cum							Rs 29502.23	
2	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)							
	Compound wall foundation	1	440.000	0.500	0.200		44.000	
	Gate pillar	3	1.000	1.000	0.200		0.601	
Total Quantity							44.601 cum	
Total Deducted Quantity							0.000 cum	
Net Total Quantity							44.601 cum	
Say 44.601 cum @ Rs 6687.23 / cum							Rs 298257.15	
3	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)							
	Compound wall foundation	1	440.000	0.450	0.450		89.101	
Total Quantity							89.101 cum	
Total Deducted Quantity							0.000 cum	
Net Total Quantity							89.101 cum	
Say 89.101 cum @ Rs 7069.81 / cum							Rs 629927.14	

4	50.6.7.2 Laterate masonry with neatly dressed laterate stone of size 40x20x15cm or nearest size in cement mortar 1:6 for super structure above plinth level up to floor two level including all cost of materials, labour charges etc.							
	Wall	1	440.000	0.200	1.800		158.400	
	Pillar Addl.	146	0.350	0.350	1.800		32.193	
	Total Quantity						190.593 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						190.593 cum	
	Say 190.593 cum @ Rs 7872.98 / cum						Rs 1500534.88	
5	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							
	Gate Piller Footing	3	1.200	1.200	0.200		0.864	
	„	3	1.000	1.000	0.600		1.800	
	Total Quantity						2.664 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						2.664 cum	
	Say 2.664 cum @ Rs 8914.95 / cum						Rs 23749.43	
6	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)							
	gate pillar	3	0.300	0.300	2.100		0.567	
	Total Quantity						0.567 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						0.567 cum	
	Say 0.567 cum @ Rs 10748.84 / cum						Rs 6094.59	
7	5.9.1 Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete							
	Footing side	3*4	1.200		0.200		2.880	
	Total Quantity						2.880 sqm	
	Total Deducted Quantity						0.000 sqm	

	Net Total Quantity							2.880 sqm
	Say 2.880 sqm @ Rs 329.03 / sqm							Rs 947.61
8	5.9.2 Centering and shuttering including strutting, etc. and removal of form for:Walls (any thickness) including attached pilasters, buttersesses, plinth and string courses etc.							
	gate pille	3*4	0.300		2.100		7.561	
	Total Quantity							7.561 sqm
	Total Deducted Quantity							0.000 sqm
	Net Total Quantity							7.561 sqm
	Say 7.561 sqm @ Rs 703.77 / sqm							Rs 5321.20
9	13.1.1 12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)							
	Compound wall sides	2	440.000	1.800			1584.000	
	Pillar sides	146*2	0.150	1.800			78.840	
	Top	1	440.000	0.230			101.200	
	Piiller Top	146	0.150	0.350			7.665	
	Gate pillar	2	1.000	2.100			4.200	
	„	1	1.200	2.100			2.520	
	Top	3	0.300	0.300			0.270	
	Total Quantity							1778.695 sqm
	Total Deducted Quantity							0.000 sqm
	Net Total Quantity							1778.695 sqm
	Say 1778.695 sqm @ Rs 308.21 / sqm							Rs 548211.59
10	13.43.1 Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer							
	Compound wall sides	2	440.000	1.800			1584.000	
	Pillar sides	146*2	0.150	1.800			78.840	
	Top	1	440.000	0.230			101.200	
	Piiller Top	146	0.150	0.350			7.665	
	Gate pillar	2	1.000	2.100			4.200	
	„	1	1.200	2.100			2.520	
	Top	3	0.300	0.300			0.270	
	Total Quantity							1778.695 sqm

		Total Deducted Quantity					0.000 sqm	
		Net Total Quantity					1778.695 sqm	
		Say 1778.695 sqm @ Rs 69.32 / sqm					Rs 123299.14	
11	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							
	Compound wall sides	2	440.000	1.800			1584.000	
	Pillar sides	146*2	0.150	1.800			78.840	
	Top	1	440.000	0.230			101.200	
	Piiller Top	146	0.150	0.350			7.665	
	Gate pillar	2	1.000	2.100			4.200	
	„	1	1.200	2.100			2.520	
	Top	3	0.300	0.300			0.270	
		Total Quantity					1778.695 sqm	
		Total Deducted Quantity					0.000 sqm	
		Net Total Quantity					1778.695 sqm	
		Say 1778.695 sqm @ Rs 148.55 / sqm					Rs 264225.14	
12	10.25.2 Item Shifted to Sub head 14 as item 14.73Item Shifted to head 14 as item 14.74Steel 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							
	Main gate	1	4.000	1.800		30.0	216.000	
	Vicat Gate	1	1.000	1.800		20.0	36.000	
		Total Quantity					252.000 kg	
		Total Deducted Quantity					0.000 kg	
		Net Total Quantity					252.000 kg	
		Say 252.000 kg @ Rs 151.28 / kg					Rs 38122.56	
13	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 .							
	Main gate	1	4.000	1.800			7.200	
	Vicat Gate	1	1.000	1.800			1.800	
		Total Quantity					9.000 sqm	

								Total Deducted Quantity	0.000 sqm
								Net Total Quantity	9.000 sqm
								Say 9.000 sqm @ Rs 204.63 / sqm	Rs 1841.67
SI No	Description	No	L	B	D	CF	Quantity	Remark	
24 Operation and Maintenance cost for STP and Allied works - 1st year (Cost Index:33.05 %)									
1	od353215/2021_2022 Labour/Workers for operation and maintenance for 7Mld STP allied works								
		1					1.000		
							Total Quantity	1.000 set	
							Total Deducted Quantity	0.000 set	
							Net Total Quantity	1.000 set	
							Say 1.000 set @ Rs 4981396.06 / set	Rs 4981396.06	
2	od353217/2021_2022 Annul maintenance(Day today if needed) of electrical, civil ,mechanical and other connected items and including replacement damaged of electrical , mechanical and civil, Including painting of items as per the direction of departmental officials								
		1					1.000		
							Total Quantity	1.000 set	
							Total Deducted Quantity	0.000 set	
							Net Total Quantity	1.000 set	
							Say 1.000 set @ Rs 882740.00 / set	Rs 882740.00	
3	od353218/2021_2022 Consumables Gas chlorine,Fuel for generator,chemicals ,Cotton waste ,Lubricants (oil and Grease)soap ,Glass ware,safety equipment etc								
		1					1.000		
							Total Quantity	1.000 set	
							Total Deducted Quantity	0.000 set	
							Net Total Quantity	1.000 set	
							Say 1.000 set @ Rs 954753.00 / set	Rs 954753.00	
SI No	Description	No	L	B	D	CF	Quantity	Remark	
25 Operation and Maintenance cost for STP and Allied works - 2nd year to 10th year (Cost Index:33.05 %)									
1	od353216/2021_2022 Operation and Maintenance cost for STP and Allied works - 2nd year to 10th year								
								4MLD STP-Operation and Maintenance for 9 year (Second year to 10 th year)	
	2 nd Year-Add 8% to 1st year	1	1.080				1.080		

	3 rd Year-Add 16% to 1st year	1	1.160					1.160	
	4 th Year-Add 24% to 1st year	1	1.240					1.240	
	5 th Year-Add 32% to 1st year	1	1.320					1.320	
	6 th Year-Add 40% to 1st year	1	1.400					1.400	
	7 th Year-Add 48% to 1st year	1	1.480					1.480	
	8 th Year-Add 56% to 1st year	1	1.560					1.560	
	9 th Year-Add 64% to 1st year	1	1.640					1.640	
	10 th Year-Add 72% to 1st year	1	1.720					1.720	
	Total Quantity							12.600 No	
	Total Deducted Quantity							0.000 No	
	Net Total Quantity							12.600 No	
	Say 12.600 No @ Rs 6818889.06 / No							Rs 85918002.16	
SI No	Description	No	L	B	D	CF	Quantity	Remark	
26Landscaping and Greenbelt Formation around the STP compound									
	Lump-Sum Total							Rs 100000.00	
SI No	Description	No	L	B	D	CF	Quantity	Remark	
27Electricity charges to STP for 10 years (Cost Index:33.05 %)									
1	od21438/2022_2023 Electricity charges for 7 MLD STP, Rs.17097370.159/Year								
	Electricity charges to S T P @ 17097370.15/Year	10					10.000		
	Total Quantity							10.000 No	
	Total Deducted Quantity							0.000 No	
	Net Total Quantity							10.000 No	
	Say 10.000 No @ Rs 17097370.15 / No							Rs 170973701.50	
Total							378455959.87		
Centage @							10.0%		

Centage Amount	37845595.99
Provision for GST payments (in %) @	18.0%
Amount reserved for GST payments	68122072.78
Total & Centage	484423628.63
Lumpsum for round off	0.00
GRAND TOTAL Rs	484423628.63
Rounded Grand Total Rs 48,44,23,629	
Rupees Forty Eight Crore Forty Four Lakh Twenty Three Thousand Six Hundred and Twenty Nine Only	



Kerala Water Authority

PRICE

General Abstract

**SEWERAGE SCHEME TO KANHANGAD MUNICIPALITY - CONSTRUCTION OF 7
MLD CAPACITY SEWAGE TREATMENT PLANT AT NILANKARAVAYAL AND
LAYING SEWERAGE NET WORK -ELECTRO-MECHANICAL ESTIMATE**

(Dsr year: 2018)

SI No	Heading Description	Amount
1	MECHANICAL WORKS	38206736.40
2	ELECTRICAL WORKS	11518044.98
3	Charges for Power allocation to KSEB and power extension by cable	10000000.00
4	Tools and Plants	400000.00
5	Provision for Automating entire plant by SCADA system	2500000.00
6	Provision for Supplying and fixing Solar panel with control unit	2500000.00
7	Provision for supplying and fixing Odour control system	10000000.00
	Total	75124781.38
	Centage @	10.0%
	Centage Amount	7512478.14
	Provision for GST payments (in %) @	18.0%
	Amount reserved for GST payments	13522460.65
	Total & Centage	96159720.17
	Lumpsum for round off	0.00
	GRAND TOTAL Rs	96159720.17
	Rounded Grand Total Rs 9,61,59,720	
	Rupees Nine Crore Sixty One Lakh Fifty Nine Thousand Seven Hundred and Twenty Only	

Detailed Estimate

**SEWERAGE SCHEME TO KANHANGAD MUNICIPALITY - CONSTRUCTION OF 7
MLD CAPACITY SEWAGE TREATMENT PLANT AT NILANKARAVAYAL AND
LAYING SEWERAGE NET WORK -ELECTRO-MECHANICAL ESTIMATE**

(Dsr year: 2018)

SI No	Description	No	L	B	D	CF	Quantity	Remark	
1MECHANICAL WORKS (Cost Index:33.05 %)									
1	od361691/2021_2022 Supply at site,erection, testing and commissioning of self priming, non clog centrifugal submersible sewage transfer pump for rated continuous duty and efficiency (from reputed manufacturers complying to IS 1520 and conforming to other relevant standards), CI construction, bronze impeller,complete with 3 phase motor, SS shaft, with automatic pedestal coupling, delivery bend, required wire chain, washers, SS bolts etc including Double Flange DI/CI PN 1 rating sluice valves, Pressure gauges, Double Flange DI/CI PN 1 rating NRVs with DI/I/Pipes connecting common delivery suitable for operation on 415 +/-10% volts, 50 HZ, AC power supply etc. complete in all respects with detachable arrangements, level indicators for automatic switch on & switch off as required by the standard specifications complete with all accessories as per technical specification or as directed by Engineer In Charge.Pumps shall have dry run protection & high/ low level alarm. Electrical Control panel shall be supplied with the pump as per the specifications in the Electrical BOQ Three phase Motor with IP 68 protection (2W 1S)"- Raw Sewage Transfer Pump-30HP								
		3					3.000		
						Total Quantity	3.000 No		
						Total Deducted Quantity	0.000 No		
						Net Total Quantity	3.000 No		
						Say 3.000 No @ Rs 1115040.00 / No	Rs 3345120.00		
2	od361693/2021_2022 Supply at site,erection, testing and commissioning of self priming, non clog centrifugal submersible sewage transfer pump for rated continuous duty and efficiency (from reputed manufacturers complying to IS 1520 and conforming to other relevant standards), CI construction, bronze impeller,complete with 3 phase motor, SS shaft, with automatic pedestal coupling, delivery bend, required wire chain, washers, SS bolts etc including Double Flange DI/CI PN 1 rating sluice valves, Pressure gauges, Double Flange DI/CI PN 1 rating NRVs with DI/I/Pipes connecting common delivery suitable for operation on 415 +/-10% volts, 50 HZ, AC power supply etc. complete in all respects with detachable arrangements, level indicators for automatic switch on & switch off as required by the standard specifications complete with all accessories as per technical specification or as directed by Engineer In Charge.Pumps shall have dry run protection & high/ low level alarm. Electrical Control panel shall be supplied with the pump as per the specifications in the Electrical BOQ Motor : three phase motor with IP 68 Protection"-Pump for septage tank to inlet-2 HP								

		2					2.000	
	Total Quantity						2.000 No	
	Total Deducted Quantity						0.000 No	
	Net Total Quantity						2.000 No	
	Say 2.000 No @ Rs 69690.00 / No						Rs 139380.00	
3	od361695/2021_2022 Supply,erection, testing and commissioning of direct driven floating mixers of approximately 3HP or as required with the rotating arm for rated continuous duty mixing and efficiency, complete set with 3 phase motor, including rotary paddles, gear box, cables, wall mooring and anchoring system with all electro mechancial equipments etc complete for the equalization tank . Electrical Control panel shall be supplied with the pump as per the specifications in the Electrical BOQ or as directed by the Engineer in Charge							
		4					4.000	
	Total Quantity						4.000 No	
	Total Deducted Quantity						0.000 No	
	Net Total Quantity						4.000 No	
	Say 4.000 No @ Rs 139380.00 / No						Rs 557520.00	
4	od361697/2021_2022 Supply at site,erection, testing and commissioning of self priming, non clog centrifugal submersible sewage transfer pump for rated continuous duty and efficiency (from reputed manufacturers complying to IS 1520 and conforming to other relevant standards), CI construction, bronze impeller,complete with 3 phase motor, SS shaft, with automatic pedestal coupling, delivery bend, required wire chain, washers, SS bolts etc including Double Flange DI/CI PN 1 rating sluice valves, Pressure gauges, Double Flange DI/CI PN 1 rating NRVs with DI/I/Pipes connecting common delivery suitable for operation on 415 /-10% volts, 50 HZ, AC power supply etc. complete in all respects with detachable arrangements, level indicators for automatic switch on & switch off as required by the standard specifications complete with all accessories as per technical specification or as directed by Engineer In Charge.Pumps shall have dry run protection & high/ low level alarm. Electrical Control panel shall be supplied with the pump as per the specifications in the Electrical BOQ Motor : three phase motor with IP 68 Protection"-Sludge Thickener Feed Pump-4 HP							
	Sludge Thickener Feed Pump	2					2.000	
	Total Quantity						2.000 No	
	Total Deducted Quantity						0.000 No	
	Net Total Quantity						2.000 No	
	Say 2.000 No @ Rs 174225.00 / No						Rs 348450.00	
5	od361699/2021_2022 Supply at site,erection, testing and commissioning of self priming, non clog centrifugal submersible sewage transfer pump for rated continuous duty and efficiency (from reputed manufacturers complying to IS 1520 and conforming to other relevant standards), CI construction, bronze impeller,complete with 3							

	phase motor, SS shaft, with automatic pedestal coupling, delivery bend, required wire chain, washers, SS bolts etc including Double Flange DI/CI PN 1 rating sluice valves, Pressure gauges, Double Flange DI/CI PN 1 rating NRVs with DI/I/Pipes connecting common delivery suitable for operation on 415 /-10% volts, 50 HZ, AC power supply etc. complete in all respects with detachable arrangements, level indicators for automatic switch on & switch off as required by the standard specifications complete with all accessories as per technical specification or as directed by Engineer In Charge.Pumps shall have dry run protection & high/ low level alarm. Electrical Control panel shall be supplied with the pump as per the specifications in the Electrical BOQ Motor : three phase motor with IP 68 Protection"-Clarifier to sludge Sump Pump-3 HP- 2 nos							
		4						4.000
		Total Quantity						4.000 No
		Total Deducted Quantity						0.000 No
		Net Total Quantity						4.000 No
		Say 4.000 No @ Rs 97566.00 / No						Rs 390264.00
6	od361701/2021_2022 Supply at site,erection, testing and commissioning of self priming, non clog centrifugal submersible sewage transfer pump for rated continuous duty and efficiency (from reputed manufacturers complying to IS 1520 and conforming to other relevant standards), CI construction, bronze impeller,complete with 3 phase motor, SS shaft, with automatic pedestal coupling, delivery bend, required wire chain, washers, SS bolts etc including Double Flange DI/CI PN 1 rating sluice valves, Pressure gauges, Double Flange DI/CI PN 1 rating NRVs with DI/I/Pipes connecting common delivery suitable for operation on 415 /-10% volts, 50 HZ, AC power supply etc. complete in all respects with detachable arrangements, level indicators for automatic switch on & switch off as required by the standard specifications complete with all accessories as per technical specification or as directed by Engineer In Charge.Pumps shall have dry run protection & high/ low level alarm. Electrical Control panel shall be supplied with the pump as per the specifications in the Electrical BOQ Motor : three phase motor with IP 68 Protection"- Sludge transfer to centrifuge pump-1.50 HP- 2Nos							
		2						2.000
		Total Quantity						2.000 No
		Total Deducted Quantity						0.000 No
		Net Total Quantity						2.000 No
		Say 2.000 No @ Rs 55752.00 / No						Rs 111504.00
7	od361703/2021_2022 Supply at site,erection, testing and commissioning of self priming, non clog centrifugal submersible sewage transfer pump for rated continuous duty and efficiency (from reputed manufacturers complying to IS 1520 and conforming to other relevant standards), CI construction, bronze impeller,complete with 3 phase motor, SS shaft, with automatic pedestal coupling, delivery bend, required wire chain, washers, SS bolts etc including Double Flange DI/CI PN 1 rating sluice valves, Pressure gauges, Double Flange DI/CI PN 1 rating NRVs with DI/I/Pipes connecting common delivery suitable for operation on 415 /-10% volts, 50 HZ, AC power supply etc. complete in all respects with detachable arrangements, level indicators for automatic switch on & switch off as required by the standard specifications complete with all accessories							

	as per technical specification or as directed by Engineer In Charge.Pumps shall have dry run protection & high/ low level alarm. Electrical Control panel shall be supplied with the pump as per the specifications in the Electrical BOQ Motor : three phase motor with IP 68 Protection"-Centrate sump to equalisation tank Pump-3HP- 2Nos						
		2					2.000
	Total Quantity						2.000 No
	Total Deducted Quantity						0.000 No
	Net Total Quantity						2.000 No
	Say 2.000 No @ Rs 111504.00 / No						Rs 223008.00
8	od361704/2021_2022 Supplying and fixing of mono block centrifugal pump, for rated continuous duty and best efficiency CI construction, CI impeller, complete with 3 phase motor,FRP motor cover, pressure gauge, operation on 415 +/-10% volts, 50 HZ, AC power supply etc including sluice valves, Pressure gauges, NRVs with DI/I/Pipes connecting common delivery suitable for complete in all respects as required by the standard specifications and shall suit following capacities complete with all accessories as per technical specification.Pumps shall have dry run protection & high/ low level alarm. Electrical Control panel shall be supplied with the pump as per the specifications in the Electrical BOQ Motor : three phase motor with IP 68 Protection"- Pump for clarifier to PSF-13HP-8 Nos						
		8					8.000
	Total Quantity						8.000 No
	Total Deducted Quantity						0.000 No
	Net Total Quantity						8.000 No
	Say 8.000 No @ Rs 332189.00 / No						Rs 2657512.00
9	od361706/2021_2022 Supplying and fixing of mono block centrifugal pump, for rated continuous duty and best efficiency CI construction, CI impeller, complete with 3 phase motor,FRP motor cover, pressure gauge, operation on 415 +/-10% volts, 50 HZ, AC power supply etc including sluice valves, Pressure gauges, NRVs with DI/I/Pipes connecting common delivery suitable for complete in all respects as required by the standard specifications and shall suit following capacities complete with all accessories as per technical specification.Pumps shall have dry run protection & high/ low level alarm. Electrical Control panel shall be supplied with the pump as per the specifications in the Electrical BOQ Motor : three phase motor with IP 68 Protection"- Treated water to septage tank-4hp- 2Nos						
		2					2.000
	Total Quantity						2.000 No
	Total Deducted Quantity						0.000 No
	Net Total Quantity						2.000 No
	Say 2.000 No @ Rs 102212.00 / No						Rs 204424.00
10	od361709/2021_2022 "Air Blower Supply,erection, testing and commissioning of twin lobe air blower for indoor application						

	complete with acoustic canopy, air filter, motor of 1500 rpm , pulleys, pressure gauges, pressure relief valve, acoustic hood, suction silencer with suitable flanges, common motor and compressor base frame with motor belt tightening arrangement interconnecting line with flanges including all accessories complete as per technical specification or as Directed by Engineer in Charge Capacity: 2763 m3/hr. Pressure: 0.6 kg/sqcm Motor : three phase motor with IP 68 Protection (3W 1 S)" 52- - 4NosHP								
		4					4.000		
		Total Quantity					4.000 No		
		Total Deducted Quantity					0.000 No		
		Net Total Quantity					4.000 No		
		Say 4.000 No @ Rs 1087164.00 / No						Rs 4348656.00	
11	od361710/2021_2022 "Bubble Diffuser for MBBR Tank Supplying at site, erection, testing & commissioning of Fine Bubble Diffuser (retrievable type using rope and pulley arrangement) for the aeration system of the MBBR Tansk (2Nos) with diffusers of sufficient size and length made of EPDM make with SS tee 1" x 1" , SS lifting hook 8 mm, SS foundation bolt 6 mm, SS C clamp suitable for 1" O.D, hose, PP Rope, PP swivel nut, PP sleeve, Silicone Washer, SS hose clamp, RCC block complete at a minimum rating of 95m/hr as per technical specification or as directed by the Engineer in Charge"								
		4					4.000		
		Total Quantity					4.000 No		
		Total Deducted Quantity					0.000 No		
		Net Total Quantity					4.000 No		
		Say 4.000 No @ Rs 209070.00 / No						Rs 836280.00	
12	od361712/2021_2022 "Bubble Diffuser for Equalisation Tank Supplying at site, erection, testing & commissioning of Coarse Bubble Diffuser (retrievable type using rope and pulley arrangement) for the aeration system of the Equalization Tank with diffusers of sufficient size and length made of EPDM make with SS tee 1" x 1" , SS lifting hook 8 mm, SS foundation bolt 6 mm, SS C clamp suitable for 1" O.D, hose, PP Rope, PP swivel nut, PP sleeve, Silicone Washer, SS hose clamp, RCC block complete at a minimum rating of 95m/hr as per technical specification or as directed by the Engineer in Charge"								
		4					4.000		
		Total Quantity					4.000 No		
		Total Deducted Quantity					0.000 No		
		Net Total Quantity					4.000 No		
		Say 4.000 No @ Rs 80724.25 / No						Rs 322897.00	
13	od361714/2021_2022 "Air Grid Pipe Supply and installation of air pipes (HDPE) aly into valves and other acessories as								

	required for the blowers to various tanks as a complete unit"						
		1					1.000
	Total Quantity						1.000 set
	Total Deducted Quantity						0.000 set
	Net Total Quantity						1.000 set
	Say 1.000 set @ Rs 290375.00 / set						Rs 290375.00
14	od361717/2021_2022 "MBBR Media Supplying and fixing of non- clogging freely moving biomass media of polypropylene construction Sp.Gravity 0.93 for MBBR reactor with surface area not less than 450 m2/m3, length 16-20 mm, dia 22 mm complete as per technical specification or as directed by Engineer in Charge"						
		1	599.430				599.430
	Total Quantity						599.430 cum
	Total Deducted Quantity						0.000 cum
	Net Total Quantity						599.430 cum
	Say 599.430 cum @ Rs 10453.50 / cum						Rs 6266141.51
15	od361718/2021_2022 "Gas Chlorinator system Supply at site, erection, testing and commissioning of electronic chlorine dosing system (gas filled Chlorine) with all wetted parts in PP construction suitable for pumping Chlorine gas including booster pumps, valves, suction and delivery lines using heavy duty PVC tubes, gas line diffusers, emergency repair kit, FRP motor cover etc.complete with all accessories. Capacity : 500gm to 1kg/hr with 2nos of chlorine tonners"						
		2					2.000
	Total Quantity						2.000 set
	Total Deducted Quantity						0.000 set
	Net Total Quantity						2.000 set
	Say 2.000 set @ Rs 464600.00 / set						Rs 929200.00
16	od361720/2021_2022 "Electromagnetic flow meter Supply, installation, testing and commissioning of electro magnetic/ Ultra Sonic D/F permanent conduit flow meter with flow recorder, digital flow indicator, flow integrator with sensors, 7digit totaliser, transmittal and digital display arrangements and all accessories including housing arrangements, internal data logger, to save upto 2000 linesof data etc. complete to fix as per the specifications . Flow range of 10 to 600LPS, One display shall be installed at the main control centre"						
		2					2.000
	Total Quantity						2.000 No
	Total Deducted Quantity						0.000 No

	or nearest suitable size made of flats having 50mm x 10mm and 6mm clear space across the screen chamber channel (fixed type) at 70 inclination including cost of mechanical screen grab bucket and arrangement for automated scrapping clogged materials suitable for operation on 415+/-10% volts, 50 HZ, AC power supply etc. complete in all respects as required by the standard specifications complete with all accessories as per technical specification"						
		1					1.000
	Total Quantity						1.000 set
	Total Deducted Quantity						0.000 set
	Net Total Quantity						1.000 set
	Say 1.000 set @ Rs 116150.00 / set						Rs 116150.00
21	od361725/2021_2022 "Manual Coarse Screen Supplying all materials, fabricating, fixing and commissioning of Manual SS Screen Bar of following or nearest suitable size made of flats having 50mm x 10mm and 20mm clear space across the screen chamber channel (fixed type) at 45 inclination including cost of screen grab bucket and arrangement for manual scrapping clogged materials as per drawings, tender specifications and as directed by Engineer in Charge"						
		1					1.000
	Total Quantity						1.000 set
	Total Deducted Quantity						0.000 set
	Net Total Quantity						1.000 set
	Say 1.000 set @ Rs 34845.00 / set						Rs 34845.00
22	od361726/2021_2022 "Gritting Mechanism Supplying at site all electro-mechanical equipments, fabricating, fixing and commissioning of the gritting mechanism to suit gritting chamber sizes as per drawings, tender specifications or as directed by Engineer in Charge."						
		2					2.000
	Total Quantity						2.000 No
	Total Deducted Quantity						0.000 No
	Net Total Quantity						2.000 No
	Say 2.000 No @ Rs 545905.00 / No						Rs 1091810.00
23	od361727/2021_2022 "Clarifier Mechanism Supplying all materials, fabricating, fixing and commissioning of Bridge mounted central driven type clarifier mechanical rake for the half diameter of the Clarifier Tank as per drawings including all feed well, drive and rake mechanism with removable scrappers with sufficient 3phase motor and gears etc complete as per tender specifications and as directed by Engineer in Charge"						

		2					2.000	
	Total Quantity						2.000 No	
	Total Deducted Quantity						0.000 No	
	Net Total Quantity						2.000 No	
	Say 2.000 No @ Rs 813050.00 / No						Rs 1626100.00	
24	od361728/2021_2022 "Sludge Thickener Mechanism Supplying all materials, fabricating, fixing and commissioning of Bridge mounted central driven type sludge thickening mechanism for the full diameter of the Sludge Thickener tank as per drawings including all feed well, drive and rake mechanism with removable scrappers with sufficient 3phase motor and gears etc complete as per tender specifications and as directed by Engineer in Charge"							
		1					1.000	
	Total Quantity						1.000 No	
	Total Deducted Quantity						0.000 No	
	Net Total Quantity						1.000 No	
	Say 1.000 No @ Rs 313605.00 / No						Rs 313605.00	
25	od361729/2021_2022 "Poly Electrolyte dosing system Supplying and fixing of electronic dosing pump with all wetted parts in PP construction suitable for pumping Poly Electrolyte solution including cost of suitable agitators, control gears, valve, suction and delivery lines using heavy duty PVC tubes, HD, FRP motor cover etc. and complete with all accessories to prepare 5% solution of 0.2kg/hr"							
		2					2.000	
	Total Quantity						2.000 No	
	Total Deducted Quantity						0.000 No	
	Net Total Quantity						2.000 No	
	Say 2.000 No @ Rs 92920.00 / No						Rs 185840.00	
26	od361730/2021_2022 "High Pressure Jet Pump Supply and commissioning of portable high pressure water pumps (along with 500litre water tanks to supply water to the pumps) all mounted on a suitable medium vehicle platform for clearing the wells, pumps, and other equipments using high pressure gauges, safety arrangements etc complete as per standards"							
		1					1.000	
	Total Quantity						1.000 No	
	Total Deducted Quantity						0.000 No	
	Net Total Quantity						1.000 No	

	Say 1.000 No @ Rs 34845.00 / No						Rs 34845.00	
27	od361731/2021_2022 "Portable Hoist - 500kg Supply and commissioning of portable Monkey type Hoist with capacity upto 500kg, with lifting height of 6m, 5HP Motor, 415V 50Hz all mounted on a suitable medium vehicle platform for easy shifting of equipments and materials whenever required with complete set as per standards"							
		1					1.000	
	Total Quantity						1.000 No	
	Total Deducted Quantity						0.000 No	
	Net Total Quantity						1.000 No	
	Say 1.000 No @ Rs 104535.00 / No						Rs 104535.00	
28	od361732/2021_2022 "Wheel Barrow Supply of three wheel type wheel barrow of capacity 200ltrs"							
		1					1.000	
	Total Quantity						1.000 No	
	Total Deducted Quantity						0.000 No	
	Net Total Quantity						1.000 No	
	Say 1.000 No @ Rs 29037.50 / No						Rs 29037.50	
29	od361733/2021_2022 "Aluminium Ladder Supply, Installation of aluminium ladders with caging on each elevated structures of required height as per the drawings or as directed by the Engineer in Charges"							
		4					4.000	
	Total Quantity						4.000 No	
	Total Deducted Quantity						0.000 No	
	Net Total Quantity						4.000 No	
	Say 4.000 No @ Rs 6969.00 / No						Rs 27876.00	
30	od361734/2021_2022 "FRP Ladder Supply, Installation of FRP ladders with caging on each elevated structures of required height as per the drawings or as directed by the Engineer in Charges"							
		6					6.000	
	Total Quantity						6.000 No	
	Total Deducted Quantity						0.000 No	
	Net Total Quantity						6.000 No	

							Say 6.000 No @ Rs 34845.00 / No	Rs 209070.00
31	od361735/2021_2022 "Monorail Crane Supply, Installation and commissioning in position mechanically operated mono rail crane of load bearing capacity of 2tonnes suitable for operation on 415+/-10% volts, 50 HZ, AC power supply etc. with 6m lift & span upto 20m complete in all respects as required by the standard specifications complete with all accessories as per technical specification"							
			1					1.000
							Total Quantity	1.000 No
							Total Deducted Quantity	0.000 No
							Net Total Quantity	1.000 No
							Say 1.000 No @ Rs 406525.00 / No	Rs 406525.00
32	od361736/2021_2022 "Pressure sand filter Supply at site, erection and commissioning of pressure sand filter vertical type pressure vessel fabricated with MS construction with epoxy coating inside and anti corrosive treatment outside, two coats of paint outside (pain quality as instructed by Engineer) withstand a minimum test pressure of 7.0Kg/cm with as operating pressure of 3.5 Kg/cm, complete with valves and dual filter media including graded pebble and sand and antracite , frontal piping, butterfly valves, internals, pressure gauges, strainers, supporting structure, back wash arrangement, etc and all other accessories tested twice the working pressure supported over pebble/gravel with inspection manholes etc complete as per specification or as directed by Engineer in Charge. The scope shall include complete piping with MS fabricated pipes and specials including valves Flow Rate:52 m3/hour Diameter - 2.4m. Height - 2.5m"							
			7					7.000
							Total Quantity	7.000 No
							Total Deducted Quantity	0.000 No
							Net Total Quantity	7.000 No
							Say 7.000 No @ Rs 522675.00 / No	Rs 3658725.00
33	od361737/2021_2022 "Activated Carbon filter Supply at site, erection and commissioning of Activated Carbon filter vertical type pressure vessel fabricated with MS construction with epoxy coating inside and anti corrosive treatment outside, two coats of paint outside (pain quality as instructed by Engineer) withstand a minimum test pressure of 7.0Kg/cm with as operating pressure of 3.5 Kg/cm, complete with valves and filter media including activated carbon of approved grade and quality , frontal piping, butterfly valves, internals, pressure gauges, strainers, supporting structure, back wash arrangement, etc and all other accessories tested twice the working pressure supported over pebble/gravel with inspection manholes etc complete as per specification or as directed by Engineer in Charge. The scope shall include complete piping with MS fabricated pipes and specials including valves Flow rate - 52 m/hr. Diameter - 2.6m. Height - 2.5m"							
			7					7.000

							Total Deducted Quantity	0.000 kg
							Net Total Quantity	100.000 kg
							Say 100.000 kg @ Rs 664.65 / kg	Rs 66465.00
37	18.73.1	Providing and laying Double Flanged (Screwed / Welded) Centrifugally (Spun) Ductile Iron Pipes of Class K - 9 conforming to IS: 8329 :100 mm dia Ductile Iron Double Flanged						
		1	50.000					50.000
							Total Quantity	50.000 metre
							Total Deducted Quantity	0.000 metre
							Net Total Quantity	50.000 metre
							Say 50.000 metre @ Rs 1769.96 / metre	Rs 88498.00
38	18.73.2	Providing and laying Double Flanged (Screwed / Welded) Centrifugally (Spun) Ductile Iron Pipes of Class K - 9 conforming to IS: 8329 :150 mm dia Ductile Iron Double Flanged						
		1	50.000					50.000
							Total Quantity	50.000 metre
							Total Deducted Quantity	0.000 metre
							Net Total Quantity	50.000 metre
							Say 50.000 metre @ Rs 2655.21 / metre	Rs 132760.50
39	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						
		1	20.000					20.000
							Total Quantity	20.000 metre
							Total Deducted Quantity	0.000 metre
							Net Total Quantity	20.000 metre
							Say 20.000 metre @ Rs 3351.06 / metre	Rs 67021.20
40	18.73.5	Providing and laying Double Flanged (Screwed / Welded) Centrifugally (Spun) Ductile Iron Pipes of Class K - 9 conforming to IS: 8329 :300 mm dia Ductile Iron Double Flanged						
		1	40.000					40.000
							Total Quantity	40.000 metre
							Total Deducted Quantity	0.000 metre
							Net Total Quantity	40.000 metre
							Say 40.000 metre @ Rs 6106.86 / metre	Rs 244274.40

41	18.73.7 Providing and laying Double Flanged (Screwed / Welded) Centrifugally (Spun) Ductile Iron Pipes of Class K - 9 conforming to IS: 8329 :400 mm dia Ductile Iron Double Flanged		1	40.000				40.000	
		Total Quantity						40.000 metre	
		Total Deducted Quantity						0.000 metre	
		Net Total Quantity						40.000 metre	
		Say 40.000 metre @ Rs 9865.59 / metre						Rs 394623.60	
42	18.73.8 Providing and laying Double Flanged (Screwed / Welded) Centrifugally (Spun) Ductile Iron Pipes of Class K - 9 conforming to IS: 8329 :450 mm dia Ductile Iron Double Flanged		1	40.000				40.000	
		Total Quantity						40.000 metre	
		Total Deducted Quantity						0.000 metre	
		Net Total Quantity						40.000 metre	
		Say 40.000 metre @ Rs 10401.32 / metre						Rs 416052.80	
43	18.73.9 Providing and laying Double Flanged (Screwed / Welded) Centrifugally (Spun) Ductile Iron Pipes of Class K - 9 conforming to IS: 8329 :500 mm dia Ductile Iron Double Flanged		1	40.000				40.000	
		Total Quantity						40.000 metre	
		Total Deducted Quantity						0.000 metre	
		Net Total Quantity						40.000 metre	
		Say 40.000 metre @ Rs 14677.21 / metre						Rs 587088.40	
SI No	Description	No	L	B	D	CF	Quantity	Remark	
2ELECTRICAL WORKS (Cost Index:33.05 %)									
1	od361692/2021_2022 "350kVA Indoor Transformer and 11 kv indoor free standing cubcle type vcb switch gear panel of suitable capacity Supplying, installation, testing and commissioning of 350KVA, 11KV/433V, 3-Phase, 50 Hz, Dyn 11, indoor ONAN type, copper wound transformer with OFF load tap changing arrangement on HV and LV side complete with all accessories i/c first filling of filtered dehydrated oil and confirming to IS 2026 (Part 1 to Part 5) & as per specification attached complete in all respects as required at site or as directed by the Engineer In Charge including supply installation commissioning of suitable rated 11kv cubicle type vcb panel and suitable rated 11kv cable and termination		1					1.000	
		Total Quantity						1.000 No	
		Total Deducted Quantity						0.000 No	

		1					1.000	
	Total Quantity						1.000 L.S	
	Total Deducted Quantity						0.000 L.S	
	Net Total Quantity						1.000 L.S	
	Say 1.000 L.S @ Rs 250000.00 / L.S						Rs 250000.00	
6	od361702/2021_2022 "350KVA Diesel Generator Providing, Installing, Testing and Commissioning of ?Silent Type? Diesel Generating set alongwith having Prime Power Rating of 350 KVA, 415 volts at 1500 RPM, 0.8 lagging power factor at 415 V suitable for 50 Hz, 3 phase system& for 0.85 Load Factor .							
		1					1.000	
	Total Quantity						1.000 No	
	Total Deducted Quantity						0.000 No	
	Net Total Quantity						1.000 No	
	Say 1.000 No @ Rs 2323000.00 / No						Rs 2323000.00	
7	od361705/2021_2022 "Auto Mains Failure Unit (AMF Panel) Fabricating, Installing, Testing & Commissioning of automatic mains failure control including auto by- pass panel, suitable for 350 KVA silent type DG set complete with relays, timers, set of CTs for metering & protection and energy analyser to indicate currents, phase and line voltages, frequency, power factor, KWH, KVARH & provision for overload, short circuit, restricted earth fault, under frequency, control cabling from AMF panel to diesel engine and elsewhere if required, all complete .							
		1					1.000	
	Total Quantity						1.000 No	
	Total Deducted Quantity						0.000 No	
	Net Total Quantity						1.000 No	
	Say 1.000 No @ Rs 232300.00 / No						Rs 232300.00	
8	od361707/2021_2022 "Earthing Equipments for DG Earthing with copper earth plate 600 mm X 600 mm X 3 mm thick including accessories, and providing masonry enclosure with cover plate having locking arrangement and watering pipe of 2.7 meter long etc. with charcoal/ coke and salt as required."							
		1					1.000	
	Total Quantity						1.000 L.S	
	Total Deducted Quantity						0.000 L.S	
	Net Total Quantity						1.000 L.S	
	Say 1.000 L.S @ Rs 102139.99 / L.S						Rs 102139.99	
9	od361708/2021_2022							

	<p>"Main Control Centre Design, Fabrication, Supply, Installation and commissioning of Electrical Control Panel of cubical construction with fully automated feature (indoor type) preferably floor mounted fabricated of 2mm thick CRCA Sheets compartmentised with hinge lock doors with Dust, vermi proof and powder coated with approved shade. The panel shall have enough size to accomadate the individual control centres of each equipment set with individual MCCB's/MCB of appropriate capacity and also to have provision for Busbars, ACBs & RCCB's as specified below with cable alley, interconnections having all accessories mounting and internal wiring, earth terminals, numbering etc, complete in all respect suitable for operation on 415V, 3 phase 50Hz AC supply with enclosure protection class IP 54 as required. Including supply, installation, termination testing & Commissioning of the all power and control cables as per specifications or as directed by the Engineer In Charge."</p>						
		1					1.000
	Total Quantity						1.000 L.S
	Total Deducted Quantity						0.000 L.S
	Net Total Quantity						1.000 L.S
	Say 1.000 L.S @ Rs 2323000.00 / L.S						Rs 2323000.00
10	<p>od361711/2021_2022 Wiring for Each equipment Supplying and Laying of PVC insulated and PVC sheathed / XLPE power cable of Aluminium conductor XLPE power cables as per IS:7098/Part-I/88 with latest ammendments 1.1 kv grad of required size direct in ground including excavation, sand cushioning, protective covering and refilling the trench etc. as required in the specifications or as directed by the Engineer in Charge.</p>						
							1.000
	Total Quantity						1.000 L.S
	Total Deducted Quantity						0.000 L.S
	Net Total Quantity						1.000 L.S
	Say 1.000 L.S @ Rs 1889258.73 / L.S						Rs 1889258.73
11	<p>od361713/2021_2022 Brass Glands & Aluminium Lugs Supplying and making end termination with brass compression gland and aluminium lugs for required size of PVC insulated and PVC sheathed I XLPE aluminium conductor cable of 1.1 kV grade as required.</p>						
		1					1.000
	Total Quantity						1.000 L.S
	Total Deducted Quantity						0.000 L.S
	Net Total Quantity						1.000 L.S
	Say 1.000 L.S @ Rs 251238.26 / L.S						Rs 251238.26
12	<p>od361715/2021_2022 "Power Distribution Board (Control Room & Centrifuge Building) Supplying and fixing of following ways surface/ recess mounting, vertical type, 415 V, TPN MCB distribution board of sheet steel, dust protected, duly powder painted, inclusive of 200 A, tinned copper</p>						

	bus bar, common neutral link, earth bar, din bar for mounting MCBs (but without MCBs and incomer) as required. (Note : Vertical type MCB TPDB is normally used where 3 phase outlets are required.) 12 way (4 + 36), Double door (i) Incoming - 63A MCCB & 63A , 100mA RCCB ii) Outgoing Feeders - 4Nos of 25A MCCB with 25A, 30mA RCCBs iii) Outgoing Feeders - 1Nos of 6A MCB iv) Outgoing Feeders - 2Nos Spares"								
		1						1.000	
	Total Quantity							1.000 L.S	
	Total Deducted Quantity							0.000 L.S	
	Net Total Quantity							1.000 L.S	
	Say 1.000 L.S @ Rs 66073.09 / L.S							Rs 66073.09	
13	od361716/2021_2022 "Wiring & Lighting accessories :- Wiring for circuit/submain wiring along with earthwire with required sizes of FRLS PVC insulated copper conductor, supply and fitting of GI boxes along with modular base and cover plates, supplying and fixing following modular switch/ sockets, supply, installation, testing and commissioning of all accessories and fixtures as approved by dept.								
		1						1.000	
	Total Quantity							1.000 L.S	
	Total Deducted Quantity							0.000 L.S	
	Net Total Quantity							1.000 L.S	
	Say 1.000 L.S @ Rs 274846.91 / L.S							Rs 274846.91	
14	od361719/2021_2022 "EXTERNAL LIGHTING Providing external lighting arrangements by supplying and laying of PVC insulated and PVC sheathed / XLPE power cable of Copper conductor XLPE control cables as per is:7098/Part-I/88 with latest amendments 1.1 kv grade of required size direct in ground including MCCB/MCB/RCCB, supply and erection of mettalic poles, strret light poles, earthing and safety equipments , fire extinguishers ,etc . complete including necessary excavation, sand cushioning, protective covering and refilling the trench etc. as required in the specifications or as directed by the Engineer in Charge."								
		1						1.000	
	Total Quantity							1.000 L.S	
	Total Deducted Quantity							0.000 L.S	
	Net Total Quantity							1.000 L.S	
	Say 1.000 L.S @ Rs 1742250.00 / L.S							Rs 1742250.00	
SI No	Description	No	L	B	D	CF	Quantity	Remark	
3Charges for Power allocation to KSEB and power extension by cable									
Lump-Sum Total							Rs 10000000.00		
SI No	Description	No	L	B	D	CF	Quantity	Remark	

4Tools and Plants								
Lump-Sum Total							Rs 400000.00	
SI No	Description	No	L	B	D	CF	Quantity	Remark
5Provision for Automating entire plant by SCADA system								
Lump-Sum Total							Rs 2500000.00	
SI No	Description	No	L	B	D	CF	Quantity	Remark
6Provision for Supplying and fixing Solar panel with control unit								
Lump-Sum Total							Rs 2500000.00	
SI No	Description	No	L	B	D	CF	Quantity	Remark
7Provision for supplying and fixing Odour control system								
Lump-Sum Total							Rs 10000000.00	
Total							75124781.38	
Centage @							10.0%	
Centage Amount							7512478.14	
Provision for GST payments (in %) @							18.0%	
Amount reserved for GST payments							13522460.65	
Total & Centage							96159720.17	
Lumpsum for round off							0.00	
GRAND TOTAL Rs							96159720.17	
Rounded Grand Total Rs							9,61,59,720	
Rupees Nine Crore Sixty One Lakh Fifty Nine Thousand Seven Hundred and Twenty Only								

General Abstract

**SEWERAGE SCHEME TO KANHANGAD MUNICIPALITY - CONSTRUCTION OF 7
MLD CAPACITY SEWAGE TREATMENT PLANT AT NILANKARAVAYAL AND
LAYING SEWERAGE NET WORK -NETWORK ESTIMATE**

(Dsr year: 2018)

SI No	Heading Description	Amount
1	Laying of sewer network	437896130.67
2	Road Restoration work of laying of sewers and pumping main.	76217533.91
3	Construction of Collection wellcum Pumping stations	1537679.95
4	Compound wall with gate for Collection wellcum Pumping stations	883593.28
5	Construction of Receiving Chanel and screen chamber at Collection well	839607.31
6	Construction of Valve chamber	278367.47
7	Construction of Control room and Generator Room for wellcum pumphouse	1431038.41
8	Bath cum Toilets	348813.99
9	Collection wellcum Pump house Mechanical, Electrical - Pumpsets, grit chamber screen, generator, transformer &&& allied works complete	6118664.65
10	Pumping mains	43502878.88
11	Construction of Man holes	184564181.16
12	Road Restoration - to PWD/NH	267851666.53
13	Lifting Stations and Allied work	48543195.39
14	Water Supply and Sanatory arrangements, Electrical wiring in pumping stations	540000.00
15	Line extension , Deposit to KSEB, etc	1080000.00
16	Sewer Network - Operation and Maintanance cost for 1st Year	14939636.33
17	Sewer Network -Operation and Maintanse Cost for 2 nd Year to 10 th Year	188239417.76
18	Sewer connection Charges	50000000.00
19	Electricity charges for networks	78311772.00
Total		1403124177.68
Centage @		10.0%
Centage Amount		140312417.77
Provision for GST payments (in %) @		18.0%
Amount reserved for GST payments		252562351.98
Total & Centage		1795998947.43
Lumpsum for round off		0.00
GRAND TOTAL Rs		1795998947.43
Rounded Grand Total Rs 1,79,59,98,947		

Rupees One Hundred Seventy Nine Crore Fifty Nine Lakh Ninety Eight Thousand Nine Hundred and Forty Seven Only



Kerala Water Authority

PRICE

Detailed Estimate

**SEWERAGE SCHEME TO KANHANGAD MUNICIPALITY - CONSTRUCTION OF 7
MLD CAPACITY SEWAGE TREATMENT PLANT AT NILANKARAVAYAL AND
LAYING SEWERAGE NET WORK -NETWORK ESTIMATE**

(Dsor year: 2018)

Sl No	Description	No	L	B	D	CF	Quantity	Remark
1Laying of sewer network (Cost Index:33.05 %)								
1	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, traffice 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.							
	Sewer lines from 225mm to 560mm	2	56014.000			0.6	67216.800	
	Inspection Chamber to Manhole	2	32912.000			0.6	39494.400	2057X8X2
Kerala Water Authority Total Quantity							106711.200 metre	
Total Deducted Quantity							0.000 metre	
Net Total Quantity							106711.200 metre	
Say 106711.200 metre @ Rs 29.87 / metre							Rs 3187463.54	
2	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							
	Sewer lines from 225mm to560mm	1	56014.000	1.200		0.6	40330.080	
	Inspection Chamber to Manhole	1	32912.000	0.800		0.6	15797.760	2057X8X2
Total Quantity							56127.840 sqm	
Total Deducted Quantity							0.000 sqm	
Net Total Quantity							56127.840 sqm	
Say 56127.840 sqm @ Rs 354.18 / sqm							Rs 19879358.37	
3	15.2.1 Demolishing cement concrete manually / by mechanical means including disposal of material within 50 metres lead as per direction of Engineer - in-Charge.Nominal concrete 1:3:6 or richer mix (i/c equivalent							

	design mix)							
	Sewer lines from 225mm to 560mm	1	56014.000	1.200	0.150	0.4	4033.009	
	Inspection Chamber to Manhole	1	32912.000	0.800	0.150	0.4	1579.776	2057X8X2
	Total Quantity						5612.785 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						5612.785 cum	
	Say 5612.785 cum @ Rs 2006.81 / cum						Rs 11263793.07	
4	<p>4.1.2 Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:1/2:3 (cement : 1 1/2 coarse sand : 3 graded stone aggregate 20 mm nominal size)</p>							
	Sewer lines from 225mm to 560mm	1	56014.000	1.200	0.150	0.4	4033.009	
	Inspection Chamber to Manhole	1	32912.000	0.800	0.150	0.4	1579.776	2057X8X2
	Total Quantity						5612.785 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						5612.785 cum	
	Say 5612.785 cum @ Rs 8328.46 / cum						Rs 46745855.36	
5	<p>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. NEW DATA (Prepared based on PWD SDB - Item No.1009)</p>							
	Sewer lines from 225mm to 560mm	1	56014.000			0.4	22405.601	
	Inspection Chamber to Manhole	1	32912.000			0.4	13164.801	2057X8X2
	Total Quantity						35570.402 metre	
	Total Deducted Quantity						0.000 metre	
	Net Total Quantity						35570.402 metre	
	Say 35570.402 metre @ Rs 95.04 / metre						Rs 3380611.01	
6	<p>100.8.1 Fencing one side of trenches, 1.50 m height with two rows of 10 cm plastic caution tape in vertical casuarina pole (girth 15cm to 24cm) fixed at 2 m intervals. (Data Prepared based on PWD SDB - Item No.1009)</p>							

	Sewer lines from 225mm to 560mm	1	56014.000			0.6	33608.400		
	Inspection Chamber to Manhole	1	32912.000			0.6	19747.200	2057X8X2	
	Total Quantity						53355.600 metre		
	Total Deducted Quantity						0.000 metre		
	Net Total Quantity						53355.600 metre		
	Say 53355.600 metre @ Rs 27.66 / metre						Rs 1475815.90		
7	<p>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 1.5 m, including getting out the excavated soil, and then returning the soil as required, in layers not exceeding 20 cm 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 :</p> <p>All kinds of soil (Ref. Item No. 2.10.1 of DSR)</p>								
	Sewer lines from 225mm to 560mm	1	63247.430			0.7	44273.201		
	Inspection Chamber to Manhole	1	32912.000	0.800	1.200	0.7	22116.864	2057X8X2	
	Sewer lines from 225mm to 560mm	1	56014.000	1.200	0.300	0.6	-12099.024		
	Inspection Chamber to Manhole	1	32912.000	0.800	0.300	0.6	-4739.327	2057X8X2	
	Sewer lines from 225mm to 560mm	1	56014.000	1.200	0.150	0.4	-4033.009		
	Inspection Chamber to Manhole	1	32912.000	0.800	0.150	0.4	-1579.776	2057X8X2	
	Total Quantity						66390.065 cum		
	Total Deducted Quantity						-22451.136 cum		
	Net Total Quantity						43938.929 cum		
	Say 43938.929 cum @ Rs 545.11 / cum						Rs 23951549.59		
8	<p>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 1.5 m, including getting out the excavated soil, and then returning the soil as required, in layers not exceeding 20 cm 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 :"</p> <p>Ordinary Rock.</p>								

	(Ref. Item No. 2.13.1 of DSR)							
	Sewer lines from 225mm to 560mm	1	63247.430			0.2	12649.486	
	Inspection Chamber to Manhole	1	32912.000	0.800	1.200	0.2	6319.104	2057X8X2
	Total Quantity						18968.590 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						18968.590 cum	
	Say 18968.590 cum @ Rs 791.65 / cum						Rs 15016484.27	
9	100.2.7 "Excavating trenches of required width for pipes, cables, etc including excavation for sockets, and dressing of sides, ramming of bottoms, depth up to 1.5 m, including getting out the excavated soil, and then returning the soil as required, in layers not exceeding 20 cm 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 : Medium Rock (blasting prohibited) New Data derived from DAR							
	Sewer lines from 225mm to 560mm	1	63247.430			0.1	6324.743	
	Inspection Chamber to Manhole	1	32912.000	0.800	1.200	0.1	3159.552	2057X8X2
	Total Quantity						9484.295 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						9484.295 cum	
	Say 9484.295 cum @ Rs 1316.46 / cum						Rs 12485695.00	
10	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 3 m, including getting out the excavated soil, and then returning the soil as required, in layers not exceeding 20 cm 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: 1.50m to 3.0m All kinds of soil (Ref. Item No. 2.11 of DSR)							
	From calculation sheet- sewerline 225 to 560mm	1	15626.980			0.7	10938.886	
	Total Quantity						10938.886 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						10938.886 cum	

	Say 10938.886 cum @ Rs 649.48 / cum						Rs 7104587.68	
11	<p>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 3 m, including getting out the excavated soil, and then returning the soil as required, in layers not exceeding 20 cm 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 : 1.50m to 3.0m. Ordinary Rock. (Ref. Item No. 2.14 of DSR)</p>							
	From calculation sheet- sewerline 225 to 560mm	1	15626.980			0.2	3125.396	
	Total Quantity						3125.396 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						3125.396 cum	
	Say 3125.396 cum @ Rs 978.85 / cum						Rs 3059293.87	
12	<p>100.2.8 Excavating trenches of required width for pipes, cables, etc including excavation for sockets, and dressing of sides, ramming of bottoms, depth up to 1.5 m but not exceeding 3 m, including getting out the excavated soil, and then returning the soil as required, in layers not exceeding 20 cm 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. (Rate is over corresponding basic item for depth up to 1.5 metre) 1.5m to 3.0m Medium Rock (blasting prohibited) New Data derived from DAR</p>							
	From calculation sheet- sewerline 225 to 560mm	1	15626.980			0.1	1562.698	
	Total Quantity						1562.698 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						1562.698 cum	
	Say 1562.698 cum @ Rs 1503.66 / cum						Rs 2349766.47	
13	<p>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</p>							
		2	56014.000	3.000		0.2	67216.800	
	Total Quantity						67216.800 sqm	
	Total Deducted Quantity						0.000 sqm	

		Net Total Quantity					67216.800 sqm	
		Say 67216.800 sqm @ Rs 187.73 / sqm					Rs 12618609.86	
14	2.23 Extra for planking and strutting in open timbering if required to be left permanently in position (Face area of the timber permanently left to be measured).							
		2	56014.000	3.000		0.05	16804.200	
		Total Quantity					16804.200 sqm	
		Total Deducted Quantity					0.000 sqm	
		Net Total Quantity					16804.200 sqm	
		Say 16804.200 sqm @ Rs 947.78 / sqm					Rs 15926684.68	
15	od347426/2021_2022 Installation of PE pipe between 110mm & 225mm outer dia by HDD method for on grade gravity sewer including preparing and setting up the plant and equipment,preparing new pipe work material making of entry pit and exit pit up to required depth installing new pipe work and commissioning system or making the system or making the system ready for commissioning by HDD operating including all related civil and mechanical works like excavation shoring/strutting etc drilling stringing reaming and pulling back the new pipe work on the designed borne path alignment proper disposal of drilling fluid and back fill of site after completion all inclusive as per Conditions PE pipes also using Ground penetrating radar survey in corridor with to detect buried utilities on the map of corridor with information of locations and depths to the top of various utilities detected .work to be conducted using 500MHZ and 300MHZ antenna or latest forthe best possible resolution and penetration							
	225mm dia HDPE	1	6921.800				6921.800	
		Total Quantity					6921.800 metre	
		Total Deducted Quantity					0.000 metre	
		Net Total Quantity					6921.800 metre	
		Say 6921.800 metre @ Rs 5013.17 / metre					Rs 34700160.11	
16	od347427/2021_2022 :Installation of PE -250mm-315mm mm dia PE pipe by horizontal directional drilling method in all types of soil above /below water table for pumping /gravity /distribution main including preparing and setting up the plat and equipment, installing new pipe work, testing and commissioning excluding cost of pipe (6 m line pipe with butt joint all related civil /mechanical works like entry /exits pit 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 og pit and holes by approved borrow material as per specification approved method statement or as directed by engineer in charge. also using Ground penetrating radar survey in corridor with to detect buried utilities on the map of corridor with information of locations and depths to the top of various utilities detected .work to be conducted using 500MHZ and 300MHZ antenna or latest for the best possible resolution and penetration including hydrolic testing							

	250 mm HDPE	1	636.200				636.200	
	280 mm HDPE	1	32.500				32.500	
	315 mm HDPE	1	824.500				824.500	
	Total Quantity						1493.200 metre	
	Total Deducted Quantity						0.000 metre	
	Net Total Quantity						1493.200 metre	
	Say 1493.200 metre @ Rs 6348.83 / metre						Rs 9480072.96	
17	od348334/2021_2022 : Installation of PE -355mm-500mm mm dia PE pipe by horizontal directional drilling method in all types of soil above /below water table for pumping /gravity /distribution main including preparing and setting up the plant and equipment, installing new pipe work, testing and commissioning excluding cost of pipe (6 m line pipe with butt joint all related civil /mechanical works like entry /exits pit as necessary. Dewatering, 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 pit and holes by approved borrow material as per specification approved method statement or as directed by engineer in charge. Also using Ground penetrating radar survey in corridor with to detect buried utilities on the map of corridor with information of locations and depths to the top of various utilities detected. Work to be conducted using 500MHZ and 300MHZ antenna or latest for the best possible resolution and penetration including hydraulic testing							
	355 mm dia HDPE PIPE	1	227.200				227.200	
	400 mm dia HDPE PIPE	1	540.000				540.000	
	450 mm dia HDPE PIPE	1	186.600				186.600	
	500 mm dia HDPE PIPE	1	308.900				308.900	
	Total Quantity						1262.700 metre	
	Total Deducted Quantity						0.000 metre	
	Net Total Quantity						1262.700 metre	
	Say 1262.700 metre @ Rs 8848.99 / metre						Rs 11173619.67	
18	od347428/2021_2022 Supplying, Providing bedding with m sand for sewer lines as per specifications to be laid wherever necessary with all lead and lift.							
	beding for lines	1	46336.300	0.600	0.100	0.7	1946.125	56014-9677.70
	Total Quantity						1946.125 cum	
	Total Deducted Quantity						0.000 cum	

	Net Total Quantity							1946.125 cum	
	Say 1946.125 cum @ Rs 2246.62 / cum							Rs 4372203.35	
19	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)								
	P C C bedding concrete where ever necessary	1	46336.300	0.600	0.100	0.25	695.045	56014- 9677.70	
	Total Quantity							695.045 cum	
	Total Deducted Quantity							0.000 cum	
	Net Total Quantity							695.045 cum	
	Say 695.045 cum @ Rs 7229.54 / cum							Rs 5024855.63	
20	100.98.227 Supply of uPVC Pipe, IS 4985: 2000 , 8kg/cm ² , 200mm Dia.								
	For house connection IC to MH	1	32912.000				32912.000	2057X8X2	
	Total Quantity							32912.000 metre	
	Total Deducted Quantity							0.000 metre	
	Net Total Quantity							32912.000 metre	
	Say 32912.000 metre @ Rs 1393.80 / metre							Rs 45872745.60	
21	od348435/2021_2022 Conveying to site, lowering into trenches, laying to correct line and grade using CC holding clamps, 200mm PVC SN 8 (8 Kg/Cm ²) S & S Sewerage pipes conforming to I.S.15328, including jointing the pipes using rubber rings as per approved methods with rubber gasket for flexible joints as per specification including cost of gasket, to correct line , dewatering with all rates of recuperation etc, providing bedding for pipe line trenches with available earth, hydraulic testing the line to the required test pressure as per IS, CPHEEO specifications, lighting, watching, providing caution boards etc. wherever required, during laying and jointing the pipes including hire for all tools etc complete including commissioning for the following diamters								
	For house connection IC to MH	1	32912.000				32912.000	2057X8X2	
	Total Quantity							32912.000 metre	
	Total Deducted Quantity							0.000 metre	
	Net Total Quantity							32912.000 metre	
	Say 32912.000 metre @ Rs 290.67 / metre							Rs 9566531.04	
22	60.2.3 Bailing out water using pump above 5 HP and Up to 10 HP-Bailing out water with engine and pump set								

	above 5HP and up to 10HP, including conveyance to site and erection, cost of fuel, lubrication oil and other stores, pay of staff etc complete							
		50	8.000	5.000*.74 6			1492.000	
	Total Quantity						1492.000 hour	
	Total Deducted Quantity						0.000 hour	
	Net Total Quantity						1492.000 hour	
	Say 1492.000 hour @ Rs 424.97 / hour						Rs 634055.24	
23	60.2.4 BAILING OUT WATER USING PUMP ABOVE 10HP AND UP TO 20HP - Bailing out water with engine and pump set above 10HP and up to 20HP, including conveyance to site and erection, cost of fuel, lubrication oil and other stores, pay of staff etc complete							
		20	15.000*.7 46	8.000			1790.400	
	Total Quantity						1790.400 hour	
	Total Deducted Quantity						0.000 hour	
	Net Total Quantity						1790.400 hour	
	Say 1790.400 hour @ Rs 527.56 / hour						Rs 944543.42	
24	60.2.5 BAILING OUT WATER USING PUMP ABOVE 20HP AND UP TO 30HP - Bailing out water with engine and pump set above 25HP and up to 30HP, including conveyance to site and erection, cost of fuel, lubrication oil and other stores, pay of staff etc complete							
		25	25.000*.7 46	8.000			3730.000	
	Total Quantity						3730.000 hour	
	Total Deducted Quantity						0.000 hour	
	Net Total Quantity						3730.000 hour	
	Say 3730.000 hour @ Rs 954.93 / hour						Rs 3561888.90	
25	od347435/2021_2022 Supply of PE Pipe PE 100 (IS 14333/ sewerage pipe with latest IS), 8kg, 225mm Outer Dia							
	HDPE Pipe PE 100 , 8kg, 225mm Outer Dia	1	49459.700				49459.700	
	Total Quantity						49459.700 metre	
	Total Deducted Quantity						0.000 metre	
	Net Total Quantity						49459.700 metre	
	Say 49459.700 metre @ Rs 1336.89 / metre						Rs 66122178.33	

26	od347436/2021_2022 Supply of PE Pipe PE 100 (IS 14333), 8kg, 250mm Outer Dia							
	HDPE Pipe PE 100 , 8kg, 250mm Outer Dia.	1	2181.900				2181.900	
	Total Quantity						2181.900 metre	
	Total Deducted Quantity						0.000 metre	
	Net Total Quantity						2181.900 metre	
	Say 2181.900 metre @ Rs 2079.09 / metre						Rs 4536366.47	
27	od347437/2021_2022 Supply of PE Pipe PE 100 (IS 14333/ sewerage pipe with latest IS), 8kg, 280mm Outer Dia.							
	HDPE Pipe PE 100, 8kg, 280mm Outer Dia.	1	596.800				596.800	
	Total Quantity						596.800 metre	
	Total Deducted Quantity						0.000 metre	
	Net Total Quantity						596.800 metre	
	Say 596.800 metre @ Rs 2066.31 / metre						Rs 1233173.81	
28	od347438/2021_2022 Supply of PE Pipe PE 100 (IS 14333/ sewerage pipe with latest IS), 8kg, 315mm Outer Dia.							
	HDPE Pipe PE 100 , 8kg, 315mm Outer Dia.	1	1326.800				1326.800	
	Total Quantity						1326.800 metre	
	Total Deducted Quantity						0.000 metre	
	Net Total Quantity						1326.800 metre	
	Say 1326.800 metre @ Rs 2624.99 / metre						Rs 3482836.73	
29	od347439/2021_2022 Supply of PE Pipe PE 100 (IS 14333/ sewerage pipe with latest IS), 8kg, 355mm Outer Dia.							
	HDPE Pipe PE 100 , 8kg, 355mm Outer Dia.	1	464.000				464.000	
	Total Quantity						464.000 metre	
	Total Deducted Quantity						0.000 metre	
	Net Total Quantity						464.000 metre	
	Say 464.000 metre @ Rs 3313.76 / metre						Rs 1537584.64	

30	od347440/2021_2022 Supply of PE Pipe PE 100 (IS 14333/ sewerage pipe with latest IS), 8kg, 400mm Outer Dia.							
	HDPE Pipe PE 100 , 8kg, 400mm Outer Dia.	1	699.800				699.800	
	Total Quantity						699.800 metre	
	Total Deducted Quantity						0.000 metre	
	Net Total Quantity						699.800 metre	
	Say 699.800 metre @ Rs 4215.86 / metre						Rs 2950258.83	
31	od347441/2021_2022 Supply of PE Pipe PE 100 (IS 14333/ sewerage pipe with latest IS), 8kg, 450mm Outer Dia.							
	HDPE Pipe PE 100, 8kg, 450mm Outer Dia.	1	186.600				186.600	
	Total Quantity						186.600 metre	
	Total Deducted Quantity						0.000 metre	
	Net Total Quantity						186.600 metre	
	Say 186.600 metre @ Rs 5335.20 / metre						Rs 995548.32	
32	od348418/2021_2022 Supply of PE Pipe PE 100 (IS 14333/ sewerage pipe with latest IS), 8kg, 500mm Outer Dia.							
	HDPE Pipe PE 100, 8kg, 500mm Outer Dia.	1	1047.700				1047.700	
	Total Quantity						1047.700 metre	
	Total Deducted Quantity						0.000 metre	
	Net Total Quantity						1047.700 metre	
	Say 1047.700 metre @ Rs 6586.38 / metre						Rs 6900550.33	
33	od348419/2021_2022 Supply of PE Pipe PE 100 (IS 14333/ sewerage pipe with latest IS), 8kg, 560mm Outer Dia.							
	HDPE Pipe PE 100, 8kg, 560mm Outer Dia.	1	50.700				50.700	
	Total Quantity						50.700 metre	
	Total Deducted Quantity						0.000 metre	
	Net Total Quantity						50.700 metre	
	Say 50.700 metre @ Rs 8261.80 / metre						Rs 418873.26	

34	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 pipe line 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 leveling the trenches including all labour charge, hire for appliances etc. complete but excluding cost of pipe and fittings. 225 mm OD HDPE pipe NEW DATA							
	HDPE Pipe PE 100 , 8kg, 225mm Outer Dia	1	42537.900				42537.900	
	Total Quantity						42537.900 metre	
	Total Deducted Quantity						0.000 metre	
	Net Total Quantity						42537.900 metre	
	Say 42537.900 metre @ Rs 370.21 / metre						Rs 15747955.96	
35	100.10.9 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 pipe line 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 leveling the trenches including all labour charge, hire for appliances etc. complete but excluding cost of pipe and fittings. 250 mm OD HDPE pipe NEW DATA							
	HDPE Pipe PE 100 , 8kg, 250mm Outer Dia.	1	1545.700				1545.700	
	Total Quantity						1545.700 metre	
	Total Deducted Quantity						0.000 metre	
	Net Total Quantity						1545.700 metre	
	Say 1545.700 metre @ Rs 433.54 / metre						Rs 670122.78	
36	100.10.10 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 pipe line 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 leveling the trenches including all labour charge, hire for appliances etc. complete but excluding cost of pipe and fittings. 280 mm OD HDPE pipe NEW DATA							

	HDPE Pipe PE 100, 8kg, 280mm Outer Dia.	1	564.300				564.300	
	Total Quantity						564.300 metre	
	Total Deducted Quantity						0.000 metre	
	Net Total Quantity						564.300 metre	
	Say 564.300 metre @ Rs 510.05 / metre						Rs 287821.21	
37	100.10.11 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 pipe line 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 leveling the trenches including all labour charge, hire for appliances etc. complete but excluding cost of pipe and fittings. 315 mm OD HDPE pipe NEW DATA							
	HDPE Pipe PE 100 , 8kg, 315mm Outer Dia.	1	502.300				502.300	
	Total Quantity						502.300 metre	
	Total Deducted Quantity						0.000 metre	
	Net Total Quantity						502.300 metre	
	Say 502.300 metre @ Rs 570.12 / metre						Rs 286371.28	
38	100.10.12 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 pipe line 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 leveling the trenches including all labour charge, hire for appliances etc. complete but excluding cost of pipe and fittings. 355 mm OD HDPE pipe NEW DATA							
	HDPE Pipe PE 100 , 8kg, 355mm Outer Dia.	1	236.800				236.800	
	Total Quantity						236.800 metre	
	Total Deducted Quantity						0.000 metre	
	Net Total Quantity						236.800 metre	
	Say 236.800 metre @ Rs 643.30 / metre						Rs 152333.44	

39	<p>100.10.13 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 pipe line 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 leveling the trenches including all labour charge, hire for appliances etc. complete but excluding cost of pipe and fittings. 400 mm OD HDPE pipe NEW DATA</p>							
	HDPE Pipe PE 100 , 8kg, 400mm Outer Dia.	1	159.800				159.800	
	Total Quantity						159.800 metre	
	Total Deducted Quantity						0.000 metre	
	Net Total Quantity						159.800 metre	
	Say 159.800 metre @ Rs 716.61 / metre						Rs 114514.28	
40	<p>100.10.15 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 pipe line 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 leveling the trenches including all labour charge, hire for appliances etc. complete but excluding cost of pipe and fittings. 500 mm OD HDPE pipe NEW DATA</p>							
	Laying 500MM HDPE pipes	1	738.800				738.800	
	Total Quantity						738.800 metre	
	Total Deducted Quantity						0.000 metre	
	Net Total Quantity						738.800 metre	
	Say 738.800 metre @ Rs 876.80 / metre						Rs 647779.84	
41	<p>od347442/2021_2022 Constructing inspection chambers of size 0.45x0.45m (inside) and 0.60m deep with RCC M20 using 20mm broken stone for floor slab ,RCC M20 slab using 20mm broken stone for removable cover slab, Brick work in CM 1:6 for walls, PCC 1:4:8 using 20mm broken stone for levelling course below foundation including earth work excavation in all classes of soil,, plastering the inside with CM 1:3, 9mm thick with neat cement flush coat, providing necessary slope in the benching towards main sewer, providing provision for connecting main sewer and service connections, conveying, lifting, placing the cover slab in position by suitable means, conveying and disposing the surplus earth with all lead and lift as per drawings and specifications , including the cost of reinforcement , testing the chamber and sulphate resistant cement shall be used for the the construction of inspection chamber</p>							

	Inspection chambers of inside size 0.45x0.45x0.6 m	1028					1028.000	2092x0.25 =523
	Total Quantity						1028.000 No	
	Total Deducted Quantity						0.000 No	
	Net Total Quantity						1028.000 No	
	Say 1028.000 No @ Rs 7095.90 / No						Rs 7294585.20	
42	od347443/2021_2022 Constructing inspection chambers of size 0.45x0.45m (inside) and 0.45m deep with RCC M20 using 20mm broken stone for floor slab ,RCC M20 slab using 20mm broken stone for removable cover slab, Brick work in CM 1:6 for walls, PCC 1:4:8 using 20mm broken stone for leveling course below foundation including earth work excavation in all classes of soil, , plastering the inside with CM 1:3, 9mm thick with neat cement flush coat, providing necessary slope in the benching towards main sewer, providing provision for connecting main sewer and service connections, conveying, lifting, placing the cover slab in position by suitable means, conveying and disposing the surplus earth with all lead and lift as per drawings and specifications , including the cost of reinforcement , testing the chamber and sulphate resistant cement shall be used for the the construction of inspection chamber							
	Inspection chambers of inside size 0.45x0.45x0.45 m	617					617.000	2092x0.15 =313.8
	Total Quantity						617.000 No	
	Total Deducted Quantity						0.000 No	
	Net Total Quantity						617.000 No	
	Say 617.000 No @ Rs 3582.61 / No						Rs 2210470.37	
43	od347444/2021_2022 Constructing inspection chambers of size 0.60x0.60m (inside) and 0.90m deep with RCC M20 using 20mm broken stone for floor slab ,RCC M20 slab using 20mm broken stone for removable cover slab, Brick work in CM 1:6 for walls, PCC 1:4:8 using 20mm broken stone for leveling course below foundation including earth work excavation in all classes of soil, plastering the inside with CM 1:3, 9mm thick with neat cement flush coat, providing necessary slope in the benching towards main sewer, providing provision for connecting main sewer and service connections, conveying, lifting, placing the cover slab in position by suitable means, conveying and disposing the surplus earth with all lead and lift as per drawings and specifications , including the cost of reinforcement , testing the chamber and sulphate resistant cement shall be used for the the construction of inspection chamber							
	Inspection chambers of inside size 0.6 X 0.6 X 0.9 m	823					823.000	2092x0.20 =418
	Total Quantity						823.000 No	
	Total Deducted Quantity						0.000 No	
	Net Total Quantity						823.000 No	

							Say 823.000 No @ Rs 7732.35 / No	Rs 6363724.05
44	od347445/2021_2022 Constructing inspection chambers of size 0.60x0.60m (inside) and 0.60m deep with RCC M20 using 20mm broken stone for floor slab ,RCC M20 slab using 20mm broken stone for removable cover slab, Brick work in CM 1:6 for walls, PCC 1:4:8 using 20mm broken stone for leveling course below foundation including earth work excavation in all classes of soil, plastering the inside with CM 1:3, 9mm thick with neat cement flush coat, providing necessary slope in the benching towards main sewer, providing provision for connecting main sewer and service connections, conveying, lifting, placing the cover slab in position by suitable means, conveying and disposing the surplus earth with all lead and lift as per drawings and specifications , including the cost of reinforcement , testing the chamber and sulphate resistant cement shall be used for the the construction of inspection chamber							
	Inspection chambers of inside size 0.6 x 0.6 x 0.6 m	823					823.000	2092x0.2=418
							Total Quantity	823.000 No
							Total Deducted Quantity	0.000 No
							Net Total Quantity	823.000 No
							Say 823.000 No @ Rs 7287.07 / No	Rs 5997258.61
45	od347446/2021_2022 Constructing inspection chambers of size 0.60x0.60m (inside) and 0.75m deep with RCC M20 using 20mm broken stone for floor slab ,RCC M20 slab using 20mm broken stone for removable cover slab, Brick work in CM 1:6 for walls, PCC 1:4:8 using 20mm broken stone for leveling course below foundation including earth work excavation in all classes of soil, plastering the inside with CM 1:3, 9mm thick with neat cement flush coat, providing necessary slope in the benching towards main sewer, providing provision for connecting main sewer and service connections, conveying, lifting, placing the cover slab in position by suitable means, conveying and disposing the surplus earth with all lead and lift as per drawings and specifications , including the cost of reinforcement , testing the chamber and sulphate resistant cement shall be used for the the construction of inspection chamber							
	Inspection chambers of inside size 0.6 x 0.6 x 0.75 m	823					823.000	2092x0.2=419
							Total Quantity	823.000 No
							Total Deducted Quantity	0.000 No
							Net Total Quantity	823.000 No
							Say 823.000 No @ Rs 7496.45 / No	Rs 6169578.35
SI No	Description	No	L	B	D	CF	Quantity	Remark
2Road Restoration work of laying of sewers and pumping main. (Cost Index:33.05 %)								

1	od347401/2021_2022 Excavation for roadwork in soil with hydraulic excavator of 0.9 cum bucket capacity including cutting and loading in tippers, trimming bottom and side slopes, in accordance with requirements of lines, grades and cross sections, and transporting to the embankment location within all lifts and lead up to 1000 m							
	Sewer lines from 225mm to 560mm	1	33608.400	1.500	0.300		15123.780	56014x0.6
	Inspection Chamber to Manhole	1	19747.200	1.500	0.300		8886.240	(2057X8X2)0.6
	Pumping main(100mm to 250mm DI)	1	1077.000	1.500	0.300		484.650	
	Total Quantity						24494.670 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						24494.670 cum	
	Say 24494.670 cum @ Rs 58.08 / cum						Rs 1422650.43	
2	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.							
	Sewer lines from 225mm to 560mm	1	33608.400	1.500	0.150		7561.890	56014x0.6
	Inspection Chamber to Manhole	1	19747.200	1.500	0.150		4443.120	(2057X8X2)0.6
	Pumping main(100mm to 250mm DI)	1	1077.000	1.500	0.150		242.325	
	Total Quantity						12247.335 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						12247.335 cum	
	Say 12247.335 cum @ Rs 543.16 / cum						Rs 6652262.48	
3	16.79 Providing , laying spreading and compacting graded stone aggregate (size range 53 mm to 0.075 mm) to wet mix macadam (WMM) specification including premixing the material with water at OMC in mechanical mix plant, carriage of mixed material by tipper to site, for all leads & lifts, laying in uniform layers with mechanical paver finisher in sub - base / base course on well prepared surface and compacting with vibratory roller of 8 to 10 tonne capacity to achieve the desired density, complete as per specifications and directions of Engineer - in- Charge.							
	Sewer lines from 225mm to 560mm	1	33608.400	1.500	0.150		7561.890	56014x0.6
	Inspection Chamber to Manhole	1	19747.200	1.500	0.150		4443.120	(2057X8X2)0.6

	Pumping main(100mm to 250mm DI)	1	1077.000	1.500	0.150		242.325		
	Total Quantity						12247.335 cum		
	Total Deducted Quantity						0.000 cum		
	Net Total Quantity						12247.335 cum		
	Say 12247.335 cum @ Rs 3050.90 / cum							Rs 37365394.35	
4	od347406/2021_2022 Providing and applying primer coat with bitumen emulsion (SS) on prepared surface of granular Base including clearing of road surface and spraying primer at the rate of 0.70 - 1.0 kg/sqm using mechanical means								
	Sewer lines from 225mm to 560mm	1	33608.400	1.500			50412.601	56014x0.6	
	Inspection Chamber to Manhole	1	19747.200	1.500			29620.801	(2057X8X 2)0.6	
	Pumping main(100mm to 250mm DI)	1	1077.000	1.500			1615.500		
	Total Quantity						81648.902 sqm		
	Total Deducted Quantity						0.000 sqm		
	Net Total Quantity						81648.902 sqm		
	Say 81648.902 sqm @ Rs 59.03 / sqm							Rs 4819734.69	
5	od347409/2021_2022 Providing and applying tack coat with bitumen emulsion(RS) using emulsion pressure distributor at the rate of 0.20 - 0.30 kg per sqm on the prepared bituminous surface cleaned with mechanical broom								
	Sewer lines from 225mm to 560mm	1	33608.400	1.800			60495.120	56014x0.6	
	Inspection Chamber to Manhole	1	19747.200	1.800			35544.960	(2057X8X 2)0.6	
	Pumping main(100mm to 250mm DI)	1	1077.000	1.800			1938.601		
	Total Quantity						97978.681 sqm		
	Total Deducted Quantity						0.000 sqm		
	Net Total Quantity						97978.681 sqm		
	Say 97978.681 sqm @ Rs 10.41 / sqm							Rs 1019958.07	
6	od347410/2021_2022 Providing, laying and rolling of open graded premix carpet of 20 mm thickness with 0.27 cum of 12 mm departmental aggregates premixed with 12.96 kg of bitumen per 10 sqm using penetration grade bitumen to required line, grade and level on a previously prepared base, after priming the								

	existing surface with 5 kg of bitumen (VG 30) 10 sqm including mixing in a suitable plant, laying and rolling with a three wheel static roller of 80-100 KN capacity, finished to required level and grades, followed by a seal coat of 0.09 cum of 6 mm departmental aggregates premixed with 8.64 kg of bitumen per 10 sqm. By Manual Means.							
	Sewer lines from 225mm to 560mm	1	33608.400	1.800			60495.120	56014x0.6
	Inspection Chamber to Manhole	1	19747.200	1.800			35544.960	(2057X8X2)0.6
	Pumping main(100mm to 250mm DI)	1	1077.000	1.800			1938.601	
	Total Quantity						97978.681 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						97978.681 sqm	
	Say 97978.681 sqm @ Rs 176.52 / sqm						Rs 17295196.77	
7	od347412/2021_2022 Seal Coat - Manual Means - Type C - Bitumen S-65 Providing and laying seal coat sealing the voids in a bituminous surface laid to the specified levels, grade and cross fall using Type A, Type B and Type C as per Technical Specification Clause 510 A. By Manual Means:-Case - III : Type C							
	Sewer lines from 225mm to 560mm	1	33608.400	1.800			60495.120	56014x0.6
	Inspection Chamber to Manhole	1	19747.200	1.800			35544.960	(2057X8X2)0.6
	Pumping main(100mm to 250mm DI)	1	1077.000	1.800			1938.601	
	Total Quantity						97978.681 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						97978.681 sqm	
	Say 97978.681 sqm @ Rs 78.00 / sqm						Rs 7642337.12	
SI No	Description	No	L	B	D	CF	Quantity	Remark
3Construction of Collection wellcum Pumping stations (Cost Index:33.05 %)								
1	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							
		1	20.000	20.000			400.000	average 40 cents
	Total Quantity						400.000 sqm	
	Total Deducted Quantity						0.000 sqm	

	Net Total Quantity						400.000 sqm	
	Say 400.000 sqm @ Rs 14.50 / sqm						Rs 5800.00	
2	100.3.5.1 Earthwork open well excavation (above water) for wells of dia. above 3.5m and upto 6.0 m in all kinds of soil and conveying and depositing the spoil within initial lead of 50m and lift up to 1.5 m including neat banking. NEW DATA (Prepared based on PHED SDB - Item No.1089 & 1092)							
	CW-5m dia, Depth 5.33 m	1	3.140	3.1*3.1	1.500		45.264	
	Total Quantity						45.264 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						45.264 cum	
	Say 45.264 cum @ Rs 461.35 / cum						Rs 20882.55	
3	100.3.5.2 Earthwork open well excavation (above water) for wells of dia. above 3.5m and upto 6.0 m in all kinds of soil and conveying and depositing the spoil within initial lead of 50m and lift from 1.5m to 3.0 m including neat banking. NEW DATA (Prepared based on PHED SDB - Item No.1089 & 1092)							
	CW-5m dia, Depth 5.33 m	1	3.140	3.1*3.1	1.500		45.264	
	Kerala Water Authority Total Quantity						45.264 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						45.264 cum	
	Say 45.264 cum @ Rs 507.52 / cum						Rs 22972.39	
4	100.3.5.13 Earthwork open well excavation (in or under water) for wells of dia. above 3.5m and upto 6.0 m in all kinds of soil and conveying and depositing the spoil within initial lead of 50m and lift from 3.0m to 4.5 m including neat banking. NEW DATA (Prepared based on PHED SDB - Item No.1090 & 1093)							
	CW-5m dia, Depth 5.33 m	1	3.140	3.1*3.1	1.500		45.264	
	Total Quantity						45.264 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						45.264 cum	
	Say 45.264 cum @ Rs 664.32 / cum						Rs 30069.78	
5	100.3.6.4 Earthwork open well excavation (above water) for wells of dia. above 3.5m and upto 6.0 m in ordinary rock and conveying and depositing the spoil within initial lead of 50m and lift from 4.5m to 6.00 m							

	including neat banking. NEW DATA (Prepared based on PHED SDB - Item No.1095)						
	CW-5m dia, Depth 5.33 m	1	3.140	3.1*3.1	1.330		40.134
	Total Quantity						40.134 cum
	Total Deducted Quantity						0.000 cum
	Net Total Quantity						40.134 cum
	Say 40.134 cum @ Rs 1516.70 / cum						Rs 60871.24
6	100.7.1 Bailing out water with 5 HP engine and pumpset including conveyance to the site, erection, dismantling and taking back of engine and pump, cost of fuel lubricating oil and other stores pay of staff etc. complete. NEW DATA (Prepared based on PHED SDB - Item No.1070)						
	CW	1	200.000				200.000
	Total Quantity						200.000 Kwh
	Total Deducted Quantity						0.000 Kwh
	Net Total Quantity						200.000 Kwh
	Say 200.000 Kwh @ Rs 36.26 / Kwh						Rs 7252.00
7	4.1.6 Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size)						
	CW-5m dia, Depth 5.33 m	1	3.140	3.1*3.1	0.200		6.036
	Total Quantity						6.036 cum
	Total Deducted Quantity						0.000 cum
	Net Total Quantity						6.036 cum
	Say 6.036 cum @ Rs 7076.06 / cum						Rs 42711.10
8	5.37.1 Providing and laying in position ready mixed M-25 grade concrete for reinforced cement concrete work, using cement content as per approved design mix, manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for reinforced cement concrete work including pumping of R.M.C. from transit mixer to site of laying, excluding the cost of centering, shuttering finishing and reinforcement including cost of 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 the Engineer - in-charge. Note:- Cement content considered in this item is @330 kg/cum. Excess /less cement used as per design mix is payable/recoverable separately.All work upto plinth level						

	CW-5m dia, Depth 5.33 m - Bottom plugging	1	3.140	3.1*3.1	0.300		9.053		
	Side wall	1	3.140*5.3	0.300	5.330		26.611		
	Cover slab	1	3.140	2.8*2.8	0.300		7.386		
	manhole	2	0.500	0.500	0.300		-0.150		
	Total Quantity						43.050 cum		
	Total Deducted Quantity						-0.150 cum		
	Net Total Quantity						42.900 cum		
	Say 42.900 cum @ Rs 9700.81 / cum						Rs 416164.75		
9	5.34.1 Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately. Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).								
	Qty taken from item no-8	1	42.900				42.900		
	Total Quantity						42.900 cum		
	Total Deducted Quantity						0.000 cum		
	Net Total Quantity						42.900 cum		
	Say 42.900 cum @ Rs 80.56 / cum						Rs 3456.02		
10	4.12 Extra for providing and mixing water proofing material in cement concrete work in doses by weight of cement as per manufacturer's specification .								
	Qty taken from item no-8*340	1	42.900	340.000			14586.000		
	Total Quantity						14586.000 kg		
	Total Deducted Quantity						0.000 kg		
	Net Total Quantity						14586.000 kg		
	Say 14586.000 kg @ Rs 1.33 / kg						Rs 19399.38		
11	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								
	CW-5m dia, Depth 5.33 m	1	3.140	3.1*3.1	5.830		175.923		
	Total Quantity						175.923 sqm		
	Total Deducted Quantity						0.000 sqm		

	Net Total Quantity						175.923 sqm	
	Say 175.923 sqm @ Rs 217.07 / sqm						Rs 38187.61	
12	5.9.1 Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete							
	CW-5m dia, Depth 5.33 m-Bottom plugging	1	3.140	6.200	0.300		5.841	
	Total Quantity						5.841 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						5.841 sqm	
	Say 5.841 sqm @ Rs 329.03 / sqm						Rs 1921.86	
13	5.9.2 Centering and shuttering including strutting, etc. and removal of form for:Walls (any thickness) including attached pilasters, buttersesses, plinth and string courses etc.							
	CW-5m dia, Depth 5.33 m-Wall inside	1	3.140	5.000	5.330		83.682	
	Wall outside	1	3.140	5.600	5.330		93.723	
	Total Quantity						177.405 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						177.405 sqm	
	Say 177.405 sqm @ Rs 703.77 / sqm						Rs 124852.32	
14	5.9.20 Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform with water proof ply 12 mm thick							
	CW-5m dia, Depth 5.33 m-Cover slab	1	3.140	2.8*2.8			24.618	
	Coverslab side edge	1	3.140	5.600	0.300		5.276	
	Total Quantity						29.894 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						29.894 sqm	
	Say 29.894 sqm @ Rs 900.08 / sqm						Rs 26906.99	
15	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							
	Qty taken from item no-8*100kg/m3	1	42.900	100.000			4290.000	

	Total Quantity						4290.000 kilogram	
	Total Deducted Quantity						0.000 kilogram	
	Net Total Quantity						4290.000 kilogram	
	Say 4290.000 kilogram @ Rs 96.46 / kilogram						Rs 413813.40	
16	od347421/2021_2022 Extra for providing epoxy coating for reinforcement bars.							
	Qty taken from item no-15	1	4290.000				4290.000	
	Total Quantity						4290.000 kg	
	Total Deducted Quantity						0.000 kg	
	Net Total Quantity						4290.000 kg	
	Say 4290.000 kg @ Rs 2.32 / kg						Rs 9952.80	
17	22.23.1 Providing and applying integral crystalline slurry of hydrophilic in nature for waterproofing treatment to the RCC structures like retaining walls of the basement, water tanks, roof slabs, podiums, reservoir, sewage & water treatment plant, tunnels/ subway and bridge deck etc., prepared by mixing in the ratio of 5 : 2 (5 parts integral crystalline slurry : 2 parts water) for vertical surfaces and 3 : 1 (3 parts integral crystalline slurry : 1 part water) for horizontal surfaces and applying the same from negative (internal) side with the help of synthetic fiber brush. The material shall meet the requirements as specified in ACI-212-3R-2010 i.e by reducing permeability of concrete by more than 90% compared with control concrete as per DIN 1048 and resistant to 16 bar hydrostatic pressure on negative side. The crystalline slurry shall be capable of self-healing of cracks up to a width of 0.50mm. The work shall be carried out all complete as per specification and the direction of the engineer in-charge. The product performance shall carry guarantee for 10 years against any leakage. For vertical surface two coats @ 0.70 kg per sqm							
	CW-5m dia, Depth 5.33 m-Wall inside	1	3.140	5.000	5.330		83.682	
	Wall outside	1	3.140	5.600	5.330		93.723	
	Total Quantity						177.405 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						177.405 sqm	
	Say 177.405 sqm @ Rs 559.61 / sqm						Rs 99277.61	
18	22.23.2 Providing and applying integral crystalline slurry of hydrophilic in nature for waterproofing treatment to the RCC structures like retaining walls of the basement, water tanks, roof slabs, podiums, reservoir, sewage & water treatment plant, tunnels/ subway and bridge deck etc., prepared by mixing in the ratio of 5 : 2 (5 parts integral crystalline slurry : 2 parts water) for vertical surfaces and 3 : 1 (3 parts integral crystalline slurry : 1 part water) for horizontal surfaces and applying the same from negative (internal) side with the help of synthetic fiber brush. The material shall meet the requirements as specified in ACI-212-3R-2010 i.e by reducing permeability of concrete by more than 90% compared with control concrete as per DIN							

	1048 and resistant to 16 bar hydrostatic pressure on negative side. The crystalline slurry shall be capable of self-healing of cracks up to a width of 0.50mm. The work shall be carried out all complete as per specification and the direction of the engineer in-charge. The product performance shall carry guarantee for 10 years against any leakage. For horizontal surface one coat @ 1.10 kg per sqm.							
	CW-5m dia, Depth 5.33 m-base slab	1	3.140	2.5*2.5			19.625	
	cover slab - bottom	1	3.140	2.5*2.5			19.625	
	Total Quantity						39.250 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						39.250 sqm	
	Say 39.250 sqm @ Rs 431.28 / sqm						Rs 16927.74	
19	13.7.1 12 mm cement plaster finished with a floating coat of neat cement of mix:1:3 (1 cement : 3 fine sand)							
	CW-5m dia, Depth 5.33 m-Wall inside	1	3.140	5.000	5.330		83.682	
	Wall outside	1	3.140	5.600	5.330		93.723	
	CW-5m dia, Depth 5.33 m-base slab	1	3.140	2.5*2.5			19.625	
	cover slab - bottom	1	3.140	2.5*2.5			19.625	
	Kerala Water Authority Total Quantity						216.655 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						216.655 sqm	
	Say 216.655 sqm @ Rs 393.69 / sqm						Rs 85294.91	
20	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)							
	CW-5m dia, Depth 5.33 m-Wall inside	1	3.140	5.000	5.330		83.682	
	Wall outside	1	3.140	5.600	5.330		93.723	
	CW-5m dia, Depth 5.33 m-base slab	1	3.140	2.5*2.5			19.625	
	cover slab - bottom	1	3.140	2.5*2.5			19.625	
	Total Quantity						216.655 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						216.655 sqm	
	Say 216.655 sqm @ Rs 105.38 / sqm						Rs 22831.10	

21	13.65.1 Painting with black anti- corrosive bitumastic paint of approved brand and manufacture to give an even shade:Two or more coats on new work							
	CW-5m dia, Depth 5.33 m-Wall inside	1	3.140	5.000	5.330		83.682	
	Wall outside	1	3.140	5.600	5.330		93.723	
	CW-5m dia, Depth 5.33 m-base slab	1	3.140	2.5*2.5			19.625	
	cover slab - bottom	1	3.140	2.5*2.5			19.625	
	Total Quantity						216.655 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						216.655 sqm	
	Say 216.655 sqm @ Rs 122.47 / sqm						Rs 26533.74	
22	100.41.34 Supplying and fixing Rectangular CI manhole cover 455x610 mm with frame (low duty) charges including all cost, labour charges etc complete.							
	CW	2					2.000	
	Total Quantity						2.000 No	
	Total Deducted Quantity						0.000 No	
	Net Total Quantity						2.000 No	
	Say 2.000 No @ Rs 2745.75 / No						Rs 5491.50	
23	2.25 Filling available excavated earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift up to 1.5 m.							
	Filling around the Stening							
	CW-5m dia, Depth 5.33 m	1	3.140*5.6	5.330	0.500		46.862	
	Total Quantity						46.862 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						46.862 cum	
	Say 46.862 cum @ Rs 253.73 / cum						Rs 11890.30	
24	od347414/2021_2022 Supplying providing and fixing CI encapsulated steps at 30.00cm c/c in a staggered manner including all labour charges, etc complete as per the instruction of the engineer in-charge.							
	Qty as per BOQ	12					12.000	

	Total Quantity						12.000 No		
	Total Deducted Quantity						0.000 No		
	Net Total Quantity						12.000 No		
	Say 12.000 No @ Rs 424.89 / No						Rs 5098.68		
25	100.36.1 Filling water with 5000 litre tankers fitted in lorry and conveying water from a distance of 5 km (average) to the reservoir site and pumping the water into the reservoir of height not less than 3 m using 5 HP diesel engine pump set , hire for tanker lorry, tools and other appliances and cost of water etc. complete. "(Ref. No. 000, Technical Circular)"								
	CW-5m dia, Depth 5.33 m-Wall inside	1	3.140	2.5*2.5	5.330		104.602		
	Total Quantity						104.602 Kilo litre		
	Total Deducted Quantity						0.000 Kilo litre		
	Net Total Quantity						104.602 Kilo litre		
	Say 104.602 Kilo litre @ Rs 182.79 / Kilo litre						Rs 19120.20		
SI No	Description	No	L	B	D	CF	Quantity	Remark	
4Compound wall with gate for Collection wellcum Pumping stations (Cost Index:33.05 %)									
1	2.2.1 Earth work in rough excavation, banking excavated earth in layers not exceeding 20 cm in depth, breaking clods, watering, rolling each layer with 1/2 tonne roller or wooden or steel rammers, and rolling every 3rd and top-most layer with power roller of minimum 8 tonnes and dressing up in embankments for roads, flood banks, marginal banks and guide banks or filling up ground depressions, lead up to 50 m and lift up to 1.5 m:All kinds of soil								
		1	80.000	0.600	0.500		24.000		
	Total Quantity						24.000 cum		
	Total Deducted Quantity						0.000 cum		
	Net Total Quantity						24.000 cum		
	Say 24.000 cum @ Rs 862.56 / cum						Rs 20701.44		
2	4.1.6 Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size)								
		1	80.000	0.600	0.200		9.601		
	Total Quantity						9.601 cum		
	Total Deducted Quantity						0.000 cum		
	Net Total Quantity						9.601 cum		
	Say 9.601 cum @ Rs 7076.06 / cum						Rs 67937.25		

3	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)	1	80.000	0.500	0.500	20.000		
		Total Quantity					20.000 cum	
		Total Deducted Quantity					0.000 cum	
		Net Total Quantity					20.000 cum	
		Say 20.000 cum @ Rs 7069.81 / cum					Rs 141396.20	
4	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)	1	80.000	0.500	0.150	6.000		
		Total Quantity					6.000 cum	
		Total Deducted Quantity					0.000 cum	
		Net Total Quantity					6.000 cum	
		Say 6.000 cum @ Rs 8914.95 / cum					Rs 53489.70	
5	6.1.2 Brick work with common burnt clay F.P.S (non modular) bricks of class designation 7.5 in foundation and plinth in:Cement mortar 1:6 (1 cement : 6 coarse sand)	1	80.000	0.220	2.000	35.200		
		Total Quantity					35.200 cum	
		Total Deducted Quantity					0.000 cum	
		Net Total Quantity					35.200 cum	
		Say 35.200 cum @ Rs 7112.12 / cum					Rs 250346.62	
6	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	1	6.000		50.0	300.000		
		Total Quantity					300.000 kilogram	
		Total Deducted Quantity					0.000 kilogram	
		Net Total Quantity					300.000 kilogram	
		Say 300.000 kilogram @ Rs 96.46 / kilogram					Rs 28938.00	
7	13.1.2 12 mm cement plaster of mix:1:6 (1 cement : 6 fine sand).							

		1	80.000		4.220		337.600	
	Total Quantity						337.600 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						337.600 sqm	
	Say 337.600 sqm @ Rs 293.64 / sqm						Rs 99132.86	
8	13.43.1	Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer						
		2	160.000		1.800		576.000	
	Total Quantity						576.000 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						576.000 sqm	
	Say 576.000 sqm @ Rs 69.32 / sqm						Rs 39928.32	
9	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)						
		2	160.000		1.800		576.000	
	Total Quantity						576.000 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						576.000 sqm	
	Say 576.000 sqm @ Rs 105.38 / sqm						Rs 60698.88	
10	10.25.2	Item Shifted to Sub head 14 as item 14.73Item Shifted to head 14 as item 14.74Steel 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						
	MS gate	1	800.000				800.000	
	Total Quantity						800.000 kg	
	Total Deducted Quantity						0.000 kg	
	Net Total Quantity						800.000 kg	
	Say 800.000 kg @ Rs 151.28 / kg						Rs 121024.00	
SI No	Description	No	L	B	D	CF	Quantity	Remark
5Construction of Receiving Chanel and screen chamber at Collection well (Cost Index:33.05 %)								

1	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 1.5 m, including getting out the excavated soil, and then returning the soil as required, in layers not exceeding 20 cm 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 : All kinds of soil (Ref. Item No. 2.10.1 of DSR)							
	screenchamber out side dim 6.2X1.75	1	7.000	2.550	1.500	0.6	16.065	out side dim 6.2X1.75x 3.83
	Total Quantity						16.065 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						16.065 cum	
	Say 16.065 cum @ Rs 545.11 / cum						Rs 8757.19	
2	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 3 m, including getting out the excavated soil, and then returning the soil as required, in layers not exceeding 20 cm 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: 1.50m to 3.0m All kinds of soil (Ref. Item No. 2.11 of DSR)							
	screenchamber out side dim 6.2X1.75	1	7.000	2.550	1.500	0.6	16.065	out side dim 6.2X1.75x 3.83
	Total Quantity						16.065 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						16.065 cum	
	Say 16.065 cum @ Rs 649.48 / cum						Rs 10433.90	
3	100.1.3 Excavating trenches of required width for pipes, cables, etc including excavation for sockets, and dressing of sides, ramming of bottoms, depth exceeding 3m in depth but not exceeding 4.5 m, including getting out the excavated soil, and then returning the soil as required, in layers not exceeding 20 cm 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 : 3.0m to 4.50m All kinds of soil (Ref. Item No. 2.12 of DSR)							

	screenchamber out side dim 6.2X1.75	1	7.000	2.550	0.830	0.6	8.890	out side dim 6.2X1.75x 3.83
	Total Quantity						8.890 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						8.890 cum	
	Say 8.890 cum @ Rs 753.86 / cum						Rs 6701.82	
4	<p>100.15 Excavating trenches of required width for pipes, cables, etc including excavation for sockets, and dressing of sides, ramming of bottoms, depth up to 1.5 m, including getting out the excavated soil, and then returning the soil as required, in layers not exceeding 20 cm 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 :"</p> <p>Ordinary Rock. (Ref. Item No. 2.13.1 of DSR)</p>							
	screenchamber out side dim 6.2X1.75	1	7.000	2.550	1.500	0.4	10.710	out side dim 6.2X1.75x 3.83
	Total Quantity						10.710 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						10.710 cum	
	Say 10.710 cum @ Rs 791.65 / cum						Rs 8478.57	
5	<p>100.16 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 20 cm 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 : 1.50m to 3.0m.</p> <p>Ordinary Rock. (Ref. Item No. 2.14 of DSR)</p>							
	screenchamber out side dim 6.2X1.75	1	7.000	2.550	1.500	0.4	10.710	out side dim 6.2X1.75x 3.33
	Total Quantity						10.710 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						10.710 cum	
	Say 10.710 cum @ Rs 978.85 / cum						Rs 10483.48	

6	<p>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 in depth but not exceeding 4.5 m, including getting out the excavated soil, and then returning the soil as required, in layers not exceeding 20 cm 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 : 3.0m to 4.50m. Ordinary Rock. (Ref. Item No. 2.15 of DSR)</p>							
	screenchamber out side dim 6.2X1.75	1	7.000	2.550	0.830	0.4	5.927	out side dim 6.2X1.75x 3.33
	Total Quantity						5.927 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						5.927 cum	
	Say 5.927 cum @ Rs 1166.05 / cum						Rs 6911.18	
7	<p>2.16.3 Close timbering in trenches including strutting, shoring and packing cavities (wherever required) complete (Measurements to be taken of the face area timbered).Depth exceeding 3 m but not exceeding 4.5 m</p>							
	screenchamber out side dim 6.2X1.75	1	(7.000*2+ 2.55*2)		3.830		73.153	out side dim 6.2X1.75x 3.83
	Total Quantity						73.153 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						73.153 sqm	
	Say 73.153 sqm @ Rs 192.39 / sqm						Rs 14073.91	
8	<p>100.7.1 Bailing out water with 5 HP engine and pumpset including conveyance to the site, erection, dismantling and taking back of engine and pump, cost of fuel lubricating oil and other stores pay of staff etc. complete. NEW DATA (Prepared based on PHED SDB - Item No.1070)</p>							
		1	200.000				200.000	
	Total Quantity						200.000 Kwh	
	Total Deducted Quantity						0.000 Kwh	
	Net Total Quantity						200.000 Kwh	
	Say 200.000 Kwh @ Rs 36.26 / Kwh						Rs 7252.00	
9	<p>4.1.6</p>							

	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size)						
	screenchamber out side dim 6.2X1.75	1	7.000	2.550	0.200	3.570	out side dim 6.2X1.75x 3.33
	Total Quantity						3.570 cum
	Total Deducted Quantity						0.000 cum
	Net Total Quantity						3.570 cum
	Say 3.570 cum @ Rs 7076.06 / cum						Rs 25261.53
10	<p>5.37.1</p> <p>Providing and laying in position ready mixed M-25 grade concrete for reinforced cement concrete work, using cement content as per approved design mix, manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for reinforced cement concrete work including pumping of R.M.C. from transit mixer to site of laying, excluding the cost of centering, shuttering finishing and reinforcement including cost of 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 the Engineer - in -charge. Note:- Cement content considered in this item is @330 kg/cum. Excess /less cement used as per design mix is payable/recoverable separately.All work upto plinth level</p>						
	screenchamber out side dim 6.2X1.75- base slab	1	6.600	2.150	0.250	3.548	out side dim 6.2X1.75x 3.83
	side wall allround	1	15.900	0.250	3.330	13.237	
	inside partition wall	2	1.250	0.250	3.330	2.082	
		1	3.200	0.250	3.330	2.664	
	working platform	1	1.200	1.750	0.250	0.525	
	Total Quantity						22.056 cum
	Total Deducted Quantity						0.000 cum
	Net Total Quantity						22.056 cum
	Say 22.056 cum @ Rs 9700.81 / cum						Rs 213961.07
11	<p>5.34.1</p> <p>Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately.Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).</p>						

	screenchamber out side dim 6.2X1.75-base slab	1	6.600	2.150	0.250		3.548	out side dim 6.2X1.75x 3.83	
	side wall allround	1	15.900	0.250	3.330		13.237		
	inside partition wall	2	1.250	0.250	3.330		2.082		
		1	3.200	0.250	3.330		2.664		
	working platform	1	1.200	1.750	0.250		0.525		
	Total Quantity						22.056 cum		
	Total Deducted Quantity						0.000 cum		
	Net Total Quantity						22.056 cum		
	Say 22.056 cum @ Rs 80.56 / cum						Rs 1776.83		
12	4.12 Extra for providing and mixing water proofing material in cement concrete work in doses by weight of cement as per manufacturer's specification .								
	screenchamber out side dim 6.2X1.75-base slab	1	6.600	2.150	0.250	340.0	1206.150	out side dim 6.2X1.75x 3.83	
	side wall allround	1	15.900	0.250	3.330	340.0	4500.495		
	inside partition wall	2	1.250	0.250	3.330	340.0	707.625		
		1	3.200	0.250	3.330	340.0	905.761		
	working platform	1	1.200	1.750	0.250	340.0	178.500		
	Total Quantity						7498.531 kg		
	Total Deducted Quantity						0.000 kg		
	Net Total Quantity						7498.531 kg		
	Say 7498.531 kg @ Rs 1.33 / kg						Rs 9973.05		
13	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								
	Qty vide item no - 10*100kg/m3 cc	1	22.056	100.000			2205.600		
	Total Quantity						2205.600 kilogram		
	Total Deducted Quantity						0.000 kilogram		
	Net Total Quantity						2205.600 kilogram		
	Say 2205.600 kilogram @ Rs 96.46 / kilogram						Rs 212752.18		

14	od347421/2021_2022 Extra for providing epoxy coating for reinforcement bars.							
	Qty vide item no - 10*100kg/m3 cc	1	22.056	100.000			2205.600	
	Total Quantity						2205.600 kg	
	Total Deducted Quantity						0.000 kg	
	Net Total Quantity						2205.600 kg	
	Say 2205.600 kg @ Rs 2.32 / kg						Rs 5116.99	
15	5.9.1 Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete							
	screenchamber out side dim 6.2X1.75- base slab	1	6.600*2+2 .15*2		0.250		4.375	out side dim 6.2X1.75x 3.33
	Total Quantity						4.375 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						4.375 sqm	
	Say 4.375 sqm @ Rs 329.03 / sqm						Rs 1439.51	
16	5.9.2 Centering and shuttering including strutting, etc. and removal of form for:Walls (any thickness) including attached pilasters, buttersesses, plinth and string courses etc.							
	side wall allround - outside	1	15.900		3.330		52.947	
	inside	1	5.7*2+1.2 5*2		3.330		46.287	
	inside partition wall	2*2	1.250		3.330		16.650	
		1*2	3.200		3.330		21.312	
	Total Quantity						137.196 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						137.196 sqm	
	Say 137.196 sqm @ Rs 703.77 / sqm						Rs 96554.43	
17	5.9.3 Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform							
	working platform -top slab	1	1.200	1.750			2.100	

		1	1.2*2+1.7 5*2		0.250		1.475		
	Total Quantity						3.575 sqm		
	Total Deducted Quantity						0.000 sqm		
	Net Total Quantity						3.575 sqm		
	Say 3.575 sqm @ Rs 800.50 / sqm						Rs 2861.79		
18	<p>22.23.1 Providing and applying integral crystalline slurry of hydrophilic in nature for waterproofing treatment to the RCC structures like retaining walls of the basement, water tanks, roof slabs, podiums, reservoir, sewage & water treatment plant, tunnels/ subway and bridge deck etc., prepared by mixing in the ratio of 5 : 2 (5 parts integral crystalline slurry : 2 parts water) for vertical surfaces and 3 : 1 (3 parts integral crystalline slurry : 1 part water) for horizontal surfaces and applying the same from negative (internal) side with the help of synthetic fiber brush. The material shall meet the requirements as specified in ACI-212-3R-2010 i.e by reducing permeability of concrete by more than 90% compared with control concrete as per DIN 1048 and resistant to 16 bar hydrostatic pressure on negative side. The crystalline slurry shall be capable of self-healing of cracks up to a width of 0.50mm. The work shall be carried out all complete as per specification and the direction of the engineer in-charge. The product performance shall carry guarantee for 10 years against any leakage. For vertical surface two coats @ 0.70 kg per sqm</p>								
	side wall allround - outside	1	15.900		3.330		52.947		
	inside	1	5.7*2+1.2 5*2		3.330		46.287		
	inside partition wall	2*2	1.250		3.330		16.650		
		1*2	3.200		3.330		21.312		
	Total Quantity						137.196 sqm		
	Total Deducted Quantity						0.000 sqm		
	Net Total Quantity						137.196 sqm		
	Say 137.196 sqm @ Rs 559.61 / sqm						Rs 76776.25		
19	<p>22.23.2 Providing and applying integral crystalline slurry of hydrophilic in nature for waterproofing treatment to the RCC structures like retaining walls of the basement, water tanks, roof slabs, podiums, reservoir, sewage & water treatment plant, tunnels/ subway and bridge deck etc., prepared by mixing in the ratio of 5 : 2 (5 parts integral crystalline slurry : 2 parts water) for vertical surfaces and 3 : 1 (3 parts integral crystalline slurry : 1 part water) for horizontal surfaces and applying the same from negative (internal) side with the help of synthetic fiber brush. The material shall meet the requirements as specified in ACI-212-3R-2010 i.e by reducing permeability of concrete by more than 90% compared with control concrete as per DIN 1048 and resistant to 16 bar hydrostatic pressure on negative side. The crystalline slurry shall be capable of self-healing of cracks up to a width of 0.50mm. The work shall be carried out all complete as per specification and the direction of the engineer in-charge. The product performance shall carry guarantee for 10 years against any leakage. For horizontal surface one coat @ 1.10 kg per sqm.</p>								

	screenchamber out side dim 6.2X1.75-base slab	1	6.600	2.150			14.190	out side dim 6.2X1.75x 3.33	
	working platform -top slab	1	1.200	1.750			2.100		
	Total Quantity						16.290 sqm		
	Total Deducted Quantity						0.000 sqm		
	Net Total Quantity						16.290 sqm		
	Say 16.290 sqm @ Rs 431.28 / sqm						Rs 7025.55		
20	13.7.1 12 mm cement plaster finished with a floating coat of neat cement of mix:1:3 (1 cement : 3 fine sand)								
	side wall allround - outside	1	15.900		3.330		52.947		
	inside	1	5.7*2+1.2 5*2		3.330		46.287		
	inside partition wall	2*2	1.250		3.330		16.650		
		1*2	3.200		3.330		21.312		
	screenchamber out side dim 6.2X1.75-base slab	1	6.600	2.150			14.190	out side dim 6.2X1.75x 3.33	
	working platform -top slab top&bottom	2	1.200	1.750			4.200		
	Total Quantity						155.586 sqm		
	Total Deducted Quantity						0.000 sqm		
	Net Total Quantity						155.586 sqm		
	Say 155.586 sqm @ Rs 393.69 / sqm						Rs 61252.65		
21	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)								
	side wall allround - outside	1	15.900		3.330		52.947		
	inside	1	5.7*2+1.2 5*2		3.330		46.287		
	inside partition wall	2*2	1.250		3.330		16.650		
		1*2	3.200		3.330		21.312		

	screenchamber out side dim 6.2X1.75-base slab	1	6.600	2.150			14.190	out side dim 6.2X1.75x 3.33	
	working platform -top slab top&bottom	2	1.200	1.750			4.200		
	Total Quantity						155.586 sqm		
	Total Deducted Quantity						0.000 sqm		
	Net Total Quantity						155.586 sqm		
	Say 155.586 sqm @ Rs 105.38 / sqm						Rs 16395.65		
22	13.65.1 Painting with black anti- corrosive bitumastic paint of approved brand and manufacture to give an even shade:Two or more coats on new work								
	side wall allround - outside	1	15.900		3.330		52.947		
	inside	1	5.7*2+1.2 5*2		3.330		46.287		
	inside partition wall	2*2	1.250		3.330		16.650		
		1*2	3.200		3.330		21.312		
	screenchamber out side dim 6.2X1.75-base slab	1	6.600	2.150			14.190	out side dim 6.2X1.75x 3.33	
	working platform -top slab top&bottom	2	1.200	1.750			4.200		
	Total Quantity						155.586 sqm		
	Total Deducted Quantity						0.000 sqm		
	Net Total Quantity						155.586 sqm		
	Say 155.586 sqm @ Rs 122.47 / sqm						Rs 19054.62		
23	od347429/2021_2022 Supplying providing and fixing CI encapsulated steps at 30.00cm c/c in a staggered manner including all labour charges, etc complete as per the instruction of the engineer in-charge.								
		6					6.000		
	Total Quantity						6.000 No		
	Total Deducted Quantity						0.000 No		
	Net Total Quantity						6.000 No		
	Say 6.000 No @ Rs 424.89 / No						Rs 2549.34		

24	50.2.25.1 Filling with contractor's own earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift up to 1.5 m as per direction of site Engineer-in-charge							
		1	15.900	0.300	3.830		18.270	
	Total Quantity						18.270 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						18.270 cum	
	Say 18.270 cum @ Rs 515.97 / cum						Rs 9426.77	
25	100.36.1 Filling water with 5000 litre tankers fitted in lorry and conveying water from a distance of 5 km (average) to the reservoir site and pumping the water into the reservoir of height not less than 3 m using 5 HP diesel engine pump set , hire for tanker lorry, tools and other appliances and cost of water etc. complete. "(Ref. No. 000, Technical Circular)"							
	screen chamber inside dim 5.7x1.25x3.33	1	5.700	1.250	3.330		23.727	
	Total Quantity						23.727 Kilo litre	
	Total Deducted Quantity						0.000 Kilo litre	
	Net Total Quantity						23.727 Kilo litre	
	Say 23.727 Kilo litre @ Rs 182.79 / Kilo litre						Rs 4337.06	
SI No	Description	No	L	B	D	CF	Quantity	Remark
6Construction of Valve chamber (Cost Index:33.05 %)								
1	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 1.5 m, including getting out the excavated soil, and then returning the soil as required, in layers not exceeding 20 cm 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 : All kinds of soil (Ref. Item No. 2.10.1 of DSR)							
	Qty- valve chamber-1 (4X2M)	1	4.800	2.800	1.500		20.160	chamber 1- 4*2*1.5
	qty - valve chamber 2 (2X1M)	1	2.800	1.800	1.500		7.561	chamber - 2 2*1*1.5
	Total Quantity						27.721 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						27.721 cum	
	Say 27.721 cum @ Rs 545.11 / cum						Rs 15110.99	

2	4.1.6 Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size)							
	Qty- valve chamber-1 (4X2M)	1	4.800	2.800	0.150		2.016	chamber 1- 4*2*1.5
	qty - valve chamber 2 (2X1M)	1	2.800	1.800	0.150		0.756	chamber - 2 2*1*1.5
	Total Quantity						2.772 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						2.772 cum	
	Say 2.772 cum @ Rs 7076.06 / cum						Rs 19614.84	
3	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)							
	Qty- valve chamber-1 (4X2M)-Bottom cc	1	4.400	2.400	0.200		2.112	chamber 1- 4*2*1.5
	side wall	1	12.800	0.200	1.200		3.073	
	cover slab	1	4.400	2.400	0.200		2.112	
	qty - valve chamber 2 (2X1M)-Bottom cc	1	2.400	1.400	0.200		0.672	chamber - 2 2*1*1.5
	side wall	1	6.800	0.200	1.200		1.633	
	cover slab	1	2.400	1.400	0.200		0.672	
	Total Quantity						10.274 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						10.274 cum	
	Say 10.274 cum @ Rs 8914.95 / cum						Rs 91592.20	
4	5.9.1 Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete							
	Qty- valve chamber-1 (4X2M)-pcc	1	4.8*2+2.8*2	0.150			2.280	chamber 1- 4*2*1.5
	RCC base slab	1	4.400*2+2.4*2	0.200			2.721	
	qty - valve chamber 2 (2X1M)-Bottom pcc	1	2.8*2+1.8*2	0.150			1.380	chamber - 2 2*1*1.5

	RCC base slab	1	2.4*2+1.4* 2	0.200			1.520	
	Total Quantity						7.901 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						7.901 sqm	
	Say 7.901 sqm @ Rs 329.03 / sqm						Rs 2599.67	
5	5.9.2 Centering and shuttering including strutting, etc. and removal of form for:Walls (any thickness) including attached pilasters, buttersesses, plinth and string courses etc.							
	Qty- valve chamber-1 (4X2M)-wall inside	1	12.000	1.300			15.601	chamber 1- 4*2*1.5
	side wall-out side	1	13.600	1.300			17.680	
	qty - valve chamber 2 (2X1M)-wall inside	1	6.000	1.300			7.801	chamber - 2 2*1*1.5
	side wall-out side	1	7.600	1.300			9.880	
	Total Quantity						50.962 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						50.962 sqm	
	Say 50.962 sqm @ Rs 703.77 / sqm						Rs 35865.53	
6	5.9.3 Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform							
	Chamber-1	1	4.400	2.400			10.560	
	Chamber 2	1	2.400	1.400			3.360	
	Total Quantity						13.920 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						13.920 sqm	
	Say 13.920 sqm @ Rs 800.50 / sqm						Rs 11142.96	
7	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							
		1	10.274			80.0	821.920	
	Total Quantity						821.920 kilogram	
	Total Deducted Quantity						0.000 kilogram	
	Net Total Quantity						821.920 kilogram	
	Say 821.920 kilogram @ Rs 96.46 / kilogram						Rs 79282.40	

8	13.9.1 Cement plaster 1:3 (1 cement : 3 coarse sand) finished with a floating coat of neat cement.12 mm cement plaster							
	Qty- valve chamber-1 (4X2M)-wall inside	1	12.000	1.300			15.601	chamber 1- 4*2*1.5
	side wall-out side	1	13.600	1.300			17.680	
	qty - valve chamber 2 (2X1M)-wall inside	1	6.000	1.300			7.801	chamber - 2 2*1*1.5
	side wall-out side	1	7.600	1.300			9.880	
	Total Quantity						50.962 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						50.962 sqm	
	Say 50.962 sqm @ Rs 404.41 / sqm						Rs 20609.54	
9	od347414/2021_2022 Supplying providing and fixing CI encapsulated steps at 30.00cm c/c in a staggered manner including all labour charges, etc complete as per the instruction of the engineer in-charge.							
	Qty	6					6.000	
	Total Quantity						6.000 No	
	Total Deducted Quantity						0.000 No	
	Net Total Quantity						6.000 No	
	Say 6.000 No @ Rs 424.89 / No						Rs 2549.34	
SI No	Description	No	L	B	D	CF	Quantity	Remark
7Construction of Control room and Generator Room for wellcum pumphouse (Cost Index:33.05 %)								
1	2.2.1 Earth work in rough excavation, banking excavated earth in layers not exceeding 20 cm in depth, breaking clods, watering, rolling each layer with 1/2 tonne roller or wooden or steel rammers, and rolling every 3rd and top-most layer with power roller of minimum 8 tonnes and dressing up in embankments for roads, flood banks, marginal banks and guide banks or filling up ground depressions, lead up to 50 m and lift up to 1.5 m:All kinds of soil							
	For Column footing	8	1.700	1.700	1.600		36.992	
	Total Quantity						36.992 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						36.992 cum	
	Say 36.992 cum @ Rs 862.56 / cum						Rs 31907.82	
2	4.1.6 Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm							

	nominal size)							
	For column footing	8	1.700	1.700	0.200		4.624	
	Floor	2	5.000	4.000	0.150		6.000	
	Total Quantity						10.624 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						10.624 cum	
	Say 10.624 cum @ Rs 7076.06 / cum						Rs 75176.06	
3	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							
	Footing	8	1.500	1.500	0.200		3.600	
		8	0.850	0.850	0.700		4.046	
	Column Pedestal	8	0.200	0.400	0.500		0.321	
	Grade slab	2	5.000	4.000	0.150		6.000	
	Plinth beam	2	10.000	0.200	0.450		1.800	
	„	4	4.000	0.200	0.450		1.441	
	Ramp	1	3.000	1.500	0.200		0.900	
	Kerala Water Authority Total Quantity						18.108 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						18.108 cum	
	Say 18.108 cum @ Rs 8914.95 / cum						Rs 161431.91	
4	5.2.2 Reinforced cement concrete work in walls (any thickness), including attached pilasters, buttresses, plinth and string courses, fillets, columns, pillars, piers, abutments, posts and struts etc. up tot floor five level excluding cost of centering, shuttering, finishing and reinforcement :1:1.5:3(1 cement : 1.5 coarse sand : 3 graded stone aggregate 20 mm nominal size)							
	Column Above Plinth	8	0.200	0.400	5.000		3.201	
	Lintel	1	18.000	0.200	0.250		0.900	
	Shade	1	18.000	0.750	0.120		1.620	
	Beam	4	3.600	0.200	0.450		1.297	
	„	2*3	3.270	0.200	0.450		1.766	
	Slab	1	11.200	5.000	0.120		6.720	
	Total Quantity						15.504 cum	
	Total Deducted Quantity						0.000 cum	

	Net Total Quantity						15.504 cum	
	Say 15.504 cum @ Rs 10748.84 / cum						Rs 166650.02	
5	5.9.1 Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete							
	Footing PCC	8*4	1.700	1.700	0.200		18.496	
	Footing RCC	8*4	1.500	1.500	0.200		14.400	
	Total Quantity						32.896 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						32.896 sqm	
	Say 32.896 sqm @ Rs 329.03 / sqm						Rs 10823.77	
6	5.9.5 Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers							
	Plinth beam	2	10.600		0.450*2		19.080	
	„	4	4.000		0.450*2		14.400	
	Lintel	1	36.000		0.25*2		18.000	
	Beam	1	36.000		(0.330*2)+ 0.2		30.961	
	Total Quantity						82.441 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						82.441 sqm	
	Say 82.441 sqm @ Rs 637.64 / sqm						Rs 52567.68	
7	5.9.6 Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts							
	Column up to Plinth	8	0.2*2+0.4* 2		0.500		4.801	
	Column above Plinth	8	1.200	4.900			47.040	
	Total Quantity						51.841 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						51.841 sqm	
	Say 51.841 sqm @ Rs 847.46 / sqm						Rs 43933.17	
8	5.9.20 Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform with water proof ply 12 mm thick							

	Shade	1	18.000	0.750+0.1 2			15.660		
	Beam	4	3.600	0.200+0.4 5*2			15.841		
	„	2*3	3.270	0.200+0.4 5*2			21.582		
	Slab	1	11.200	5.000			56.000		
	Total Quantity						109.083 sqm		
	Total Deducted Quantity						0.000 sqm		
	Net Total Quantity						109.083 sqm		
	Say 109.083 sqm @ Rs 900.08 / sqm						Rs 98183.43		
9	50.6.7.2 Laterate masonry with neatly dressed laterate stone of size 40x20x15cm or nearest size in cement mortar 1:6 for super structure above plinth level up to floor two level including all cost of materials, labour charges etc.								
	Masonry wall	6	3.270	0.200	4.650		18.247		
	„	2	3.600	0.200	4.550		6.553		
	„	1	4.000	0.200	4.900		3.921		
	Parapet wall	1	31.600	0.200	0.400		2.529		
	Lintel	4	3.270	0.200	0.150		-0.392		
	„	2	3.270	0.200	0.300		-0.392		
	„	2	3.600	0.200	0.150		-0.216		
	„	1	4.000	0.200	0.150		-0.120		
	RS Opening	2	3.270	0.200	3.000		-3.924		
	Window	4	1.500	0.200	1.500		-1.800		
	Door op	1	1.500	2.400			-3.599		
	Total Quantity						31.250 cum		
	Total Deducted Quantity						-10.443 cum		
	Net Total Quantity						20.807 cum		
	Say 20.807 cum @ Rs 7872.98 / cum						Rs 163813.09		
10	5.22.6 Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth level Thermo - Mechanically Treated bars of grade Fe-500D or more								
	@ 80 Kg of Steel of 1 Cum of CC	1	33.612			80.0	2688.960		
	Total Quantity						2688.960 kilogram		

	Total Deducted Quantity						0.000 kilogram	
	Net Total Quantity						2688.960 kilogram	
	Say 2688.960 kilogram @ Rs 96.46 / kilogram						Rs 259377.08	
11	13.1.1 12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)							
	Room inside	2	18.000	4.900			176.400	
	Column sides	4*2	0.200	4.900			7.841	
	Op. Side	2	9.270	0.200			3.708	
	„	1	6.300	0.200			1.260	
	Out side	1	30.000	4.900			147.000	
	Parapet wall	1	31.600	1.000			31.600	
	Window	4	1.500	1.500			-9.000	
	Open.	1*2	1.500	2.400			-7.199	
	Rs	2*2	3.270		3.000		-39.240	
	Total Quantity						367.809 sqm	
	Total Deducted Quantity						-55.439 sqm	
	Net Total Quantity						312.370 sqm	
	Say 312.370 sqm @ Rs 308.21 / sqm						Rs 96275.56	
12	50.13.1 9 mm cement plastering of mix : 1:3 (1 cement : 3 fine sand) including all cost of materials, labour charges etc complete							
	Ceiling	2	5.000	4.000			40.000	
	Beam sides	2*2	4.000	0.330			5.280	
	Slab Proj.	1	31.500	0.300			9.450	
	Edge	1	32.400	0.150			4.860	
	Shade Bottom & Top	2	11.800	0.750			17.701	
	„	2	11.800	0.600			14.160	
	„	2*2	4.400	0.600			10.560	
	Vertical	2*2	0.600	0.900			2.160	
	Roof Top	1	10.200	4.000			40.800	
	Total Quantity						144.971 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						144.971 sqm	
	Say 144.971 sqm @ Rs 285.86 / sqm						Rs 41441.41	

13	10.6.1 Supplying and fixing rolling shutters of approved make, made of required size M.S. laths, interlocked together through their entire length and jointed together at the end by end locks, mounted on specially designed pipe shaft with brackets, side guides and arrangements for inside and outside locking with push and pull operation complete, including the cost of providing and fixing necessary 27.5 cm long wire springs manufactured from high tensile steel wire of adequate strength conforming to IS: 4454 - part 1 and M.S. top cover of required thickness for rolling shutters.80x1.25 mm M.S. laths with 1.25 mm thick top cover								
		2	3.270		3.000		19.620		
		Total Quantity					19.620 sqm		
		Total Deducted Quantity					0.000 sqm		
		Net Total Quantity					19.620 sqm		
		Say 19.620 sqm @ Rs 3400.56 / sqm					Rs 66718.99		
14	od347419/2021_2022 Supplying and providing aluminium window with powder coated aluminium sections for frames and shutters with 4mm thick glass panels as per drawings and specifications including all fittings and fixing charges								
	Windows	4	1.500		1.500		9.000		
		Total Quantity					9.000 sqm		
		Total Deducted Quantity					0.000 sqm		
		Net Total Quantity					9.000 sqm		
		Say 9.000 sqm @ Rs 3771.86 / sqm					Rs 33946.74		
15	4.1.3 Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:2:4 (cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size)								
	Screading Concrete (Panel Room)	1	4.000	5.000	0.040		0.800		
		Total Quantity					0.800 cum		
		Total Deducted Quantity					0.000 cum		
		Net Total Quantity					0.800 cum		
		Say 0.800 cum @ Rs 7841.17 / cum					Rs 6272.94		
16	13.9.1 Cement plaster 1:3 (1 cement : 3 coarse sand) finished with a floating coat of neat cement.12 mm cement plaster								
	Floor Finishing	2	4.000	5.000			40.000		
	Rammp	2	3.000	1.500			9.000		

						Total Quantity	49.000 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	49.000 sqm	
						Say 49.000 sqm @ Rs 404.41 / sqm	Rs 19816.09	
17	13.43.1	Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer						
	Room inside	2	18.000	4.900			176.400	
	Column sides	4*2	0.200	4.900			7.841	
	Op. Side	2	9.270	0.200			3.708	
	„	1	6.300	0.200			1.260	
	Out side	1	30.000	4.900			147.000	
	Parapet wall	1	31.600	1.000			31.600	
	Window	4	1.500	1.500			-9.000	
	Open.	1*2	1.500	2.400			-7.199	
	Rs	2*2	3.270		3.000		-39.240	
	Ceiling	2	5.000	4.000			40.000	
	Beam sides	2*2	4.000	0.330			5.280	
	Slab Proj.	1	31.500	0.300			9.450	
	Edge	1	32.400	0.150			4.860	
	Shade Bottom & Top	2	11.800	0.750			17.701	
	„	2	11.800	0.600			14.160	
	„	2*2	4.400	0.600			10.560	
	Vertical	2*2	0.600	0.900			2.160	
						Total Quantity	471.980 sqm	
						Total Deducted Quantity	-55.439 sqm	
						Net Total Quantity	416.541 sqm	
						Say 416.541 sqm @ Rs 69.32 / sqm	Rs 28874.62	
18	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)						
	Room inside	2	18.000	4.900			176.400	
	Column sides	4*2	0.200	4.900			7.841	
	Op. Side	2	9.270	0.200			3.708	

	„	1	6.300	0.200			1.260	
	Out side	1	30.000	4.900			147.000	
	Parapet wall	1	31.600	1.000			31.600	
	Window	4	1.500	1.500			-9.000	
	Open.	1*2	1.500	2.400			-7.199	
	Rs	2*2	3.270		3.000		-39.240	
	Ceiling	2	5.000	4.000			40.000	
	Beam sides	2*2	4.000	0.330			5.280	
	Slab Proj.	1	31.500	0.300			9.450	
	Edge	1	32.400	0.150			4.860	
	Shade Bottom & Top	2	11.800	0.750			17.701	
	„	2	11.800	0.600			14.160	
	„	2*2	4.400	0.600			10.560	
	Vertical	2*2	0.600	0.900			2.160	
						Total Quantity	471.980 sqm	
						Total Deducted Quantity	-55.439 sqm	
						Net Total Quantity	416.541 sqm	
						Say 416.541 sqm @ Rs 105.38 / sqm	Rs 43895.09	
19	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							
	Window grill	4	1.500	1.500		16.0	144.000	
						Total Quantity	144.000 kg	
						Total Deducted Quantity	0.000 kg	
						Net Total Quantity	144.000 kg	
						Say 144.000 kg @ Rs 151.28 / kg	Rs 21784.32	
20	13.61.1 Painting with synthetic enamel paint of approved brand and manufacture to give an even shade:Two or more coats on new work							
	Window	4	1.500	1.500			9.000	
	Rolling shutter	2	3.270	3.000		2.5	49.051	
						Total Quantity	58.051 sqm	
						Total Deducted Quantity	0.000 sqm	

SI No	Description	No	L	B	D	CF	Quantity	Remark
Net Total Quantity							58.051 sqm	
Say 58.051 sqm @ Rs 140.37 / sqm								Rs 8148.62
8Bath cum Toilets (Cost Index:33.05 %)								
1	2.2.1 Earth work in rough excavation, banking excavated earth in layers not exceeding 20 cm in depth, breaking clods, watering, rolling each layer with 1/2 tonne roller or wooden or steel rammers, and rolling every 3rd and top-most layer with power roller of minimum 8 tonnes and dressing up in embankments for roads, flood banks, marginal banks and guide banks or filling up ground depressions, lead up to 50 m and lift up to 1.5 m:All kinds of soil							
	WALL	1	9.920	0.900	0.700		6.250	
	STEPS	1	1.000	0.750	0.150		0.113	
Total Quantity							6.363 cum	
Total Deducted Quantity							0.000 cum	
Net Total Quantity							6.363 cum	
Say 6.363 cum @ Rs 862.56 / cum								Rs 5488.47
2	4.1.6 Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size)							
	WALL	1	9.920	0.900	0.100		0.893	
	STEPS	1	1.000	0.750	0.100		0.076	
Total Quantity							0.969 cum	
Total Deducted Quantity							0.000 cum	
Net Total Quantity							0.969 cum	
Say 0.969 cum @ Rs 7076.06 / cum								Rs 6856.70
3	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)							
	FOUNDATION	2	9.920	0.600	0.600		7.143	
	BASEMENT	2	9.920	0.450	0.450		4.018	
Total Quantity							11.161 cum	
Total Deducted Quantity							0.000 cum	
Net Total Quantity							11.161 cum	
Say 11.161 cum @ Rs 7069.81 / cum								Rs 78906.15

4	6.4.1 Brick work with common burnt clay F.P.S. (non modular) bricks of class designation 7.5 in superstructure above plinth level up to floor V level in all shapes and sizes in:Cement mortar 1:4 (1 cement : 4 coarse sand)(from floor 2 level up to floor 5 level)							
	Walls	2	9.920	0.230	2.700		12.321	
	steps	2*3	1.000	0.250	0.150		0.225	
	door	2	0.800	0.230	1.700		-0.625	
	windows/ventilator	2	0.700	0.230	0.500		-0.161	
							Total Quantity	12.546 cum
							Total Deducted Quantity	-0.786 cum
							Net Total Quantity	11.760 cum
							Say 11.760 cum @ Rs 9020.06 / cum	Rs 106075.91
5	5.3 Reinforced cement concrete work in beams, suspended floors, roofs, having slope up to 15 ⁰ 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).							
	roof slab	2	3.160	2.660	0.150		2.522	
	lintel	2	9.920	0.230	0.150		0.685	
	sunshade	2	2.580	0.600	0.100		0.310	
							Total Quantity	3.517 cum
							Total Deducted Quantity	0.000 cum
							Net Total Quantity	3.517 cum
							Say 3.517 cum @ Rs 11277.58 / cum	Rs 39663.25
6	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							
		1	3.500			80.0	280.000	
							Total Quantity	280.000 kilogram
							Total Deducted Quantity	0.000 kilogram
							Net Total Quantity	280.000 kilogram
							Say 280.000 kilogram @ Rs 96.46 / kilogram	Rs 27008.80
7	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)							

		2	2.000	2.500	0.100		1.000	
	Total Quantity						1.000 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						1.000 cum	
	Say 1.000 cum @ Rs 6687.23 / cum						Rs 6687.23	
8	13.1.1 12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)							
	Walls	2*2	9.920		2.700		107.137	
	steps	2*3	1.000		0.150		0.900	
	door	2	0.800		1.700		-2.720	
	windows/ventilator	2	0.700		0.500		-0.700	
	Total Quantity						108.037 sqm	
	Total Deducted Quantity						-3.420 sqm	
	Net Total Quantity						104.617 sqm	
	Say 104.617 sqm @ Rs 308.21 / sqm						Rs 32244.01	
9	50.13.1 9 mm cement plastering of mix : 1:3 (1 cement : 3 fine sand) including all cost of materials, labour charges etc complete							
	roof slab	2*2	3.160	2.660			33.623	
	sunshade	2*2	2.800	0.600			6.720	
	Total Quantity						40.343 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						40.343 sqm	
	Say 40.343 sqm @ Rs 285.86 / sqm						Rs 11532.45	
10	13.33.1 Pointing on stone work with cement mortar 1:3 (1 cement : 3 fine sand):Flush/ Ruled pointing							
	FOUNDATION	2	9.920		0.600		11.904	
	BASEMENT	2	9.920		0.450		8.928	
	Total Quantity						20.832 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						20.832 sqm	
	Say 20.832 sqm @ Rs 329.70 / sqm						Rs 6868.31	
11	od347407/2021_2022 Supplying and fixing PVC door of size 0.8x2.10m as per the standard specification including all fittings and labour charges ,etc. .complete							

		1	2.000				2.000	
	Total Quantity						2.000 No	
	Total Deducted Quantity						0.000 No	
	Net Total Quantity						2.000 No	
	Say 2.000 No @ Rs 4696.84 / No						Rs 9393.68	
12	5.18.1 Providing precast cement concrete jali 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 6 mm nominal size) reinforced with 1.6 mm dia mild steel wire including centering and shuttering, roughening cleaning, fixing and finishing in cement mortar 1:3 (1 cement : 3 fine sand) etc. complete excluding plastering of the jambs, sills and soffits.50 mm thick							
		2	1.500		1.000		3.000	
	Total Quantity						3.000 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						3.000 sqm	
	Say 3.000 sqm @ Rs 1702.64 / sqm						Rs 5107.92	
13	11.37 Providing and laying Ceramic glazed floor tiles of size 300x300 mm (thickness to be specified by the manufacturer), of 1st quality conforming to IS : 15622, of approved make, in colours such as White, Ivory, Grey, Fume Red Brown, laid on 20 mm thick cement mortar 1:4 (1 Cement : 4 Coarse sand), including pointing the joints with white cement and matching pigment etc., complete.							
		2	3.000	1.500			9.000	
	Total Quantity						9.000 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						9.000 sqm	
	Say 9.000 sqm @ Rs 1070.59 / sqm						Rs 9635.31	
14	13.37.1 White washing with lime to give an even shade:New work (three or more coats)							
	side wall	2	3.000		1.800		10.800	
	top	2	3.000		1.500		9.000	
	Total Quantity						19.800 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						19.800 sqm	
	Say 19.800 sqm @ Rs 33.00 / sqm						Rs 653.40	
15	13.40 Distemping with dry distemper of approved brand and manufacture (two or more coats) of required shade on new work, over and including water thinnable priming coat to give an even shade:							

	side wall	2	3.000		1.800		10.800	
	top	2	3.000		1.500		9.000	
	Total Quantity						19.800 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						19.800 sqm	
	Say 19.800 sqm @ Rs 135.98 / sqm						Rs 2692.40	
SI No	Description	No	L	B	D	CF	Quantity	Remark
9Collection wellcum Pump house Mechanical, Electrical - Pumpsets, grit chamber screen, generator, transformer &&& allied works complete (Cost Index:33.05 %)								



Kerala Water Authority

PRICE

1	<p>od347392/2021_2022</p> <p>Supply, delivery and erection of non-clog sewage submersible pump sets with stainless steel impeller to pass soft solids upto 50mm size per separate special specification. including cost of required submersible cable to suit the site condition ,starter with control board, Submersible cables required as per site conditions should be supplied with two capacitance type level guards for operating automatically autocoupler SS chain ,guide rail etc for the following duty condition. MSB(Separate pannels for H&C PS 1,Asramom and H&C PS 2 pump houses)
Fabrication supply,conveyance,installation testing and commissioning of floor/wall mounting dust and vermin proof cubicle type MV panel board confirming of the fallowing components/devicess and complying to IS 8623
Fabrication of fully partitioned ,dust and vermin proof enclosure for panel assembly as per form 4 of IS 8623 using 2mm CRCA sheet as per approved design and requirement, with front and rear accessembly ,bus bar chambers,hinged doors for all switch gear components ,earthing the door using 4sq.mm braided copper conductor, providing necessary cut-outs for mounting meters,relays,indication lamps,bus bar inter connections etc,detachable covers for busbar chamber and cable alley,power coating the assembly after subjecting to 7 tank process etc as required. CRCA sheet alone be used for the fabrication.Angles/flats/slotted angles etc shall not be used forthe fabrication of panel assembly. The panel shaii be provided with base frame from ISMS 75.Necessary barriers and shrouding with 2mm/3mm SMC Sheets shall be provided.Heavy duty neoprene beeding of aproprate sizes shall be used to make the panel dust and vermin proof. The control board should have necessary tripping devices and indicating devices for safety of motor and pumpsets with necessary isolator near the wet well site - lpd and head in m as follow as per actual site condition.>Outgoing
(i)H&C PS2: 150A TP MCCB to control the submersible pump set-5Nos,
(b). 150 A TP MCCB to control the capacitor bank - 1 no(c)Providing suitable rating capacitor bank with APFC Panel-1No.(d)150A 25Ka TP MCCB spare -1No.
 (ii)ASRAMOM: a,150A 16KA TP MCCB to control submersible pump sets at Asramom-5Nos,b,150A 16 KA TPMCCB to control the capacitor bank-1No c, Providing suitable rating capacitor bank with APFC Panel (d) (iii)H&C PS1(a)150A 25 KA TPMCCB -2 Nos,(b) 150A 25KA TPMCCB-2Nos,(c)150A 25 KA TPMCCB-2Nos (d) Providing suitable ratings(3Nos 40Kvar) capacitor bank with APFC Panel-1No.
N.B (a) Necessary CTs should be provided for safe guarding the instruments wherever necessary .Interlocking should be provided for standby pump sets.
(b)
Cabling
 Supply ,delivery and laying of following size L.T cable (1.1KV Grade)including jointing material,cable carrier system like trenches,cable trays pipe sleeves etc as per IE rules including cost of flat submersible cable connecting main panel board and submersible pump sets thro starter control board and isolator 3 ½ core 95 sq mm armoured aluminum conductor cable length as per site condition.connection from suction up to header line.(three year additional replacement warrandy additional to 2 years = total 5 year -Including replacement of parts or pump,motors,panel board fully.)</p>						
CW	2	50.000				100.000	
Total Quantity						100.000 Hp	
Total Deducted Quantity						0.000 Hp	
Net Total Quantity						100.000 Hp	
Say 100.000 Hp @ Rs 25395.04 / Hp						Rs 2539504.00	
2	<p>od347398/2021_2022</p> <p>Supply and delivery of suitable flexible joint coupling upto 200mm for easy dismantling of delivery pipes and valves with Tie bolts with angular deflection 5 Degree</p>						

		2					2.000	
	Total Quantity						2.000 No	
	Total Deducted Quantity						0.000 No	
	Net Total Quantity						2.000 No	
	Say 2.000 No @ Rs 10350.00 / No						Rs 20700.00	
3	od347408/2021_2022 Supply, delivery and erection of Multistage force Pump 600LPM X 30M head suitable for cleaning the screen chamber,Pumpset during servicing with 16 m of 20 mm dia hose required for operating the pump .							
	One for each pumping station	1					1.000	
	Total Quantity						1.000 set	
	Total Deducted Quantity						0.000 set	
	Net Total Quantity						1.000 set	
	Say 1.000 set @ Rs 63250.00 / set						Rs 63250.00	
4	od347411/2021_2022 Supply and delivery of breathing apparatus with Oxygen cylinder mask etc complete .							
		1					1.000	
	Total Quantity						1.000 set	
	Total Deducted Quantity						0.000 set	
	Net Total Quantity						1.000 set	
	Say 1.000 set @ Rs 86250.00 / set						Rs 86250.00	
5	od347413/2021_2022 Supply and delivery of Diaphragm type pressure gauge with necessary S.S tubes and isolating valves							
	One for each pumping station	1					1.000	
	Total Quantity						1.000 No	
	Total Deducted Quantity						0.000 No	
	Net Total Quantity						1.000 No	
	Say 1.000 No @ Rs 6900.00 / No						Rs 6900.00	
6	od347415/2021_2022 Supply and delivery of spare parts for pumps,motors and starter for maintenance.							
		1					1.000	
	Total Quantity						1.000 No	
	Total Deducted Quantity						0.000 No	
	Net Total Quantity						1.000 No	

								Say 1.000 No @ Rs 28750.00 / No	Rs 28750.00
7	od347416/2021_2022 Supply and fixing of Electro magnetic flow meter suitable for remote sensing operation with required pipes, specials and accessories at laminar flow region (full flow) including cost of pit cover slab etc								
		1							1.000
	Total Quantity								1.000 No
	Total Deducted Quantity								0.000 No
	Net Total Quantity								1.000 No
	Say 1.000 No @ Rs 345000.00 / No								Rs 345000.00
8	od347417/2021_2022 Supply, delivery and usage of tools required for maintenance works including double end spanners, ring spanners, screw drivers, electrical megger, Tong testers, hand gloves etc.								
	One for each pumping station	1							1.000
	Total Quantity								1.000 set
	Total Deducted Quantity								0.000 set
	Net Total Quantity								1.000 set
	Say 1.000 set @ Rs 11615.00 / set								Rs 11615.00
9	od347418/2021_2022 Supply, delivery and erecting of following safety items ,including cost of same. I. Fire extinguisher of 5 Kg capacity (powder type 2 no's) II. Fire buckets with stand 5no's III. Electric quality Rubber mat to be laid in front of all the panel boards including starter panels 								
	One for each pumping station	1							1.000
	Total Quantity								1.000 No
	Total Deducted Quantity								0.000 No
	Net Total Quantity								1.000 No
	Say 1.000 No @ Rs 46000.00 / No								Rs 46000.00
10	100.98.463 Supply of CI Double Flanged Sluice Valve Conforming to IS 14846 - 2000, Sluice Valve with Cap PN 1.6, Size 300mm.								
		1							1.000
	Total Quantity								1.000 No
	Total Deducted Quantity								0.000 No
	Net Total Quantity								1.000 No
	Say 1.000 No @ Rs 21653.95 / No								Rs 21653.95

11	od347420/2021_2022 Supply and delivery of 200 mm Non-Return Ball valve made up of DI and ball of Aluminum with MVR coated for the common header.						
		1					1.000
	Total Quantity						1.000 No
	Total Deducted Quantity						0.000 No
	Net Total Quantity						1.000 No
	Say 1.000 No @ Rs 25875.00 / No						Rs 25875.00
12	100.31.1.7 "Conveying and fixing C.I. sluice valves (with cap) by providing complete with bolts, nuts, rubber insertions etc. excluding the cost of valve (the tail pieces if required will be paid separately) : 300 mm diameter. Class I" Data derived from item no.18.31.6.1 of DAR						
	SV&NRV	2					2.000
	Total Quantity						2.000 Nos
	Total Deducted Quantity						0.000 Nos
	Net Total Quantity						2.000 Nos
	Say 2.000 Nos @ Rs 2545.85 / Nos						Rs 5091.70
13	od347422/2021_2022 Supply, delivery and erection of 200 mm CIDE Pipes and fittings suitable for the pump set offered and as per drawings enclosed including cost of puddle collars required						
		1					1.000
	Total Quantity						1.000 No
	Total Deducted Quantity						0.000 No
	Net Total Quantity						1.000 No
	Say 1.000 No @ Rs 12075.00 / No						Rs 12075.00
14	od347423/2021_2022 Supply and fixing of stainless steel screen made of bars of size 50 mm x 10 mm for fixing across the screen chamber channel (fixed type) at 45 degree inclination for a clear passage of 40 mm solids and suitable for manual cleaning including cost of of screen ,Grab bucket and lifting arrangement material and fixing charges for 1.00m x 1.30m size.						
	for each ps	1					1.000
	Total Quantity						1.000 No
	Total Deducted Quantity						0.000 No
	Net Total Quantity						1.000 No
	Say 1.000 No @ Rs 103500.00 / No						Rs 103500.00

15	od347424/2021_2022 Supply , delivery , erecting and maintenance of 2 ton or suitable capacity hand operated pulley block hoist with mono rail traveling on single girder with over head traveling trolley for a clear lift according to site condition for a travel of 9 (well dia+3m) meters or suitable design for erection and easy loading and unloading of Pumps and specials from trucks.							
	one for each pump house	1					1.000	
	Total Quantity						1.000 No	
	Total Deducted Quantity						0.000 No	
	Net Total Quantity						1.000 No	
	Say 1.000 No @ Rs 402500.00 / No						Rs 402500.00	
16	od347425/2021_2022 Estimate for Mechanical and Electrical works for sewage pumping stations including supply of Generators							
		1					1.000	
	Total Quantity						1.000 L.S	
	Total Deducted Quantity						0.000 L.S	
	Net Total Quantity						1.000 L.S	
	Say 1.000 L.S @ Rs 2400000.00 / L.S						Rs 2400000.00	
SI No	Description	No	L	B	D	CF	Quantity	Remark
10Pumping mains (Cost Index:33.05 %)								
1	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, traffice 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.							
	LS1 to MH id 381,L-5m,100mm DI	2	5.000			0.8	8.000	
	LS2 to MH id 1524,L-5m,,100mm DI	2	5.000			0.8	8.000	
	LS3 to MH id 403,L-5m,150mm DI	2	5.000			0.8	8.000	
	LS4 to MH id 451,L-5m,150mm DI	2	5.000			0.8	8.000	
	LS5 to MH id 1552,L-5m,150mm DI	2	5.000			0.8	8.000	

LS6 to MH id538,L-5m,100mm DI	2	5.000			0.8	8.000	
LS7 to MH id 148,L-5m,100mm DI	2	5.000			0.8	8.000	
LS8 to MH id 741,L-5m,150mm DI	2	5.000			0.8	8.000	
LS9 to MH id 605,L-5m,150mm DI	2	5.000			0.8	8.000	
CW1 to MH id132,L-2190,250mm DI	2	2190.000			0.8	3504.000	
LS10 to MH id 48,L-5m,100mm DI	2	5.000			0.8	8.000	
LS11 to MH id 104,L-5m,100mm DI	2	5.000			0.8	8.000	
LS12 to MH id 739,L-5m,100mm DI	2	5.000			0.8	8.000	
CW2 to MH id748,L-1550,200mm DI	2	1550.000			0.8	2480.000	
LS13 to MH id 524,L-390M,100mm DI	2	390.000			0.8	624.000	
LS14 to MH id 376,L-245M,100mm DI	2	245.000			0.8	392.000	
LS15 to MH id 317,L-5m,100mm DI	2	5.000			0.8	8.000	
LS16 to MH id 193,L-5m,100mm DI	2	5.000			0.8	8.000	
LS17 to MH id 210,L-5m,100mm DI	2	5.000			0.8	8.000	
LS18 to MH id 1666,L-50m,100mm DI	2	50.000			0.8	80.000	
LS19 to MH id 615,L-657m,200mm DI	2	657.000			0.8	1051.200	
LS20 to MH id 583,L-330m,100mm DI	2	330.000			0.8	528.000	
CW3 to MH id 35,L-4570m,300mm DI	2	4570.000			0.8	7312.000	
LS21 to MH id 220,L-5m,100mm DI	2	5.000			0.8	8.000	

	LS22 to MH id 639,L-5m,100mm DI	2	5.000			0.8	8.000		
	LS23 to MH id 301,L-5m,100mm DI	2	5.000			0.8	8.000		
	LS24 to MH id 646,L-5m,100mm DI	2	5.000			0.8	8.000		
	Total Quantity						16123.200 metre		
	Total Deducted Quantity						0.000 metre		
	Net Total Quantity						16123.200 metre		
	Say 16123.200 metre @ Rs 29.87 / metre						Rs 481599.98		
2	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								
	LS1 to MH id 381,L-5m,100mm DI	1	5.000	0.600		0.6	1.800		
	LS2 to MH id 1524,L-5m,,100mm DI	1	5.000	0.600		0.6	1.800		
	LS3 to MH id 403,L-5m,150mm DI	1	5.000	0.600		0.6	1.800		
	LS4 to MH id 451,L-5m,150mm DI	1	5.000	0.600		0.6	1.800		
	LS5 to MH id 1552,L-5m,150mm DI	1	5.000	0.600		0.6	1.800		
	LS6 to MH id538,L-5m,100mm DI	1	5.000	0.600		0.6	1.800		
	LS7 to MH id 148,L-5m,100mm DI	1	5.000	0.600		0.6	1.800		
	LS8 to MH id 741,L-5m,150mm DI	1	5.000	0.600		0.6	1.800		
	LS9 to MH id 605,L-5m,150mm DI	1	5.000	0.600		0.6	1.800		
	CW1 to MH id132,L-2190,250mm DI	1	2190.000	0.800		0.6	1051.200		
	LS10 to MH id 48,L-5m,100mm DI	1	5.000	0.600		0.6	1.800		
	LS11 to MH id 104,L-5m,100mm DI	1	5.000	0.600		0.6	1.800		

	LS12 to MH id 739,L-5m,100mm DI	1	5.000	0.600		0.6	1.800		
	CW2 to MH id748,L-1550,200mm DI	1	1550.000	0.700		0.6	651.000		
	LS13 to MH id 524,L-390M,100mm DI	1	390.000	0.600		0.6	140.400		
	LS14 to MH id 376,L-245M,100mm DI	1	245.000	0.600		0.6	88.200		
	LS15 to MH id 317,L-5m,100mm DI	1	5.000	0.600		0.6	1.800		
	LS16 to MH id 193,L-5m,100mm DI	1	5.000	0.600		0.6	1.800		
	LS17 to MH id 210,L-5m,100mm DI	1	5.000	0.600		0.6	1.800		
	LS18 to MH id 1666,L-50m,100mm DI	1	50.000	0.600		0.6	18.000		
	LS19 to MH id 615,L-657m,200mm DI	1	657.000	0.700		0.6	275.940		
	LS20 to MH id 583,L-330m,100mm DI	1	330.000	0.600		0.6	118.800		
	CW3 to MH id 35,L-4570m,300mm DI	1	4570.000	0.900		0.6	2467.800		
	LS21 to MH id 220,L-5m,100mm DI	1	5.000	0.600		0.6	1.800		
	LS22 to MH id 639,L-5m,100mm DI	1	5.000	0.600		0.6	1.800		
	LS23 to MH id 301,L-5m,100mm DI	1	5.000	0.600		0.6	1.800		
	LS24 to MH id 646,L-5m,100mm DI	1	5.000	0.600		0.6	1.800		
	Total Quantity						4845.540 sqm		
	Total Deducted Quantity						0.000 sqm		
	Net Total Quantity						4845.540 sqm		
	Say 4845.540 sqm @ Rs 354.18 / sqm						Rs 1716193.36		
3	15.2.1 Demolishing cement concrete manually / by mechanical means including disposal of material within 50 metres lead as per direction of Engineer - in-Charge.Nominal concrete 1:3:6 or richer mix (i/c equivalent design mix)								

LS1 to MH id 381,L-5m,100mm DI	1	5.000	0.600	0.150	0.2	0.090	
LS2 to MH id 1524,L-5m,,100mm DI	1	5.000	0.600	0.150	0.2	0.090	
LS3 to MH id 403,L-5m,150mm DI	1	5.000	0.600	0.150	0.2	0.090	
LS4 to MH id 451,L-5m,150mm DI	1	5.000	0.600	0.150	0.2	0.090	
LS5 to MH id 1552,L-5m,150mm DI	1	5.000	0.600	0.150	0.2	0.090	
LS6 to MH id538,L-5m,100mm DI	1	5.000	0.600	0.150	0.2	0.090	
LS7 to MH id 148,L-5m,100mm DI	1	5.000	0.600	0.150	0.2	0.090	
LS8 to MH id 741,L-5m,150mm DI	1	5.000	0.600	0.150	0.2	0.090	
LS9 to MH id 605,L-5m,150mm DI	1	5.000	0.600	0.150	0.2	0.090	
CW1 to MH id132,L-2190,250mm DI	1	2190.000	0.800	0.150	0.2	52.560	
LS10 to MH id 48,L-5m,100mm DI	1	5.000	0.600	0.150	0.2	0.090	
LS11 to MH id 104,L-5m,100mm DI	1	5.000	0.600	0.150	0.2	0.090	
LS12 to MH id 739,L-5m,100mm DI	1	5.000	0.600	0.150	0.2	0.090	
CW2 to MH id748,L-1550,200mm DI	1	1550.000	0.700	0.150	0.2	32.551	
LS13 to MH id 524,L-390M,100mm DI	1	390.000	0.600	0.150	0.2	7.021	
LS14 to MH id 376,L-245M,100mm DI	1	245.000	0.600	0.150	0.2	4.410	
LS15 to MH id 317,L-5m,100mm DI	1	5.000	0.600	0.150	0.2	0.090	
LS16 to MH id 193,L-5m,100mm DI	1	5.000	0.600	0.150	0.2	0.090	
LS17 to MH id 210,L-5m,100mm DI	1	5.000	0.600	0.150	0.2	0.090	

	LS18 to MH id 1666,L-50m,100mm DI	1	50.000	0.600	0.150	0.2	0.900		
	LS19 to MH id 615,L-657m,200mm DI	1	657.000	0.700	0.150	0.2	13.797		
	LS20 to MH id 583,L-330m,100mm DI	1	330.000	0.600	0.150	0.2	5.940		
	CW3 to MH id 35,L-4570m,300mm DI	1	4570.000	0.900	0.150	0.2	123.390		
	LS21 to MH id 220,L-5m,100mm DI	1	5.000	0.600	0.150	0.2	0.090		
	LS22 to MH id 639,L-5m,100mm DI	1	5.000	0.600	0.150	0.2	0.090		
	LS23 to MH id 301,L-5m,100mm DI	1	5.000	0.600	0.150	0.2	0.090		
	LS24 to MH id 646,L-5m,100mm DI	1	5.000	0.600	0.150	0.2	0.090		
	Total Quantity						242.279 cum		
	Total Deducted Quantity						0.000 cum		
	Net Total Quantity						242.279 cum		
	Say 242.279 cum @ Rs 2006.81 / cum						Rs 486207.92		
4	<p>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 1.5 m, including getting out the excavated soil, and then returning the soil as required, in layers not exceeding 20 cm 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 :</p> <p>All kinds of soil (Ref. Item No. 2.10.1 of DSR)</p>								
	LS1 to MH id 381,L-5m,100mm DI	1	5.000	0.600	1.000	0.7	2.100		
	LS2 to MH id 1524,L-5m,,100mm DI	1	5.000	0.600	1.000	0.7	2.100		
	LS3 to MH id 403,L-5m,150mm DI	1	5.000	0.600	1.000	0.7	2.100		
	LS4 to MH id 451,L-5m,150mm DI	1	5.000	0.600	1.000	0.7	2.100		
	LS5 to MH id 1552,L-5m,150mm DI	1	5.000	0.600	1.000	0.7	2.100		

LS6 to MH id538,L-5m,100mm DI	1	5.000	0.600	1.000	0.7	2.100	
LS7 to MH id 148,L-5m,100mm DI	1	5.000	0.600	1.000	0.7	2.100	
LS8 to MH id 741,L-5m,150mm DI	1	5.000	0.600	1.000	0.7	2.100	
LS9 to MH id 605,L-5m,150mm DI	1	5.000	0.600	1.000	0.7	2.100	
CW1 to MH id132,L-2190,250mm DI	1	2190.000	0.800	1.000	0.7	1226.400	
LS10 to MH id 48,L-5m,100mm DI	1	5.000	0.600	1.000	0.7	2.100	
LS11 to MH id 104,L-5m,100mm DI	1	5.000	0.600	1.000	0.7	2.100	
LS12 to MH id 739,L-5m,100mm DI	1	5.000	0.600	1.000	0.7	2.100	
CW2 to MH id748,L-1550,200mm DI	1	1550.000	0.700	1.000	0.7	759.500	
LS13 to MH id 524,L-390M,100mm DI	1	390.000	0.600	1.000	0.7	163.800	
LS14 to MH id 376,L-245M,100mm DI	1	245.000	0.600	1.000	0.7	102.900	
LS15 to MH id 317,L-5m,100mm DI	1	5.000	0.600	1.000	0.7	2.100	
LS16 to MH id 193,L-5m,100mm DI	1	5.000	0.600	1.000	0.7	2.100	
LS17 to MH id 210,L-5m,100mm DI	1	5.000	0.600	1.000	0.7	2.100	
LS18 to MH id 1666,L-50m,100mm DI	1	50.000	0.600	1.000	0.7	21.000	
LS19 to MH id 615,L-657m,200mm DI	1	657.000	0.700	1.000	0.7	321.930	
LS20 to MH id 583,L-330m,100mm DI	1	330.000	0.600	1.000	0.7	138.600	
CW3 to MH id 35,L-4570m,300mm DI	1	4570.000	0.900	1.000	0.7	2879.100	
LS21 to MH id 220,L-5m,100mm DI	1	5.000	0.600	1.000	0.7	2.100	

	LS22 to MH id 639,L-5m,100mm DI	1	5.000	0.600	1.000	0.7	2.100		
	LS23 to MH id 301,L-5m,100mm DI	1	5.000	0.600	1.000	0.7	2.100		
	LS24 to MH id 646,L-5m,100mm DI	1	5.000	0.600	1.000	0.7	2.100		
	Total Quantity						5653.130 cum		
	Total Deducted Quantity						0.000 cum		
	Net Total Quantity						5653.130 cum		
	Say 5653.130 cum @ Rs 545.11 / cum						Rs 3081577.69		
5	<p>100.15 Excavating trenches of required width for pipes, cables, etc including excavation for sockets, and dressing of sides, ramming of bottoms, depth up to 1.5 m, including getting out the excavated soil, and then returning the soil as required, in layers not exceeding 20 cm 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 :"</p> <p>Ordinary Rock. (Ref. Item No. 2.13.1 of DSR)</p>								
	LS1 to MH id 381,L-5m,100mm DI	1	5.000	0.600	1.000	0.2	0.601		
	LS2 to MH id 1524,L-5m,,100mm DI	1	5.000	0.600	1.000	0.2	0.601		
	LS3 to MH id 403,L-5m,150mm DI	1	5.000	0.600	1.000	0.2	0.601		
	LS4 to MH id 451,L-5m,150mm DI	1	5.000	0.600	1.000	0.2	0.601		
	LS5 to MH id 1552,L-5m,150mm DI	1	5.000	0.600	1.000	0.2	0.601		
	LS6 to MH id538,L-5m,100mm DI	1	5.000	0.600	1.000	0.2	0.601		
	LS7 to MH id 148,L-5m,100mm DI	1	5.000	0.600	1.000	0.2	0.601		
	LS8 to MH id 741,L-5m,150mm DI	1	5.000	0.600	1.000	0.2	0.601		
	LS9 to MH id 605,L-5m,150mm DI	1	5.000	0.600	1.000	0.2	0.601		
	CW1 to MH id132,L-2190,250mm DI	1	2190.000	0.800	1.000	0.2	350.401		

	LS10 to MH id 48,L-5m,100mm DI	1	5.000	0.600	1.000	0.2	0.601		
	LS11 to MH id 104,L-5m,100mm DI	1	5.000	0.600	1.000	0.2	0.601		
	LS12 to MH id 739,L-5m,100mm DI	1	5.000	0.600	1.000	0.2	0.601		
	CW2 to MH id748,L-1550,200mm DI	1	1550.000	0.700	1.000	0.2	217.000		
	LS13 to MH id 524,L-390M,100mm DI	1	390.000	0.600	1.000	0.2	46.801		
	LS14 to MH id 376,L-245M,100mm DI	1	245.000	0.600	1.000	0.2	29.401		
	LS15 to MH id 317,L-5m,100mm DI	1	5.000	0.600	1.000	0.2	0.601		
	LS16 to MH id 193,L-5m,100mm DI	1	5.000	0.600	1.000	0.2	0.601		
	LS17 to MH id 210,L-5m,100mm DI	1	5.000	0.600	1.000	0.2	0.601		
	LS18 to MH id 1666,L-50m,100mm DI	1	50.000	0.600	1.000	0.2	6.000		
	LS19 to MH id 615,L-657m,200mm DI	1	657.000	0.700	1.000	0.2	91.980		
	LS20 to MH id 583,L-330m,100mm DI	1	330.000	0.600	1.000	0.2	39.600		
	CW3 to MH id 35,L-4570m,300mm DI	1	4570.000	0.900	1.000	0.2	822.600		
	LS21 to MH id 220,L-5m,100mm DI	1	5.000	0.600	1.000	0.2	0.601		
	LS22 to MH id 639,L-5m,100mm DI	1	5.000	0.600	1.000	0.2	0.601		
	LS23 to MH id 301,L-5m,100mm DI	1	5.000	0.600	1.000	0.2	0.601		
	LS24 to MH id 646,L-5m,100mm DI	1	5.000	0.600	1.000	0.2	0.601		
	Total Quantity						1615.202 cum		
	Total Deducted Quantity						0.000 cum		
	Net Total Quantity						1615.202 cum		
	Say 1615.202 cum @ Rs 791.65 / cum						Rs 1278674.66		

6	100.27 "Excavating trenches of required width for pipes, cables, etc including excavation for sockets, and dressing of sides, ramming of bottoms, depth up to 1.5 m, including getting out the excavated soil, and then returning the soil as required, in layers not exceeding 20 cm 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 : Medium Rock (blasting prohibited) New Data derived from DAR							
	LS1 to MH id 381,L-5m,100mm DI	1	5.000	0.600	1.000	0.1	0.301	
	LS2 to MH id 1524,L-5m,,100mm DI	1	5.000	0.600	1.000	0.1	0.301	
	LS3 to MH id 403,L-5m,150mm DI	1	5.000	0.600	1.000	0.1	0.301	
	LS4 to MH id 451,L-5m,150mm DI	1	5.000	0.600	1.000	0.1	0.301	
	LS5 to MH id 1552,L-5m,150mm DI	1	5.000	0.600	1.000	0.1	0.301	
	LS6 to MH id538,L-5m,100mm DI	1	5.000	0.600	1.000	0.1	0.301	
	LS7 to MH id 148,L-5m,100mm DI	1	5.000	0.600	1.000	0.1	0.301	
	LS8 to MH id 741,L-5m,150mm DI	1	5.000	0.600	1.000	0.1	0.301	
	LS9 to MH id 605,L-5m,150mm DI	1	5.000	0.600	1.000	0.1	0.301	
	CW1 to MH id132,L-2190,250mm DI	1	2190.000	0.800	1.000	0.1	175.201	
	LS10 to MH id 48,L-5m,100mm DI	1	5.000	0.600	1.000	0.1	0.301	
	LS11 to MH id 104,L-5m,100mm DI	1	5.000	0.600	1.000	0.1	0.301	
	LS12 to MH id 739,L-5m,100mm DI	1	5.000	0.600	1.000	0.1	0.301	
	CW2 to MH id748,L-1550,200mm DI	1	1550.000	0.700	1.000	0.1	108.500	
	LS13 to MH id 524,L-390M,100mm DI	1	390.000	0.600	1.000	0.1	23.401	

	LS14 to MH id 376,L-245M,100mm DI	1	245.000	0.600	1.000	0.1	14.701		
	LS15 to MH id 317,L-5m,100mm DI	1	5.000	0.600	1.000	0.1	0.301		
	LS16 to MH id 193,L-5m,100mm DI	1	5.000	0.600	1.000	0.1	0.301		
	LS17 to MH id 210,L-5m,100mm DI	1	5.000	0.600	1.000	0.1	0.301		
	LS18 to MH id 1666,L-50m,100mm DI	1	50.000	0.600	1.000	0.1	3.000		
	LS19 to MH id 615,L-657m,200mm DI	1	657.000	0.700	1.000	0.1	45.990		
	LS20 to MH id 583,L-330m,100mm DI	1	330.000	0.600	1.000	0.1	19.800		
	CW3 to MH id 35,L-4570m,300mm DI	1	4570.000	0.900	1.000	0.1	411.300		
	LS21 to MH id 220,L-5m,100mm DI	1	5.000	0.600	1.000	0.1	0.301		
	LS22 to MH id 639,L-5m,100mm DI	1	5.000	0.600	1.000	0.1	0.301		
	LS23 to MH id 301,L-5m,100mm DI	1	5.000	0.600	1.000	0.1	0.301		
	LS24 to MH id 646,L-5m,100mm DI	1	5.000	0.600	1.000	0.1	0.301		
	Total Quantity						807.612 cum		
	Total Deducted Quantity						0.000 cum		
	Net Total Quantity						807.612 cum		
	Say 807.612 cum @ Rs 1316.46 / cum						Rs 1063188.89		
7	100.8.1 Fencing one side of trenches, 1.50 m height with two rows of 10 cm plastic caution tape in vertical casuarina pole (girth 15cm to 24cm) fixed at 2 m intervals. (Data Prepared based on PWD SDB - Item No.1009)								
		1	10077.000			0.6	6046.200		
	Total Quantity						6046.200 metre		
	Total Deducted Quantity						0.000 metre		
	Net Total Quantity						6046.200 metre		
	Say 6046.200 metre @ Rs 27.66 / metre						Rs 167237.89		

8	100.98.115 Supply of DI K9 Pipe Conforming to IS 8329/2000, 100mm Dia.							
	DI K9 Pipe , 100mm Dia.	1	1080.000				1080.000	
	Total Quantity						1080.000 metre	
	Total Deducted Quantity						0.000 metre	
	Net Total Quantity						1080.000 metre	
	Say 1080.000 metre @ Rs 1143.05 / metre						Rs 1234494.00	
9	100.98.116 Supply of DI K9 Pipe Conforming to IS 8329/2000, 150mm Dia.							
	DI K9 Pipe 150mm Dia.	1	30.000				30.000	
	Total Quantity						30.000 metre	
	Total Deducted Quantity						0.000 metre	
	Net Total Quantity						30.000 metre	
	Say 30.000 metre @ Rs 1673.35 / metre						Rs 50200.50	
10	100.98.117 Supply of DI K9 Pipe Conforming to IS 8329/2000, 200mm Dia.							
	DI K9 Pipe, 200mm Dia.	1	2207.000				2207.000	
	Total Quantity						2207.000 metre	
	Total Deducted Quantity						0.000 metre	
	Net Total Quantity						2207.000 metre	
	Say 2207.000 metre @ Rs 2100.55 / metre						Rs 4635913.85	
11	100.98.118 Supply of DI K9 Pipe Conforming to IS 8329/2000, 250mm Dia.							
	DI K9 Pipe , 250mm Dia.	1	2190.000				2190.000	
	Total Quantity						2190.000 metre	
	Total Deducted Quantity						0.000 metre	
	Net Total Quantity						2190.000 metre	
	Say 2190.000 metre @ Rs 2811.20 / metre						Rs 6156528.00	
12	100.98.119 Supply of DI K9 Pipe Conforming to IS 8329/2000, 300mm Dia.							
	DI K9 Pipe , 300mm Dia.	1	4570.000				4570.000	

16	100.14.4 Conveying and laying S&S Centrifugally Cast (Spun) / Ductile Iron Pipes conforming to IS: 8329 excluding cost of pipes and specials : 250 mm dia Ductile Iron Class K-9 Pipes Data derived from 18.72.18 in DAR							
	250 mm dia Ductile Iron Class K-9 Pipes	1	2190.000				2190.000	
	Total Quantity						2190.000 metre	
	Total Deducted Quantity						0.000 metre	
	Net Total Quantity						2190.000 metre	
	Say 2190.000 metre @ Rs 159.99 / metre						Rs 350378.10	
17	100.14.5 Conveying and laying S&S Centrifugally Cast (Spun) / Ductile Iron Pipes conforming to IS: 8329 excluding cost of pipes and specials : 300 mm dia Ductile Iron Class K-9 Pipes Data derived from 18.72.19 in DAR							
	DI K9 Pipe , 300mm Dia.	1	4570.000				4570.000	
	Total Quantity						4570.000 metre	
	Total Deducted Quantity						0.000 metre	
	Net Total Quantity						4570.000 metre	
	Say 4570.000 metre @ Rs 201.30 / metre						Rs 919941.00	
18	18.70.1 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:100 mm dia pipes							
	DI K9 Pipe , 100mm Dia.	1	216.000				216.000	
	Total Quantity						216.000 joint	
	Total Deducted Quantity						0.000 joint	
	Net Total Quantity						216.000 joint	
	Say 216.000 joint @ Rs 105.84 / joint						Rs 22861.44	
19	18.70.2 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:150 mm dia pipes							
	150mm DI	6					6.000	422/5
	Total Quantity						6.000 joint	
	Total Deducted Quantity						0.000 joint	

	Net Total Quantity						6.000 joint	
	Say 6.000 joint @ Rs 173.10 / joint						Rs 1038.60	
20	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							
	200mm DI	442					442.000	
	Total Quantity						442.000 joint	
	Total Deducted Quantity						0.000 joint	
	Net Total Quantity						442.000 joint	
	Say 442.000 joint @ Rs 253.93 / joint						Rs 112237.06	
21	18.70.4 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:250 mm dia pipes							
	250mm DI Pipe	438					438.000	
	Total Quantity						438.000 joint	
	Total Deducted Quantity						0.000 joint	
	Net Total Quantity						438.000 joint	
	Say 438.000 joint @ Rs 310.07 / joint						Rs 135810.66	
22	18.70.5 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:300 mm dia pipe							
	300mm DI	914					914.000	
	Total Quantity						914.000 joint	
	Total Deducted Quantity						0.000 joint	
	Net Total Quantity						914.000 joint	
	Say 914.000 joint @ Rs 404.87 / joint						Rs 370051.18	
23	18.83.2 Labour for cutting C.I. pipe with steel saw.100 mm diameter C.I. pipe							
	100 DI	44					44.000	
	Total Quantity						44.000 Each Cut	
	Total Deducted Quantity						0.000 Each Cut	
	Net Total Quantity						44.000 Each Cut	
	Say 44.000 Each Cut @ Rs 168.64 / Each Cut						Rs 7420.16	
24	18.83.4 Labour for cutting C.I. pipe with steel saw.150 mm diameter C.I. pipe							

	150mm DI	3					3.000	
	Total Quantity						3.000 Each Cut	
	Total Deducted Quantity						0.000 Each Cut	
	Net Total Quantity						3.000 Each Cut	
	Say 3.000 Each Cut @ Rs 316.93 / Each Cut						Rs 950.79	
25	18.83.5 Labour for cutting C.I. pipe with steel saw.200 mm diameter C.I. pipe							
	200mm DI	88					88.000	
	Total Quantity						88.000 Each Cut	
	Total Deducted Quantity						0.000 Each Cut	
	Net Total Quantity						88.000 Each Cut	
	Say 88.000 Each Cut @ Rs 422.63 / Each Cut						Rs 37191.44	
26	18.83.6 Labour for cutting C.I. pipe with steel saw.250 mm diameter C.I. pipe							
		88					88.000	
	Total Quantity						88.000 Each Cut	
	Total Deducted Quantity						0.000 Each Cut	
	Net Total Quantity						88.000 Each Cut	
	Say 88.000 Each Cut @ Rs 525.61 / Each Cut						Rs 46253.68	
27	18.83.7 Labour for cutting C.I. pipe with steel saw.300 mm diameter C.I. pipe							
	300mm DI	182					182.000	
	Total Quantity						182.000 Each Cut	
	Total Deducted Quantity						0.000 Each Cut	
	Net Total Quantity						182.000 Each Cut	
	Say 182.000 Each Cut @ Rs 631.39 / Each Cut						Rs 114912.98	
28	18.68.1 Providing and laying D.I specials of class K - 12 suitable for push - on jointing as per IS : 9523 :Upt 600 mm dia							
		1	60.000				60.000	
	Total Quantity						60.000 quintal	
	Total Deducted Quantity						0.000 quintal	
	Net Total Quantity						60.000 quintal	
	Say 60.000 quintal @ Rs 19744.62 / quintal						Rs 1184677.20	

29	100.35.1 Testing 100mm DI/CI pipeline with potable water to the required test pressure 100 mm dia Observed Data derived from item no.1016 of PHED DATA						
	DI K9 Pipe , 100mm Dia.	1	1080.000				1080.000
	Total Quantity						1080.000 metre
	Total Deducted Quantity						0.000 metre
	Net Total Quantity						1080.000 metre
	Say 1080.000 metre @ Rs 22.92 / metre						Rs 24753.60
30	100.35.2 Testing 150mm DI/CI pipeline with potable water to the required test pressure 150 mm dia Observed Data derived from item no.1018 of PHED DATA						
	DI K9 Pipe 150mm Dia.	1	30.000				30.000
	Total Quantity						30.000 metre
	Total Deducted Quantity						0.000 metre
	Net Total Quantity						30.000 metre
	Say 30.000 metre @ Rs 30.99 / metre						Rs 929.70
31	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						
	200mm DI	1	2207.000				2207.000
	Total Quantity						2207.000 metre
	Total Deducted Quantity						0.000 metre
	Net Total Quantity						2207.000 metre
	Say 2207.000 metre @ Rs 39.20 / metre						Rs 86514.40
32	100.35.4 Testing 250mm DI/CI pipeline with potable water to the required test pressure . 250 mm dia Observed Data derived from item no.1022 of PHED DATA						
	250mm DI	1	2190.000				2190.000
	Total Quantity						2190.000 metre
	Total Deducted Quantity						0.000 metre
	Net Total Quantity						2190.000 metre

	Say 2190.000 metre @ Rs 50.02 / metre						Rs 109543.80	
33	100.35.5 Testing 300mm DI/CI pipeline with potable water to the required test pressure. 300 mm dia Observed Data derived from item no.1023 of PHED DATA							
	300mm DI	1	4570.000				4570.000	
	Total Quantity						4570.000 metre	
	Total Deducted Quantity						0.000 metre	
	Net Total Quantity						4570.000 metre	
	Say 4570.000 metre @ Rs 54.64 / metre						Rs 249704.80	
34	5.1.3 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:1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size)							
	pipe supports/ anchor blocks	40	1.000	1.000	1.000		40.000	
	Total Quantity						40.000 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						40.000 cum	
	Say 40.000 cum @ Rs 8427.59 / cum						Rs 337103.60	
35	5.9.1 Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete							
	Anchor block	40	2.000				80.000	
	valve chamber-inside	6	4*1		1.000		24.000	
	valve chamber-outside	6	4*1.3		1.000		31.201	
	valve chamber-cover slab	6	1.300	1.300			10.140	
	valve chamber-cover slab side edge	6	1.3*4		0.200		6.240	
	Total Quantity						151.581 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						151.581 sqm	
	Say 151.581 sqm @ Rs 329.03 / sqm						Rs 49874.70	
36	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							

	Anchor block	1	40.000			80.0	3200.000		
	For item no-39 air valve and scour valve chamber	1	7.458			80.0	596.640		
	Total Quantity						3796.640 kilogram		
	Total Deducted Quantity						0.000 kilogram		
	Net Total Quantity						3796.640 kilogram		
	Say 3796.640 kilogram @ Rs 96.46 / kilogram						Rs 366223.89		
37	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								
	Air valve & Scour valve Chamber	6	1.300	1.300	1.500		15.210		
	Total Quantity						15.210 cum		
	Total Deducted Quantity						0.000 cum		
	Net Total Quantity						15.210 cum		
	Say 15.210 cum @ Rs 291.38 / cum						Rs 4431.89		
38	4.1.3 Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:2:4 (cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size)								
	Air valve & Scour valve chamber	6	1.300	1.300	1.500	0.2	3.043		
	Total Quantity						3.043 cum		
	Total Deducted Quantity						0.000 cum		
	Net Total Quantity						3.043 cum		
	Say 3.043 cum @ Rs 7841.17 / cum						Rs 23860.68		
39	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)								
	air valve & Scour valve back to collection well-sidewall	6	4*1.15	0.150	1.100		4.554		

	bottom	6	1.150	1.150	0.150		1.191		
	cover slab	6	1.300	1.300	0.200		2.029		
	for MH cover	6	3.14/4	0.560	0.600	0.2	-0.316		
	Total Quantity						7.774 cum		
	Total Deducted Quantity						-0.316 cum		
	Net Total Quantity						7.458 cum		
	Say 7.458 cum @ Rs 10748.84 / cum							Rs 80164.85	
40	4.1.2 Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:1 1/2:3 (cement : 1 1/2 coarse sand : 3 graded stone aggregate 20 mm nominal size)								
	LS1 to MH id 381,L-5m,100mm DI	1	5.000	0.600	0.150	0.2	0.090		
	LS2 to MH id 1524,L-5m,,100mm DI	1	5.000	0.600	0.150	0.2	0.090		
	LS3 to MH id 403,L-5m,150mm DI	1	5.000	0.600	0.150	0.2	0.090		
	LS4 to MH id 451,L-5m,150mm DI	1	5.000	0.600	0.150	0.2	0.090		
	LS5 to MH id 1552,L-5m,150mm DI	1	5.000	0.600	0.150	0.2	0.090		
	LS6 to MH id538,L-5m,100mm DI	1	5.000	0.600	0.150	0.2	0.090		
	LS7 to MH id 148,L-5m,100mm DI	1	5.000	0.600	0.150	0.2	0.090		
	LS8 to MH id 741,L-5m,150mm DI	1	5.000	0.600	0.150	0.2	0.090		
	LS9 to MH id 605,L-5m,150mm DI	1	5.000	0.600	0.150	0.2	0.090		
	CW1 to MH id132,L-2190,250mm DI	1	2190.000	0.800	0.150	0.2	52.560		
	LS10 to MH id 48,L-5m,100mm DI	1	5.000	0.600	0.150	0.2	0.090		
	LS11 to MH id 104,L-5m,100mm DI	1	5.000	0.600	0.150	0.2	0.090		
	LS12 to MH id 739,L-5m,100mm DI	1	5.000	0.600	0.150	0.2	0.090		

	CW2 to MH id748,L-1550,200mm DI	1	1550.000	0.700	0.150	0.2	32.551	
	LS13 to MH id 524,L-390M,100mm DI	1	390.000	0.600	0.150	0.2	7.021	
	LS14 to MH id 376,L-245M,100mm DI	1	245.000	0.600	0.150	0.2	4.410	
	LS15 to MH id 317,L-5m,100mm DI	1	5.000	0.600	0.150	0.2	0.090	
	LS16 to MH id 193,L-5m,100mm DI	1	5.000	0.600	0.150	0.2	0.090	
	LS17 to MH id 210,L-5m,100mm DI	1	5.000	0.600	0.150	0.2	0.090	
	LS18 to MH id 1666,L-50m,100mm DI	1	50.000	0.600	0.150	0.2	0.900	
	LS19 to MH id 615,L-657m,200mm DI	1	657.000	0.700	0.150	0.2	13.797	
	LS20 to MH id 583,L-330m,100mm DI	1	330.000	0.600	0.150	0.2	5.940	
	CW3 to MH id 35,L-4570m,300mm DI	1	4570.000	0.900	0.150	0.2	123.390	
	LS21 to MH id 220,L-5m,100mm DI	1	5.000	0.600	0.150	0.2	0.090	
	LS22 to MH id 639,L-5m,100mm DI	1	5.000	0.600	0.150	0.2	0.090	
	LS23 to MH id 301,L-5m,100mm DI	1	5.000	0.600	0.150	0.2	0.090	
	LS24 to MH id 646,L-5m,100mm DI	1	5.000	0.600	0.150	0.2	0.090	
	Total Quantity						242.279 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						242.279 cum	
	Say 242.279 cum @ Rs 8328.46 / cum						Rs 2017810.96	
SI No	Description	No	L	B	D	CF	Quantity	Remark
11Construction of Man holes (Cost Index:33.05 %)								

1	od347395/2021_2022 Constructing manholes of different depths as per drawings and specifications on sewer lines and provided with tight fitting approved make heavy duty CI manhole cover with frame 600 mm dia, embedded into the cover slab, providing provision of encapsulated PVC/CI foot rests @ 30 cm apart in a staggered manner, bottom slab, side wall and cover slab with RCC M30 with a provision of PCC 1:3:6, 10 cm thick below floor slab, inside to be plastered with CM. 1:3, 12mm thick one coat with a neat cement flushing coat, two coats of anticorrosive bituminous paint to the outside surfaces, providing benching and channelling inside the manhole with CC M30 as per drawings and specifications. The rate shall include earthwork excavation for all leads and lifts, backfilling, de-watering, side protection with steel shoring, provision of pipe connection for inlet, outlet and service connection pipes, providing danger lights, barricades etc. and disposing the surplus earth away with all leads and lifts as directed upto manhole depth 1.5m (internal dia-1200mm)						
	MH-up to 1.5m depth, 1.2m dia	1020					1020.000
	Total Quantity						1020.000 No
	Total Deducted Quantity						0.000 No
	Net Total Quantity						1020.000 No
	Say 1020.000 No @ Rs 57046.57 / No						Rs 58187501.40
2	od347399/2021_2022 Constructing manholes of different depths as per drawings and specifications on sewer lines and provided with tight fitting approved make heavy CI manhole cover with frame 600 mm dia, embedded into the cover slab, providing provision of encapsulated PVC/CI foot rests @ 30 cm apart in a staggered manner, bottom slab, side wall and cover slab with RCC M30 with a provision of PCC 1:3:6, 10 cm thick below floor slab, inside to be plastered with CM. 1:3, 12mm thick one coat with a neat cement flushing coat, two coats of anticorrosive bituminous paint to the outside surfaces, providing benching and channelling inside the manhole with CC M30 as per drawings and specifications. The rate shall include earthwork excavation for all leads and lifts, backfilling, de-watering, side protection with steel shoring, provision of pipe connection for inlet, outlet and service connection pipes, providing danger lights, barricades etc. and disposing the surplus earth away with all leads and lifts as directed upto manhole depth 2.5m (internal diameter 1200m)						
	MH- up to 2.5m depth, 1.2m dia	505					505.000
	Total Quantity						505.000 No
	Total Deducted Quantity						0.000 No
	Net Total Quantity						505.000 No
	Say 505.000 No @ Rs 75213.42 / No						Rs 37982777.10
3	od347402/2021_2022 Constructing manholes of different depths as per drawings and specifications on sewer lines and provided with tight fitting approved make heavy CI manhole cover with frame 600 mm dia, embedded into the cover slab, providing provision of encapsulated PVC/CI foot rests @ 30 cm apart in a staggered manner, bottom slab, side wall and cover slab with RCC M30 with a provision of PCC 1:3:6, 10 cm thick						

	below floor slab, inside to be plastered with CM. 1:3, 12mm thick one coat with a neat cement flushing coat, two coats of anticorrosive bituminous paint to the outside surfaces, providing benching and channelling inside the manhole with CC M30 as per drawings and specifications. The rate shall include earthwork excavation for all leads and lifts, backfilling, de-watering, side protection with steel shoring, provision of pipe connection for inlet, outlet and service connection pipes, providing danger lights, barricades etc.and disposing the surplus earth away with all leads and lifts as directed upto manhole depth 3.5m (internal diameter - 1500mm)								
	upto manhole depth 3.5m (internal diameter - 1500mm)	339						339.000	
	Total Quantity							339.000 No	
	Total Deducted Quantity							0.000 No	
	Net Total Quantity							339.000 No	
	Say 339.000 No @ Rs 150804.07 / No							Rs 51122579.73	
4	od347403/2021_2022 Constructing manholes of different depths as per drawings and specifications on sewer lines and provided with tight fitting approved make heavy CI manhole cover with frame 600 mm dia, embedded into the cover slab, providing provision of encapsulated PVC/CI foot rests @ 30 cm apart in a staggered manner, bottom slab, side wall and cover slabwith RCC M30 with a provision of PCC 1:3:6, 10 cm thick below floor slab, inside to be plastered with CM. 1:3, 12mm thick one coat with a neat cement flushing coat, two coats of anticorrosive bituminous paint to the outside surfaces, providing benching and channelling inside the manhole with CC M30 as per drawings and specifications. The rate shall include earthwork excavation for all leads and lifts, backfilling, de-watering, side protection with steel shoring, provision of pipe connection for inlet, outlet and service connection pipes, providing danger lights, barricades etc.and disposing the surplus earth away with all leads and lifts as directed upto manhole depth upto 4.5m (internal diameter-1500mm)								
	upto manhole depth upto 4.5m (internal diameter-1500mm)	188						188.000	
	Total Quantity							188.000 No	
	Total Deducted Quantity							0.000 No	
	Net Total Quantity							188.000 No	
	Say 188.000 No @ Rs 192105.61 / No							Rs 36115854.68	
5	od347404/2021_2022 Constructing manholes of different depths as per drawings and specifications on sewer lines and provided with tight fitting approved make heavy CI manhole cover with frame 600 mm dia, embedded into the cover slab, providing provision of encapsulated PVC/CI foot rests @ 30 cm apart in a staggered manner, bottom slab, side wall and cover slabwith RCC M30 with a provision of PCC 1:3:6, 10 cm thick below floor slab, inside to be plastered with CM. 1:3, 12mm thick one coat with a neat cement flushing coat, two coats of anticorrosive bituminous paint to the outside surfaces, providing benching and channelling inside the manhole with CC M30 as per drawings and specifications. The rate shall include								

	earthwork excavation for all leads and lifts, backfilling, de-watering, side protection with steel shoring, provision of pipe connection for inlet, outlet and service connection pipes, providing danger lights, barricades etc.and disposing the surplus earth away with all leads and lifts as directed upto manhole depth upto 5.50m (internal diameter-1500mm)							
	upto manhole depth upto 5.50m (internal diameter-1500mm)	5					5.000	
	Total Quantity						5.000 No	
	Total Deducted Quantity						0.000 No	
	Net Total Quantity						5.000 No	
	Say 5.000 No @ Rs 231093.65 / No						Rs 1155468.25	
SI No	Description	No	L	B	D	CF	Quantity	Remark
12Road Restoration - to PWD/NH (Cost Index:33.05 %)								
1	od347391/2021_2022 PWD Berm Cutting(GO.(Ms)No.59/2020/PWD Dated, Thiruvananthapuram 30/07/2020)							
	Sewer lines from 225mm to 560mm	1	33608.400	1.500		0.1	5041.261	56014x0.6
	Inspection Chamber to Manhole	1	19747.200	1.500		0.1	2962.081	(2057X8X2)0.6
	Pumping main(100mm to 250mm DI)	1	1077.000	1.500		0.1	161.550	
	Total Quantity						8164.892 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						8164.892 sqm	
	Say 8164.892 sqm @ Rs 304.95 / sqm						Rs 2489883.82	
2	od347394/2021_2022 PWD Road reformation Charges- BT Cutting(GO.(Ms)No.59/2020/PWD Dated, Thiruvananthapuram 30/07/2020)							
	Sewer lines from 225mm to 560mm	1	33608.400	1.500		0.6	30247.560	56014x0.6
	Inspection Chamber to Manhole	1	19747.200	1.500		0.6	17772.480	(2057X8X2)0.6
	Pumping main(100mm to 250mm DI)	1	1077.000	1.500		0.6	969.300	
	Total Quantity						48989.340 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						48989.340 sqm	

	Say 48989.340 sqm @ Rs 3692.36 / sqm						Rs 180886279.44	
3	od347396/2021_2022 Road restoration charges for BM & BC Tar Cutting(GO.(Ms)No.59/2020/PWD Dated, Thiruvananthapuram 30/07/2020)							
	Sewer lines from 225mm to 560mm	1	33608.400	1.500		0.3	15123.780	56014x0.6
	Inspection Chamber to Manhole	1	19747.200	1.500		0.3	8886.240	(2057X8X2)0.6
	Pumping main(100mm to 250mm DI)	1	1077.000	1.500		0.3	484.650	
	Total Quantity						24494.670 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						24494.670 sqm	
	Say 24494.670 sqm @ Rs 3448.73 / sqm						Rs 84475503.27	
SI No	Description	No	L	B	D	CF	Quantity	Remark
13Lifting Stations and Allied work (Cost Index:33.05 %)								
1	100.3.3.1 Earthwork open well excavation (above water) for wells of dia. above 2.5m and upto 3.50 m in all kinds of soil and conveying and depositing the spoil within initial lead of 50m and lift up to 1.5 m including neat banking. NEW DATA (Prepared based on PHED SDB - Item No.1080 & 1083)							
	2m dia- LS1-depth 5.12m	1	3.140	1.600*1.60	1.500		12.058	Depth 4.97m
	2m dia- LS2-depth 4.99m	1	3.140	1.600*1.60	1.500		12.058	
	2m dia- LS6-depth 5.33m	1	3.140	1.600*1.60	1.500		12.058	
	2m dia- LS7-depth 5.50m	1	3.140	1.600*1.60	1.500		12.058	
	2m dia- LS10-depth 5.65m	1	3.140	1.600*1.60	1.500		12.058	
	2m dia- LS11-depth 4.92m	1	3.140	1.600*1.60	1.500		12.058	
	2m dia- LS12-depth 5.76m	1	3.140	1.600*1.60	1.500		12.058	
	2m dia- LS13-depth 3.19m	1	3.140	1.600*1.60	1.500		12.058	

	2m dia- LS14-depth 2.69m	1	3.140	1.600*1.6 0	1.500		12.058		
	2m dia- LS18-depth 5.29m	1	3.140	1.600*1.6 0	1.500		12.058		
	2m dia- LS21-depth 5.09m	1	3.140	1.600*1.6 0	1.500		12.058		
	2m dia- LS22-depth 5.42m	1	3.140	1.600*1.6 0	1.500		12.058		
	2m dia- LS23-depth 5.05m	1	3.140	1.600*1.6 0	1.500		12.058		
	Total Quantity						156.754 cum		
	Total Deducted Quantity						0.000 cum		
	Net Total Quantity						156.754 cum		
	Say 156.754 cum @ Rs 501.00 / cum							Rs 78533.75	
2	<p>100.3.3.2 Earthwork open well excavation (above water) for wells of dia. above 2.5m and upto 3.50 m in all kinds of soil and conveying and depositing the spoil within initial lead of 50m and lift from 1.5m to 3.0 m including neat banking. NEW DATA (Prepared based on PHED SDB - Item No.1082 & 1085)</p>								
	2m dia- LS1-depth 5.12m	1	3.140	1.600*1.6 0	1.500		12.058	Depth 4.97m	
	2m dia- LS2-depth 4.99m	1	3.140	1.600*1.6 0	1.500		12.058		
	2m dia- LS6-depth 5.33m	1	3.140	1.600*1.6 0	1.500		12.058		
	2m dia- LS7-depth 5.50m	1	3.140	1.600*1.6 0	1.500		12.058		
	2m dia- LS10-depth 5.65m	1	3.140	1.600*1.6 0	1.500		12.058		
	2m dia- LS11-depth 4.92m	1	3.140	1.600*1.6 0	1.500		12.058		
	2m dia- LS12-depth 5.76m	1	3.140	1.600*1.6 0	1.500		12.058		
	2m dia- LS13-depth 3.19m	1	3.140	1.600*1.6 0	1.500		12.058		
	2m dia- LS14-depth 2.69m	1	3.140	1.600*1.6 0	1.500		12.058		

	2m dia- LS18-depth 5.29m	1	3.140	1.600*1.6 0	1.500		12.058		
	2m dia- LS21-depth 5.09m	1	3.140	1.600*1.6 0	1.500		12.058		
	2m dia- LS22-depth 5.42m	1	3.140	1.600*1.6 0	1.500		12.058		
	2m dia- LS23-depth 5.05m	1	3.140	1.600*1.6 0	1.500		12.058		
	Total Quantity						156.754 cum		
	Total Deducted Quantity						0.000 cum		
	Net Total Quantity						156.754 cum		
	Say 156.754 cum @ Rs 551.09 / cum							Rs 86385.56	
3	<p>100.3.3.13 Earthwork open well excavation (in or under water) for wells of dia. above 2.5m and upto 3.50 m in all kinds of soil and conveying and depositing the spoil within initial lead of 50m and lift from 3.0m to 4.5 m including neat banking. NEW DATA (Prepared based on PHED SDB - Item No.1081 & 1084)</p>								
	2m dia- LS1-depth 5.12m	1	3.140	1.600*1.6 0	1.500		12.058	Depth 4.97m	
	2m dia- LS2-depth 4.99m	1	3.140	1.600*1.6 0	1.500		12.058		
	2m dia- LS6-depth 5.33m	1	3.140	1.600*1.6 0	1.500		12.058		
	2m dia- LS7-depth 5.50m	1	3.140	1.600*1.6 0	1.500		12.058		
	2m dia- LS10-depth 5.65m	1	3.140	1.600*1.6 0	1.500		12.058		
	2m dia- LS11-depth 4.92m	1	3.140	1.600*1.6 0	1.500		12.058		
	2m dia- LS12-depth 5.76m	1	3.140	1.600*1.6 0	1.500		12.058		
	2m dia- LS13-depth 3.19m	1	3.140	1.600*1.6 0	0.690		5.547		
	2m dia- LS14-depth 2.69m	1	3.140	1.600*1.6 0	0.190		1.528		
	2m dia- LS18-depth 5.29m	1	3.140	1.600*1.6 0	1.500		12.058		

	2m dia- LS21-depth 5.09m	1	3.140	1.600*1.6 0	1.500		12.058		
	2m dia- LS22-depth 5.42m	1	3.140	1.600*1.6 0	1.500		12.058		
	2m dia- LS23-depth 5.05m	1	3.140	1.600*1.6 0	1.500		12.058		
	Total Quantity						139.713 cum		
	Total Deducted Quantity						0.000 cum		
	Net Total Quantity						139.713 cum		
	Say 139.713 cum @ Rs 721.40 / cum							Rs 100788.96	
4	100.3.4.14 Earthwork open well excavation (in or under water) for wells of dia. above 2.5m and upto 3.50 m in ordinary rock in ordinary rock and conveying and depositing the spoil within initial lead of 50m and lift from 4.5m to 6.0 m including neat banking. NEW DATA (Prepared based on PHED SDB - Item No.1087)								
	2m dia- LS1-depth 5.12m	1	3.140	1.600*1.6 0	1.120		9.004	Depth 4.97m	
	2m dia- LS2-depth 4.99m	1	3.140	1.600*1.6 0	0.990		7.959		
	2m dia- LS6-depth 5.33m	1	3.140	1.600*1.6 0	1.330		10.692		
	2m dia- LS7-depth 5.50m	1	3.140	1.600*1.6 0	1.500		12.058		
	2m dia- LS10-depth 5.65m	1	3.140	1.600*1.6 0	1.500		12.058		
	2m dia- LS11-depth 4.92m	1	3.140	1.600*1.6 0	0.920		7.396		
	2m dia- LS12-depth 5.76m	1	3.140	1.600*1.6 0	1.500		12.058		
	2m dia- LS18-depth 5.29m	1	3.140	1.600*1.6 0	1.290		10.370		
	2m dia- LS21-depth 5.09m	1	3.140	1.600*1.6 0	1.090		8.762		
	2m dia- LS22-depth 5.42m	1	3.140	1.600*1.6 0	1.420		11.415		
	2m dia- LS23-depth 5.05m	1	3.140	1.600*1.6 0	1.050		8.441		
	Total Quantity						110.213 cum		

		Total Deducted Quantity				0.000 cum	
		Net Total Quantity				110.213 cum	
		Say 110.213 cum @ Rs 2025.89 / cum				Rs 223279.41	
5	<p>100.3.4.15 Earthwork open well excavation (in or under water) for wells of dia. above 2.5m and upto 3.50 m in ordinary rock in ordinary rock and conveying and depositing the spoil within initial lead of 50m and lift from 6.0m to 7.5 m including neat banking. NEW DATA (Prepared based on PHED SDB - Item No.1087)</p>						
	2m dia- LS10-depth 5.65m	1	3.140	1.600*1.6 0	0.150		1.206
	2m dia- LS12-depth 5.76m	1	3.140	1.600*1.6 0	0.260		2.090
		Total Quantity				3.296 cum	
		Total Deducted Quantity				0.000 cum	
		Net Total Quantity				3.296 cum	
		Say 3.296 cum @ Rs 2181.69 / cum				Rs 7190.85	
6	<p>100.3.5.1 Earthwork open well excavation (above water) for wells of dia. above 3.5m and upto 6.0 m in all kinds of soil and conveying and depositing the spoil within initial lead of 50m and lift up to 1.5 m including neat banking. NEW DATA (Prepared based on PHED SDB - Item No.1089 & 1092)</p>						
	3m dia LS-3, Depth 5.87	1	3.140	2.1*2.1	1.500		20.772
	3m dia LS-4, Depth 5.99m	1	3.140	2.1*2.1	1.500		20.772
	3m dia LS-5, Depth 5.88m	1	3.140	2.1*2.1	1.500		20.772
	3m dia LS-8, Depth 5.39m	1	3.140	2.1*2.1	1.500		20.772
	3m dia CW2, Depth 5.39m	1	3.140	2.1*2.1	1.500		20.772
	3m dia LS-15, Depth 5.59m	1	3.140	2.1*2.1	1.500		20.772
	3m dia LS-16, Depth 5.74m	1	3.140	2.1*2.1	1.500		20.772
	3m dia LS-17, Depth 5.36m	1	3.140	2.1*2.1	1.500		20.772

	3m dia LS-20, Depth 5.80m	1	3.140	2.1*2.1	1.500		20.772		
	3m dia LS-24, Depth 5.35m	1	3.140	2.1*2.1	1.500		20.772		
	5m dia LS-9, Depth 5.38m	1	3.140	3.1*3.1	1.500		45.264		
	5m dia CW1, Depth 5.59m	1	3.140	3.1*3.1	1.500		45.264		
	5m dia LS-19, Depth 5.42m	1	3.140	3.1*3.1	1.500		45.264		
	Total Quantity						343.512 cum		
	Total Deducted Quantity						0.000 cum		
	Net Total Quantity						343.512 cum		
	Say 343.512 cum @ Rs 461.35 / cum							Rs 158479.26	
7	<p>100.3.5.2 Earthwork open well excavation (above water) for wells of dia. above 3.5m and upto 6.0 m in all kinds of soil and conveying and depositing the spoil within initial lead of 50m and lift from 1.5m to 3.0 m including neat banking. NEW DATA (Prepared based on PHED SDB - Item No.1089 & 1092)</p>								
	3m dia LS-3, Depth 5.87	1	3.140	2.1*2.1	1.500		20.772		
	3m dia LS-4, Depth 5.99m	1	3.140	2.1*2.1	1.500		20.772		
	3m dia LS-5, Depth 5.88m	1	3.140	2.1*2.1	1.500		20.772		
	3m dia LS-8, Depth 5.39m	1	3.140	2.1*2.1	1.500		20.772		
	3m dia CW2, Depth 5.39m	1	3.140	2.1*2.1	1.500		20.772		
	3m dia LS-15, Depth 5.59m	1	3.140	2.1*2.1	1.500		20.772		
	3m dia LS-16, Depth 5.74m	1	3.140	2.1*2.1	1.500		20.772		
	3m dia LS-17, Depth 5.36m	1	3.140	2.1*2.1	1.500		20.772		
	3m dia LS-20, Depth 5.80m	1	3.140	2.1*2.1	1.500		20.772		

	3m dia LS-24, Depth 5.35m	1	3.140	2.1*2.1	1.500		20.772		
	5m dia LS-9, Depth 5.38m	1	3.140	3.1*3.1	1.500		45.264		
	5m dia CW1, Depth 5.59m	1	3.140	3.1*3.1	1.500		45.264		
	5m dia LS-19, Depth 5.42m	1	3.140	3.1*3.1	1.500		45.264		
	Total Quantity						343.512 cum		
	Total Deducted Quantity						0.000 cum		
	Net Total Quantity						343.512 cum		
	Say 343.512 cum @ Rs 507.52 / cum							Rs 174339.21	
8	<p>100.3.5.13 Earthwork open well excavation (in or under water) for wells of dia. above 3.5m and upto 6.0 m in all kinds of soil and conveying and depositing the spoil within initial lead of 50m and lift from 3.0m to 4.5 m including neat banking. NEW DATA (Prepared based on PHED SDB - Item No.1090 & 1093)</p>								
	3m dia LS-3, Depth 5.87	1	3.140	2.1*2.1	1.500		20.772		
	3m dia LS-4, Depth 5.99m	1	3.140	2.1*2.1	1.500		20.772		
	3m dia LS-5, Depth 5.88m	1	3.140	2.1*2.1	1.500		20.772		
	3m dia LS-8, Depth 5.39m	1	3.140	2.1*2.1	1.500		20.772		
	3m dia CW2, Depth 5.39m	1	3.140	2.1*2.1	1.500		20.772		
	3m dia LS-15, Depth 5.59m	1	3.140	2.1*2.1	1.500		20.772		
	3m dia LS-16, Depth 5.74m	1	3.140	2.1*2.1	1.500		20.772		
	3m dia LS-17, Depth 5.36m	1	3.140	2.1*2.1	1.500		20.772		
	3m dia LS-20, Depth 5.80m	1	3.140	2.1*2.1	1.500		20.772		
	3m dia LS-24, Depth 5.35m	1	3.140	2.1*2.1	1.500		20.772		

	5m dia LS-9, Depth 5.38m	1	3.140	3.1*3.1	1.500		45.264		
	5m dia CW1, Depth 5.59m	1	3.140	3.1*3.1	1.500		45.264		
	5m dia LS-19, Depth 5.42m	1	3.140	3.1*3.1	1.500		45.264		
	Total Quantity						343.512 cum		
	Total Deducted Quantity						0.000 cum		
	Net Total Quantity						343.512 cum		
	Say 343.512 cum @ Rs 664.32 / cum							Rs 228201.89	
9	<p>100.3.6.4 Earthwork open well excavation (above water) for wells of dia. above 3.5m and upto 6.0 m in ordinary rock and conveying and depositing the spoil within initial lead of 50m and lift from 4.5m to 6.00 m including neat banking. NEW DATA (Prepared based on PHED SDB - Item No.1095)</p>								
	3m dia LS-3, Depth 5.87	1	3.140	2.1*2.1	1.500		20.772		
	3m dia LS-4, Depth 5.99m	1	3.140	2.1*2.1	1.500		20.772		
	3m dia LS-5, Depth 5.88m	1	3.140	2.1*2.1	1.500		20.772		
	3m dia LS-8, Depth 5.39m	1	3.140	2.1*2.1	1.390		19.248		
	3m dia CW2, Depth 5.39m	1	3.140	2.1*2.1	1.390		19.248		
	3m dia LS-15, Depth 5.59m	1	3.140	2.1*2.1	1.500		20.772		
	3m dia LS-16, Depth 5.74m	1	3.140	2.1*2.1	1.500		20.772		
	3m dia LS-17, Depth 5.36m	1	3.140	2.1*2.1	1.360		18.833		
	3m dia LS-20, Depth 5.80m	1	3.140	2.1*2.1	1.500		20.772		
	3m dia LS-24, Depth 5.35m	1	3.140	2.1*2.1	1.350		18.694		
	5m dia LS-9, Depth 5.38m	1	3.140	3.1*3.1	1.380		41.643		

	5m dia CW1, Depth 5.59m	1	3.140	3.1*3.1	1.500		45.264		
	5m dia LS-19, Depth 5.42m	1	3.140	3.1*3.1	1.420		42.850		
	Total Quantity						330.412 cum		
	Total Deducted Quantity						0.000 cum		
	Net Total Quantity						330.412 cum		
	Say 330.412 cum @ Rs 1516.70 / cum							Rs 501135.88	
10	<p>100.3.6.5 Earthwork open well excavation (above water) for wells of dia. above 3.5m and upto 6.0 m in ordinary rock and conveying and depositing the spoil within initial lead of 50m and lift from 6.0m to 7.5 m including neat banking. NEW DATA (Prepared based on PHED SDB - Item No.1095)</p>								
	3m dia LS-3, Depth 5.87	1	3.140	2.1*2.1	0.370		5.124		
	3m dia LS-4, Depth 5.99m	1	3.140	2.1*2.1	0.490		6.786		
	3m dia LS-5, Depth 5.88m	1	3.140	2.1*2.1	0.380		5.263		
	3m dia LS-15, Depth 5.59m	1	3.140	2.1*2.1	0.090		1.247		
	3m dia LS-16, Depth 5.74m	1	3.140	2.1*2.1	0.240		3.324		
	3m dia LS-20, Depth 5.80m	1	3.140	2.1*2.1	0.300		4.155		
	5m dia CW1, Depth 5.59m	1	3.140	3.1*3.1	0.090		2.716		
	Total Quantity						28.615 cum		
	Total Deducted Quantity						0.000 cum		
	Net Total Quantity						28.615 cum		
	Say 28.615 cum @ Rs 1633.39 / cum							Rs 46739.45	
11	<p>100.7.1 Bailing out water with 5 HP engine and pumpset including conveyance to the site, erection, dismantling and taking back of engine and pump, cost of fuel lubricating oil and other stores pay of staff etc. complete. NEW DATA (Prepared based on PHED SDB - Item No.1070)</p>								
		26	200.000				5200.000		
	Total Quantity						5200.000 Kwh		

		Total Deducted Quantity					0.000 Kwh	
		Net Total Quantity					5200.000 Kwh	
		Say 5200.000 Kwh @ Rs 36.26 / Kwh					Rs 188552.00	
12	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							
	2m dia- LS1-depth 5.12m	1	3.140	1.600*1.6 0	5.620		45.176	Depth 4.97m
	2m dia- LS2-depth 4.99m	1	3.140	1.600*1.6 0	5.490		44.131	
	2m dia- LS6-depth 5.33m	1	3.140	1.600*1.6 0	5.830		46.864	
	2m dia- LS7-depth 5.50m	1	3.140	1.600*1.6 0	6.000		48.231	
	2m dia- LS10-depth 5.65m	1	3.140	1.600*1.6 0	6.150		49.437	
	2m dia- LS11-depth 4.92m	1	3.140	1.600*1.6 0	5.420		43.569	
	2m dia- LS12-depth 5.76m	1	3.140	1.600*1.6 0	6.260		50.321	
	2m dia- LS13-depth 3.19m	1	3.140	1.600*1.6 0	3.690		29.662	
	2m dia- LS14-depth 2.69m	1	3.140	1.600*1.6 0	3.190		25.643	
	2m dia- LS18-depth 5.29m	1	3.140	1.600*1.6 0	5.790		46.543	
	2m dia- LS21-depth 5.09m	1	3.140	1.600*1.6 0	5.590		44.935	
	2m dia- LS22-depth 5.42m	1	3.140	1.600*1.6 0	5.920		47.588	
	2m dia- LS23-depth 5.05m	1	3.140	1.600*1.6 0	5.550		44.614	
	3m dia LS-3, Depth 5.87	1	3.140	2.1*2.1	6.370		88.208	
	3m dia LS-4, Depth 5.99m	1	3.140	2.1*2.1	6.490		89.870	

	3m dia LS-5, Depth 5.88m	1	3.140	2.1*2.1	6.380		88.347	
	3m dia LS-8, Depth 5.39m	1	3.140	2.1*2.1	5.890		81.562	
	3m dia CW2, Depth 5.39m	1	3.140	2.1*2.1	5.890		81.562	
	3m dia LS-15, Depth 5.59m	1	3.140	2.1*2.1	6.090		84.331	
	3m dia LS-16, Depth 5.74m	1	3.140	2.1*2.1	6.240		86.408	
	3m dia LS-17, Depth 5.36m	1	3.140	2.1*2.1	5.860		81.146	
	3m dia LS-20, Depth 5.80m	1	3.140	2.1*2.1	6.300		87.239	
	3m dia LS-24, Depth 5.35m	1	3.140	2.1*2.1	5.850		81.008	
	5m dia LS-9, Depth 5.38m	1	3.140	3.1*3.1	5.880		177.432	
	5m dia CW1, Depth 5.59m	1	3.140	3.1*3.1	6.090		183.769	
	5m dia LS-19, Depth 5.42m	1	3.140	3.1*3.1	5.920		178.639	
						Total Quantity	1956.235 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	1956.235 sqm	
						Say 1956.235 sqm @ Rs 217.07 / sqm	Rs 424639.93	
13	4.1.6 Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size)							
	2m dia- LS1-depth 5.12m	1	3.140	1.600*1.6 0	0.200		1.608	Depth 4.97m
	2m dia- LS2-depth 4.99m	1	3.140	1.600*1.6 0	0.200		1.608	
	2m dia- LS6-depth 5.33m	1	3.140	1.600*1.6 0	0.200		1.608	
	2m dia- LS7-depth 5.50m	1	3.140	1.600*1.6 0	0.200		1.608	

2m dia- LS10-depth 5.65m	1	3.140	1.600*1.6 0	0.200		1.608	
2m dia- LS11-depth 4.92m	1	3.140	1.600*1.6 0	0.200		1.608	
2m dia- LS12-depth 5.76m	1	3.140	1.600*1.6 0	0.200		1.608	
2m dia- LS13-depth 3.19m	1	3.140	1.600*1.6 0	0.200		1.608	
2m dia- LS14-depth 2.69m	1	3.140	1.600*1.6 0	0.200		1.608	
2m dia- LS18-depth 5.29m	1	3.140	1.600*1.6 0	0.200		1.608	
2m dia- LS21-depth 5.09m	1	3.140	1.600*1.6 0	0.200		1.608	
2m dia- LS22-depth 5.42m	1	3.140	1.600*1.6 0	0.200		1.608	
2m dia- LS23-depth 5.05m	1	3.140	1.600*1.6 0	0.200		1.608	
3m dia LS-3, Depth 5.87	1	3.140	2.1*2.1	0.200		2.770	
3m dia LS-4, Depth 5.99m	1	3.140	2.1*2.1	0.200		2.770	
3m dia LS-5, Depth 5.88m	1	3.140	2.1*2.1	0.200		2.770	
3m dia LS-8, Depth 5.39m	1	3.140	2.1*2.1	0.200		2.770	
3m dia CW2,Depth 5.39m	1	3.140	2.1*2.1	0.200		2.770	
3m dia LS-15, Depth 5.59m	1	3.140	2.1*2.1	0.200		2.770	
3m dia LS-16, Depth 5.74m	1	3.140	2.1*2.1	0.200		2.770	
3m dia LS-17, Depth 5.36m	1	3.140	2.1*2.1	0.200		2.770	
3m dia LS-20, Depth 5.80m	1	3.140	2.1*2.1	0.200		2.770	
3m dia LS-24, Depth 5.35m	1	3.140	2.1*2.1	0.200		2.770	

	5m dia LS-9, Depth 5.38m	1	3.140	3.1*3.1	0.200		6.036		
	5m dia CW1, Depth 5.59m	1	3.140	3.1*3.1	0.200		6.036		
	5m dia LS-19, Depth 5.42m	1	3.140	3.1*3.1	0.200		6.036		
	Total Quantity						66.712 cum		
	Total Deducted Quantity						0.000 cum		
	Net Total Quantity						66.712 cum		
	Say 66.712 cum @ Rs 7076.06 / cum							Rs 472058.11	
14	<p>5.37.1 Providing and laying in position ready mixed M-25 grade concrete for reinforced cement concrete work, using cement content as per approved design mix, manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for reinforced cement concrete work including pumping of R.M.C. from transit mixer to site of laying, excluding the cost of centering, shuttering finishing and reinforcement including cost of 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 the Engineer - in-charge. Note:- Cement content considered in this item is @330 kg/cum. Excess /less cement used as per design mix is payable/recoverable separately.All work upto plinth level</p>								
	2m dia- LS1-depth 5.12m-Bottom Plugging	1	3.140	1.600*1.6 0	0.300		2.412	Depth 4.97m	
	Side wall	1	3.140*2.3	0.300	5.120		11.093		
	Cover Slab	1	3.140	1.3*1.3	0.250		1.327		
	2m dia- LS2-depth 4.99m-Bottom Plugging	1	3.140	1.600*1.6 0	0.300		2.412		
	Side wall	1	3.140*2.3	0.300	4.990		10.812		
	Cover Slab	1	3.140	1.3*1.3	0.250		1.327		
	2m dia- LS6-depth 5.33m-Bottom Plugging	1	3.140	1.600*1.6 0	0.300		2.412		
	Side wall	1	3.140*2.3	0.300	5.330		11.548		
	Cover Slab	1	3.140	1.3*1.3	0.250		1.327		
	2m dia- LS7-depth 5.50m-Bottom Plugging	1	3.140	1.600*1.6 0	0.300		2.412		
	Side wall	1	3.140*2.3	0.300	5.500		11.917		
	Cover Slab	1	3.140	1.3*1.3	0.250		1.327		
	2m dia- LS10-depth 5.65m-Bottom Plugging	1	3.140	1.600*1.6 0	0.300		2.412		

	Side wall	1	3.140*2.3	0.300	5.650		12.242	
	Cover Slab	1	3.140	1.3*1.3	0.250		1.327	
	2m dia- LS11-depth 4.92m-Bottom Plugging	1	3.140	1.600*1.6 0	0.300		2.412	
	Side wall	1	3.140*2.3	0.300	4.920		10.660	
	Cover Slab	1	3.140	1.3*1.3	0.250		1.327	
	2m dia- LS12-depth 5.76m-Bottom Plugging	1	3.140	1.600*1.6 0	0.300		2.412	
	Side wall	1	3.140*2.3	0.300	5.760		12.480	
	Cover Slab	1	3.140	1.3*1.3	0.250		1.327	
	2m dia- LS13-depth 3.19m-Bottom Plugging	1	3.140	1.600*1.6 0	0.300		2.412	
	Side wall	1	3.140*2.3	0.300	3.190		6.912	
	Cover Slab	1	3.140	1.3*1.3	0.250		1.327	
	2m dia- LS14-depth 2.69m-Bottom Plugging	1	3.140	1.600*1.6 0	0.300		2.412	
	Side wall	1	3.140*2.3	0.300	2.690		5.829	
	Cover Slab	1	3.140	1.3*1.3	0.250		1.327	
	2m dia- LS18-depth 5.29m-Bottom Plugging	1	3.140	1.600*1.6 0	0.300		2.412	
	Side wall	1	3.140*2.3	0.300	5.290		11.462	
	Cover Slab	1	3.140	1.3*1.3	0.250		1.327	
	2m dia- LS21-depth 5.09m-Bottom Plugging	1	3.140	1.600*1.6 0	0.300		2.412	
	Side wall	1	3.140*2.3	0.300	5.090		11.028	
	Cover Slab	1	3.140	1.3*1.3	0.250		1.327	
	2m dia- LS22-depth 5.42m-Bottom Plugging	1	3.140	1.600*1.6 0	0.300		2.412	
	Side wall	1	3.140*2.3	0.300	5.420		11.743	
	Cover Slab	1	3.140	1.3*1.3	0.250		1.327	
	2m dia- LS23-depth 5.05m-Bottom Plugging	1	3.140	1.600*1.6 0	0.300		2.412	
	Side wall	1	3.140*2.3	0.300	5.050		10.942	
	Cover Slab	1	3.140	1.3*1.3	0.250		1.327	

3m dia LS-3, Depth 5.87m-Bottom plugging	1	3.140	2.1*2.1	0.300	4.155	
Sidewall	1	3.140*3.3	0.300	5.870	18.248	
Cover Slab	1	3.140	1.8*1.8	0.300	3.053	
3m dia LS-4, Depth 5.99m-Bottom plugging	1	3.140	2.1*2.1	0.300	4.155	
Sidewall	1	3.140*3.3	0.300	5.990	18.621	
Cover Slab	1	3.140	1.8*1.8	0.300	3.053	
3m dia LS-5, Depth 5.88m-Bottom plugging	1	3.140	2.1*2.1	0.300	4.155	
Sidewall	1	3.140*3.3	0.300	5.880	18.279	
Cover Slab	1	3.140	1.8*1.8	0.300	3.053	
3m dia LS-8, Depth 5.39m-Bottom plugging	1	3.140	2.1*2.1	0.300	4.155	
Sidewall	1	3.140*3.3	0.300	5.390	16.756	
Cover Slab	1	3.140	1.8*1.8	0.300	3.053	
3m dia CW2, Depth 5.39m-Bottom plugging	1	3.140	2.1*2.1	0.300	4.155	
Sidewall	1	3.140*3.3	0.300	5.390	16.756	
Cover Slab	1	3.140	1.8*1.8	0.300	3.053	
3m dia LS-15, Depth 5.59m-Bottom plugging	1	3.140	2.1*2.1	0.300	4.155	
Sidewall	1	3.140*3.3	0.300	5.590	17.378	
Cover Slab	1	3.140	1.8*1.8	0.300	3.053	
3m dia LS-16, Depth 5.74m-Bottom plugging	1	3.140	2.1*2.1	0.300	4.155	
Sidewall	1	3.140*3.3	0.300	5.740	17.844	
Cover Slab	1	3.140	1.8*1.8	0.300	3.053	
3m dia LS-17, Depth 5.36m-Bottom plugging	1	3.140	2.1*2.1	0.300	4.155	
Sidewall	1	3.140*3.3	0.300	5.360	16.663	
Cover Slab	1	3.140	1.8*1.8	0.300	3.053	
3m dia LS-20, Depth 5.80m-Bottom plugging	1	3.140	2.1*2.1	0.300	4.155	
Sidewall	1	3.140*3.3	0.300	5.800	18.030	

	Cover Slab	1	3.140	1.8*1.8	0.300		3.053	
	3m dia LS-24, Depth 5.35m-Bottom plugging	1	3.140	2.1*2.1	0.300		4.155	
	Sidewall	1	3.140*3.3	0.300	5.350		16.632	
	Cover Slab	1	3.140	1.8*1.8	0.300		3.053	
	5m dia LS-9, Depth 5.38m-Bottom plugging	1	3.140	3.1*3.1	0.300		9.053	
	Sidewall	1	3.140*5.3	0.300	5.380		26.861	
	Cover Slab	1	3.140	2.8*2.8	0.300		7.386	
	5m dia CW1, Depth 5.59m-Bottom plugging	1	3.140	3.1*3.1	0.300		9.053	
	Sidewall	1	3.140*5.3	0.300	5.590		27.909	
	Cover Slab	1	3.140	2.8*2.8	0.300		7.386	
	5m dia LS-19, Depth 5.42m-Bottom plugging	1	3.140	3.1*3.1	0.300		9.053	
	Sidewall	1	3.140*5.3	0.300	5.420		27.060	
	Cover Slab	1	3.140	2.8*2.8	0.300		7.386	
	manhole opening	13	0.500	0.500	0.250		-0.812	
	manhole opening	13	0.500	0.500	0.300		-0.975	
						Total Quantity	565.709 cum	
						Total Deducted Quantity	-1.787 cum	
						Net Total Quantity	563.922 cum	
						Say 563.922 cum @ Rs 9700.81 / cum	Rs 5470500.18	
15	5.34.1 Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately. Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).							
	Qty taken from item no-14	1	563.922				563.922	
						Total Quantity	563.922 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	563.922 cum	
						Say 563.922 cum @ Rs 80.56 / cum	Rs 45429.56	
16	4.12 Extra for providing and mixing water proofing material in cement concrete work in doses by weight of cement as per manufacturer's specification .							

	Qty taken from item no-14*340	1	563.922	340.000			191733.480	
	Total Quantity						191733.480 kg	
	Total Deducted Quantity						0.000 kg	
	Net Total Quantity						191733.480 kg	
	Say 191733.480 kg @ Rs 1.33 / kg						Rs 255005.53	
17	5.9.2 Centering and shuttering including strutting, etc. and removal of form for:Walls (any thickness) including attached pilasters, buttersesses, plinth and string courses etc.							
	2m dia- LS1-depth 5.12m-Wall inside	1	3.140	2.000	5.120		32.154	Depth 4.97m
	Wall outside	1	3.140	2.600	5.120		41.800	
	2m dia- LS2-depth 4.99m-Bottom Plugging	1	3.140	2.000	4.990		31.338	
	Wall outside	1	3.140	2.600	4.990		40.739	
	2m dia- LS6-depth 5.33m-Bottom Plugging	1	3.140	2.000	5.330		33.473	
	Wall outside	1	3.140	2.600	5.330		43.515	
	2m dia- LS7-depth 5.50m-Bottom Plugging	1	3.140	2.000	5.500		34.540	
	Wall outside	1	3.140	2.600	5.500		44.903	
	2m dia- LS10-depth 5.65m-Bottom Plugging	1	3.140	2.000	5.650		35.483	
	Wall outside	1	3.140	2.600	5.650		46.127	
	2m dia- LS11-depth 4.92m-Bottom Plugging	1	3.140	2.000	4.920		30.898	
	Wall outside	1	3.140	2.600	4.920		40.167	
	2m dia- LS12-depth 5.76m-Bottom Plugging	1	3.140	2.000	5.760		36.173	
	Wall outside	1	3.140	2.600	5.760		47.025	
	2m dia- LS13-depth 3.19m-Bottom Plugging	1	3.140	2.000	3.190		20.034	
	Wall outside	1	3.140	2.600	3.190		26.044	
	2m dia- LS14-depth 2.69m-Bottom Plugging	1	3.140	2.000	2.690		16.894	
	Wall outside	1	3.140	2.600	2.690		21.962	

2m dia- LS18-depth 5.29m-Bottom Plugging	1	3.140	2.000	5.290		33.222	
Wall outside	1	3.140	2.600	5.290		43.188	
2m dia- LS21-depth 5.09m-Bottom Plugging	1	3.140	2.000	5.090		31.966	
Wall outside	1	3.140	2.600	5.090		41.555	
2m dia- LS22-depth 5.42m-Bottom Plugging	1	3.140	2.000	5.420		34.038	
Wall outside	1	3.140	2.600	5.420		44.249	
2m dia- LS23-depth 5.05m-Bottom Plugging	1	3.140	2.000	5.050		31.714	
Wall outside	1	3.140	2.600	5.050		41.229	
3m dia LS-3, Depth 5.87-Wall Inside	1	3.140	3.000	5.870		55.296	
Walloutside	1	3.140	3.600	5.870		66.355	
3m dia LS-4, Depth 5.99m-Wall Inside	1	3.140	3.000	5.990		56.426	
Walloutside	1	3.140	3.600	5.990		67.711	
3m dia LS-5, Depth 5.88m-Wall Inside	1	3.140	3.000	5.880		55.390	
Walloutside	1	3.140	3.600	5.880		66.468	
3m dia LS-8, Depth 5.39m-Wall Inside	1	3.140	3.000	5.390		50.774	
Walloutside	1	3.140	3.600	5.390		60.929	
3m dia CW2,Depth 5.39m-Wall Inside	1	3.140	3.000	5.390		50.774	
Walloutside	1	3.140	3.600	5.390		60.929	
3m dia LS-15, Depth 5.59m-Wall Inside	1	3.140	3.000	5.590		52.658	
Walloutside	1	3.140	3.600	5.590		63.190	
3m dia LS-16, Depth 5.74m-Wall Inside	1	3.140	3.000	5.740		54.071	
Walloutside	1	3.140	3.600	5.740		64.885	
3m dia LS-17, Depth 5.36m-Wall Inside	1	3.140	3.000	5.360		50.492	
Walloutside	1	3.140	3.600	5.360		60.590	

	3m dia LS-20, Depth 5.80m-Wall Inside	1	3.140	3.000	5.800		54.636	
	Walloutside	1	3.140	3.600	5.800		65.564	
	3m dia LS-24, Depth 5.35m-Wall Inside	1	3.140	3.000	5.350		50.397	
	Walloutside	1	3.140	3.600	5.350		60.477	
	5m dia LS-9, Depth 5.38m-Wall Inside	1	3.140	5.000	5.380		84.467	
	Walloutside	1	3.140	5.600	5.380		94.602	
	5m dia CW1, Depth 5.59m-Wall Inside	1	3.140	5.000	5.590		87.763	
	Walloutside	1	3.140	5.600	5.590		98.295	
	5m dia LS-19, Depth 5.42m-Wall Inside	1	3.140	5.000	5.420		85.095	
	Walloutside	1	3.140	5.600	5.420		95.306	
						Total Quantity	2637.970 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	2637.970 sqm	
						Say 2637.970 sqm @ Rs 703.77 / sqm	Rs 1856524.15	
18	5.9.20 Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform with water proof ply 12 mm thick							
	2m dia- LS1-depth 5.12m-Coverslab	1	3.140	1.3*1.3			5.307	
	Coverslab outside edge	1	3.140	2.600	0.250		2.042	
	2m dia- LS2-depth 4.99m-Coverslab	1	3.140	1.3*1.3			5.307	
	Coverslab outside edge	1	3.140	2.600	0.250		2.042	
	2m dia- LS6-depth 5.33m-Coverslab	1	3.140	1.3*1.3			5.307	
	Coverslab outside edge	1	3.140	2.600	0.250		2.042	
	2m dia- LS7-depth 5.50m-Coverslab	1	3.140	1.3*1.3			5.307	

Coverslab outside edge	1	3.140	2.600	0.250	2.042	
2m dia- LS10-depth 5.65m-Coverslab	1	3.140	1.3*1.3		5.307	
Coverslab outside edge	1	3.140	2.600	0.250	2.042	
2m dia- LS11-depth 4.92m-Coverslab	1	3.140	1.3*1.3		5.307	
Coverslab outside edge	1	3.140	2.600	0.250	2.042	
2m dia- LS12-depth 5.76m-Coverslab	1	3.140	1.3*1.3		5.307	
Coverslab outside edge	1	3.140	2.600	0.250	2.042	
2m dia- LS13-depth 3.19m-Coverslab	1	3.140	1.3*1.3		5.307	
Coverslab outside edge	1	3.140	2.600	0.250	2.042	
2m dia- LS14-depth 2.69m-Coverslab	1	3.140	1.3*1.3		5.307	
Coverslab outside edge	1	3.140	2.600	0.250	2.042	
2m dia- LS18-depth 5.29m-Coverslab	1	3.140	1.3*1.3		5.307	
Coverslab outside edge	1	3.140	2.600	0.250	2.042	
2m dia- LS21-depth 5.09m-Coverslab	1	3.140	1.3*1.3		5.307	
Coverslab outside edge	1	3.140	2.600	0.250	2.042	
2m dia- LS22-depth 5.42m-Coverslab	1	3.140	1.3*1.3		5.307	
Coverslab outside edge	1	3.140	2.600	0.250	2.042	
2m dia- LS23-depth 5.05m-Coverslab	1	3.140	1.3*1.3		5.307	
Coverslab outside edge	1	3.140	2.600	0.250	2.042	

3m dia LS-3, Depth 5.87m-Coverslab	1	3.140	1.8*1.8			10.174	
Coverslab outside edge	1	3.140	3.600	0.300		3.392	
3m dia LS-4, Depth 5.99m-Coverslab	1	3.140	1.8*1.8			10.174	
Coverslab outside edge	1	3.140	3.600	0.300		3.392	
3m dia LS-5, Depth 5.88m-Coverslab	1	3.140	1.8*1.8			10.174	
Coverslab outside edge	1	3.140	3.600	0.300		3.392	
3m dia LS-8, Depth 5.39m-Coverslab	1	3.140	1.8*1.8			10.174	
Coverslab outside edge	1	3.140	3.600	0.300		3.392	
3m dia CW2,Depth 5.39m-Coverslab	1	3.140	1.8*1.8			10.174	
Coverslab outside edge	1	3.140	3.600	0.300		3.392	
3m dia LS-15, Depth 5.59m-Coverslab	1	3.140	1.8*1.8			10.174	
Coverslab outside edge	1	3.140	3.600	0.300		3.392	
3m dia LS-16, Depth 5.74m-Coverslab	1	3.140	1.8*1.8			10.174	
Coverslab outside edge	1	3.140	3.600	0.300		3.392	
3m dia LS-17, Depth 5.36m-Coverslab	1	3.140	1.8*1.8			10.174	
Coverslab outside edge	1	3.140	3.600	0.300		3.392	
3m dia LS-20, Depth 5.80m-Coverslab	1	3.140	1.8*1.8			10.174	
Coverslab outside edge	1	3.140	3.600	0.300		3.392	
3m dia LS-24, Depth 5.35m-Coverslab	1	3.140	1.8*1.8			10.174	

	Coverslab outside edge	1	3.140	3.600	0.300		3.392		
	5m dia LS-9, Depth 5.38m-Coverslab	1	3.140	2.8*2.8			24.618		
	Coverslab outside edge	1	3.140	5.600	0.300		5.276		
	5m dia CW1, Depth 5.59m-Coverslab	1	3.140	2.8*2.8			24.618		
	Coverslab outside edge	1	3.140	5.600	0.300		5.276		
	5m dia LS-19, Depth 5.42m-Coverslab	1	3.140	2.8*2.8			24.618		
	Coverslab outside edge	1	3.140	5.600	0.300		5.276		
	Total Quantity						320.879 sqm		
	Total Deducted Quantity						0.000 sqm		
	Net Total Quantity						320.879 sqm		
	Say 320.879 sqm @ Rs 900.08 / sqm							Rs 288816.77	
19	5.22.1 Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth level Mild steel and Medium Tensile steel bars								
	Qty taken from item no - 14 Steel reinforcement @ 100Kg/ 1Cum of CC	1	563.922	100.000			56392.201		
	Total Quantity						56392.201 kg		
	Total Deducted Quantity						0.000 kg		
	Net Total Quantity						56392.201 kg		
	Say 56392.201 kg @ Rs 94.86 / kg							Rs 5349364.19	
20	od347421/2021_2022 Extra for providing epoxy coating for reinforcement bars.								
	Qty taken from item no - 14 Steel reinforcement @ 100Kg/ 1Cum of CC	1	563.922	100.000			56392.201		
	Total Quantity						56392.201 kg		
	Total Deducted Quantity						0.000 kg		
	Net Total Quantity						56392.201 kg		

		Say 56392.201 kg @ Rs 2.32 / kg					Rs 130829.91	
21	22.23.1 Providing and applying integral crystalline slurry of hydrophilic in nature for waterproofing treatment to the RCC structures like retaining walls of the basement, water tanks, roof slabs, podiums, reservoir, sewage & water treatment plant, tunnels/ subway and bridge deck etc., prepared by mixing in the ratio of 5 : 2 (5 parts integral crystalline slurry : 2 parts water) for vertical surfaces and 3 : 1 (3 parts integral crystalline slurry : 1 part water) for horizontal surfaces and applying the same from negative (internal) side with the help of synthetic fiber brush. The material shall meet the requirements as specified in ACI-212-3R-2010 i.e. by reducing permeability of concrete by more than 90% compared with control concrete as per DIN 1048 and resistant to 16 bar hydrostatic pressure on negative side. The crystalline slurry shall be capable of self-healing of cracks up to a width of 0.50mm. The work shall be carried out all complete as per specification and the direction of the engineer in-charge. The product performance shall carry guarantee for 10 years against any leakage. For vertical surface two coats @ 0.70 kg per sqm							
	2m dia- LS1-depth 5.12m-Wall inside	1	3.140	2.000	5.120		32.154	Depth 4.97m
	Wall outside	1	3.140	2.600	5.120		41.800	
	2m dia- LS2-depth 4.99m-Bottom Plugging	1	3.140	2.000	4.990		31.338	
	Wall outside	1	3.140	2.600	4.990		40.739	
	2m dia- LS6-depth 5.33m-Bottom Plugging	1	3.140	2.000	5.330		33.473	
	Wall outside	1	3.140	2.600	5.330		43.515	
	2m dia- LS7-depth 5.50m-Bottom Plugging	1	3.140	2.000	5.500		34.540	
	Wall outside	1	3.140	2.600	5.500		44.903	
	2m dia- LS10-depth 5.65m-Bottom Plugging	1	3.140	2.000	5.650		35.483	
	Wall outside	1	3.140	2.600	5.650		46.127	
	2m dia- LS11-depth 4.92m-Bottom Plugging	1	3.140	2.000	4.920		30.898	
	Wall outside	1	3.140	2.600	4.920		40.167	
	2m dia- LS12-depth 5.76m-Bottom Plugging	1	3.140	2.000	5.760		36.173	
	Wall outside	1	3.140	2.600	5.760		47.025	
	2m dia- LS13-depth 3.19m-Bottom Plugging	1	3.140	2.000	3.190		20.034	
	Wall outside	1	3.140	2.600	3.190		26.044	

2m dia- LS14-depth 2.69m-Bottom Plugging	1	3.140	2.000	2.690	16.894
Wall outside	1	3.140	2.600	2.690	21.962
2m dia- LS18-depth 5.29m-Bottom Plugging	1	3.140	2.000	5.290	33.222
Wall outside	1	3.140	2.600	5.290	43.188
2m dia- LS21-depth 5.09m-Bottom Plugging	1	3.140	2.000	5.090	31.966
Wall outside	1	3.140	2.600	5.090	41.555
2m dia- LS22-depth 5.42m-Bottom Plugging	1	3.140	2.000	5.420	34.038
Wall outside	1	3.140	2.600	5.420	44.249
2m dia- LS23-depth 5.05m-Bottom Plugging	1	3.140	2.000	5.050	31.714
Wall outside	1	3.140	2.600	5.050	41.229
3m dia LS-3, Depth 5.87-Wall Inside	1	3.140	3.000	5.870	55.296
Walloutside	1	3.140	3.600	5.870	66.355
3m dia LS-4, Depth 5.99m-Wall Inside	1	3.140	3.000	5.990	56.426
Walloutside	1	3.140	3.600	5.990	67.711
3m dia LS-5, Depth 5.88m-Wall Inside	1	3.140	3.000	5.880	55.390
Walloutside	1	3.140	3.600	5.880	66.468
3m dia LS-8, Depth 5.39m-Wall Inside	1	3.140	3.000	5.390	50.774
Walloutside	1	3.140	3.600	5.390	60.929
3m dia CW2,Depth 5.39m-Wall Inside	1	3.140	3.000	5.390	50.774
Walloutside	1	3.140	3.600	5.390	60.929
3m dia LS-15, Depth 5.59m-Wall Inside	1	3.140	3.000	5.590	52.658
Walloutside	1	3.140	3.600	5.590	63.190
3m dia LS-16, Depth 5.74m-Wall Inside	1	3.140	3.000	5.740	54.071
Walloutside	1	3.140	3.600	5.740	64.885

	3m dia LS-17, Depth 5.36m-Wall Inside	1	3.140	3.000	5.360		50.492	
	Walloutside	1	3.140	3.600	5.360		60.590	
	3m dia LS-20, Depth 5.80m-Wall Inside	1	3.140	3.000	5.800		54.636	
	Walloutside	1	3.140	3.600	5.800		65.564	
	3m dia LS-24, Depth 5.35m-Wall Inside	1	3.140	3.000	5.350		50.397	
	Walloutside	1	3.140	3.600	5.350		60.477	
	5m dia LS-9, Depth 5.38m-Wall Inside	1	3.140	5.000	5.380		84.467	
	Walloutside	1	3.140	5.600	5.380		94.602	
	5m dia CW1, Depth 5.59m-Wall Inside	1	3.140	5.000	5.590		87.763	
	Walloutside	1	3.140	5.600	5.590		98.295	
	5m dia LS-19, Depth 5.42m-Wall Inside	1	3.140	5.000	5.420		85.095	
	Walloutside	1	3.140	5.600	5.420		95.306	
						Total Quantity	2637.970 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	2637.970 sqm	
						Say 2637.970 sqm @ Rs 559.61 / sqm	Rs 1476234.39	
22	22.23.2 Providing and applying integral crystalline slurry of hydrophilic in nature for waterproofing treatment to the RCC structures like retaining walls of the basement, water tanks, roof slabs, podiums, reservoir, sewage & water treatment plant, tunnels/ subway and bridge deck etc., prepared by mixing in the ratio of 5 : 2 (5 parts integral crystalline slurry : 2 parts water) for vertical surfaces and 3 : 1 (3 parts integral crystalline slurry : 1 part water) for horizontal surfaces and applying the same from negative (internal) side with the help of synthetic fiber brush. The material shall meet the requirements as specified in ACI-212-3R-2010 i.e by reducing permeability of concrete by more than 90% compared with control concrete as per DIN 1048 and resistant to 16 bar hydrostatic pressure on negative side. The crystalline slurry shall be capable of self-healing of cracks up to a width of 0.50mm. The work shall be carried out all complete as per specification and the direction of the engineer in-charge. The product performance shall carry guarantee for 10 years against any leakage. For horizontal surface one coat @ 1.10 kg per sqm.							
	2m dia- LS1-depth 5 . 1 2 m - Coverslab & baseslab	2	3.140	1.3*1.3			10.614	

2m dia- LS2-depth 4 . 9 9 m - Coverslab&baseslab	2	3.140	1.3*1.3			10.614	
2m dia- LS6-depth 5 . 3 3 m - Coverslab&baseslab	2	3.140	1.3*1.3			10.614	
2m dia- LS7-depth 5 . 5 0 m - Coverslab&baseslab	2	3.140	1.3*1.3			10.614	
2m dia- LS10-depth 5 . 6 5 m - Coverslab&baseslab	2	3.140	1.3*1.3			10.614	
2m dia- LS11-depth 4 . 9 2 m - Coverslab&baseslab	2	3.140	1.3*1.3			10.614	
2m dia- LS12-depth 5 . 7 6 m - Coverslab&baseslab	2	3.140	1.3*1.3			10.614	
2m dia- LS13-depth 3 . 1 9 m - Coverslab&baseslab	2	3.140	1.3*1.3			10.614	
2m dia- LS14-depth 2 . 6 9 m - Coverslab&baseslab	2	3.140	1.3*1.3			10.614	
2m dia- LS18-depth 5 . 2 9 m - Coverslab&baseslab	2	3.140	1.3*1.3			10.614	
2m dia- LS21-depth 5 . 0 9 m - Coverslab&baseslab	2	3.140	1.3*1.3			10.614	
2m dia- LS22-depth 5 . 4 2 m - Coverslab&baseslab	2	3.140	1.3*1.3			10.614	
2m dia- LS23-depth 5 . 0 5 m - Coverslab&baseslab	2	3.140	1.3*1.3			10.614	
3m dia LS-3, Depth 5 . 8 7 - Coverslab&baseslab	2	3.140	1.8*1.8			20.348	

3m dia LS-4, Depth 5 . 9 9 m - Coverslab&baseslab	2	3.140	1.8*1.8			20.348	
3m dia LS-5, Depth 5 . 8 8 m - Coverslab&baseslab	2	3.140	1.8*1.8			20.348	
3m dia LS-8, Depth 5 . 3 9 m - Coverslab&baseslab	2	3.140	1.8*1.8			20.348	
3m dia CW2,Depth 5 . 3 9 m - Coverslab&baseslab	2	3.140	1.8*1.8			20.348	
3m dia LS-15, Depth 5 . 5 9 m - Coverslab&baseslab	2	3.140	1.8*1.8			20.348	
3m dia LS-16, Depth 5 . 7 4 m - Coverslab&baseslab	2	3.140	1.8*1.8			20.348	
3m dia LS-17, Depth 5 . 3 6 m - Coverslab&baseslab	2	3.140	1.8*1.8			20.348	
3m dia LS-20, Depth 5 . 8 0 m - Coverslab&baseslab	2	3.140	1.8*1.8			20.348	
3m dia LS-24, Depth 5 . 3 5 m - Coverslab&baseslab	2	3.140	1.8*1.8			20.348	
5m dia LS-9, Depth 5 . 3 8 m - Coverslab&baseslab	2	3.140	2.8*2.8			49.236	
5m dia CW1, Depth 5 . 5 9 m - Coverslab&baseslab	2	3.140	2.8*2.8			49.236	
5m dia LS-19, Depth 5 . 4 2 m - Coverslab&baseslab	2	3.140	2.8*2.8			49.236	
Total Quantity						489.170 sqm	
Total Deducted Quantity						0.000 sqm	
Net Total Quantity						489.170 sqm	
Say 489.170 sqm @ Rs 431.28 / sqm						Rs 210969.24	

23	13.7.1 12 mm cement plaster finished with a floating coat of neat cement of mix:1:3 (1 cement : 3 fine sand)							
	2m dia- LS1-depth 5.12m-Wall inside	1	3.140	2.000	5.120		32.154	Depth 4.97m
	Wall outside	1	3.140	2.600	5.120		41.800	
	2m dia- LS2-depth 4.99m-Bottom Plugging	1	3.140	2.000	4.990		31.338	
	Wall outside	1	3.140	2.600	4.990		40.739	
	2m dia- LS6-depth 5.33m-Bottom Plugging	1	3.140	2.000	5.330		33.473	
	Wall outside	1	3.140	2.600	5.330		43.515	
	2m dia- LS7-depth 5.50m-Bottom Plugging	1	3.140	2.000	5.500		34.540	
	Wall outside	1	3.140	2.600	5.500		44.903	
	2m dia- LS10-depth 5.65m-Bottom Plugging	1	3.140	2.000	5.650		35.483	
	Wall outside	1	3.140	2.600	5.650		46.127	
	2m dia- LS11-depth 4.92m-Bottom Plugging	1	3.140	2.000	4.920		30.898	
	Wall outside	1	3.140	2.600	4.920		40.167	
	2m dia- LS12-depth 5.76m-Bottom Plugging	1	3.140	2.000	5.760		36.173	
	Wall outside	1	3.140	2.600	5.760		47.025	
	2m dia- LS13-depth 3.19m-Bottom Plugging	1	3.140	2.000	3.190		20.034	
	Wall outside	1	3.140	2.600	3.190		26.044	
	2m dia- LS14-depth 2.69m-Bottom Plugging	1	3.140	2.000	2.690		16.894	
	Wall outside	1	3.140	2.600	2.690		21.962	
	2m dia- LS18-depth 5.29m-Bottom Plugging	1	3.140	2.000	5.290		33.222	
	Wall outside	1	3.140	2.600	5.290		43.188	
	2m dia- LS21-depth 5.09m-Bottom Plugging	1	3.140	2.000	5.090		31.966	
	Wall outside	1	3.140	2.600	5.090		41.555	
	2m dia- LS22-depth 5.42m-Bottom Plugging	1	3.140	2.000	5.420		34.038	

	Wall outside	1	3.140	2.600	5.420		44.249	
	2m dia- LS23-depth 5.05m-Bottom Plugging	1	3.140	2.000	5.050		31.714	
	Wall outside	1	3.140	2.600	5.050		41.229	
	3m dia LS-3, Depth 5.87-Wall Inside	1	3.140	3.000	5.870		55.296	
	Walloutside	1	3.140	3.600	5.870		66.355	
	3m dia LS-4, Depth 5.99m-Wall Inside	1	3.140	3.000	5.990		56.426	
	Walloutside	1	3.140	3.600	5.990		67.711	
	3m dia LS-5, Depth 5.88m-Wall Inside	1	3.140	3.000	5.880		55.390	
	Walloutside	1	3.140	3.600	5.880		66.468	
	3m dia LS-8, Depth 5.39m-Wall Inside	1	3.140	3.000	5.390		50.774	
	Walloutside	1	3.140	3.600	5.390		60.929	
	3m dia CW2,Depth 5.39m-Wall Inside	1	3.140	3.000	5.390		50.774	
	Walloutside	1	3.140	3.600	5.390		60.929	
	3m dia LS-15, Depth 5.59m-Wall Inside	1	3.140	3.000	5.590		52.658	
	Walloutside	1	3.140	3.600	5.590		63.190	
	3m dia LS-16, Depth 5.74m-Wall Inside	1	3.140	3.000	5.740		54.071	
	Walloutside	1	3.140	3.600	5.740		64.885	
	3m dia LS-17, Depth 5.36m-Wall Inside	1	3.140	3.000	5.360		50.492	
	Walloutside	1	3.140	3.600	5.360		60.590	
	3m dia LS-20, Depth 5.80m-Wall Inside	1	3.140	3.000	5.800		54.636	
	Walloutside	1	3.140	3.600	5.800		65.564	
	3m dia LS-24, Depth 5.35m-Wall Inside	1	3.140	3.000	5.350		50.397	
	Walloutside	1	3.140	3.600	5.350		60.477	
	5m dia LS-9, Depth 5.38m-Wall Inside	1	3.140	5.000	5.380		84.467	

	Walloutside	1	3.140	5.600	5.380		94.602	
	5m dia CW1, Depth 5.59m-Wall Inside	1	3.140	5.000	5.590		87.763	
	Walloutside	1	3.140	5.600	5.590		98.295	
	5m dia LS-19, Depth 5.42m-Wall Inside	1	3.140	5.000	5.420		85.095	
	Walloutside	1	3.140	5.600	5.420		95.306	
	2m dia- LS1-depth 5 . 1 2 m - Coverslab&baseslab	2	3.140	1.3*1.3			10.614	
	2m dia- LS2-depth 4 . 9 9 m - Coverslab&baseslab	2	3.140	1.3*1.3			10.614	
	2m dia- LS6-depth 5 . 3 3 m - Coverslab&baseslab	2	3.140	1.3*1.3			10.614	
	2m dia- LS7-depth 5 . 5 0 m - Coverslab&baseslab	2	3.140	1.3*1.3			10.614	
	2m dia- LS10-depth 5 . 6 5 m - Coverslab&baseslab	2	3.140	1.3*1.3			10.614	
	2m dia- LS11-depth 4 . 9 2 m - Coverslab&baseslab	2	3.140	1.3*1.3			10.614	
	2m dia- LS12-depth 5 . 7 6 m - Coverslab&baseslab	2	3.140	1.3*1.3			10.614	
	2m dia- LS13-depth 3 . 1 9 m - Coverslab&baseslab	2	3.140	1.3*1.3			10.614	
	2m dia- LS14-depth 2 . 6 9 m - Coverslab&baseslab	2	3.140	1.3*1.3			10.614	
	2m dia- LS18-depth 5 . 2 9 m - Coverslab&baseslab	2	3.140	1.3*1.3			10.614	
	2m dia- LS21-depth 5 . 0 9 m - Coverslab&baseslab	2	3.140	1.3*1.3			10.614	

2m dia- LS22-depth 5 . 4 2 m - Coverslab&baseslab	2	3.140	1.3*1.3			10.614	
2m dia- LS23-depth 5 . 0 5 m - Coverslab&baseslab	2	3.140	1.3*1.3			10.614	
3m dia LS-3, Depth 5 . 8 7 - Coverslab&baseslab	2	3.140	1.8*1.8			20.348	
3m dia LS-4, Depth 5 . 9 9 m - Coverslab&baseslab	2	3.140	1.8*1.8			20.348	
3m dia LS-5, Depth 5 . 8 8 m - Coverslab&baseslab	2	3.140	1.8*1.8			20.348	
3m dia LS-8, Depth 5 . 3 9 m - Coverslab&baseslab	2	3.140	1.8*1.8			20.348	
3m dia CW2,Depth 5 . 3 9 m - Coverslab&baseslab	2	3.140	1.8*1.8			20.348	
3m dia LS-15, Depth 5 . 5 9 m - Coverslab&baseslab	2	3.140	1.8*1.8			20.348	
3m dia LS-16, Depth 5 . 7 4 m - Coverslab&baseslab	2	3.140	1.8*1.8			20.348	
3m dia LS-17, Depth 5 . 3 6 m - Coverslab&baseslab	2	3.140	1.8*1.8			20.348	
3m dia LS-20, Depth 5 . 8 0 m - Coverslab&baseslab	2	3.140	1.8*1.8			20.348	
3m dia LS-24, Depth 5 . 3 5 m - Coverslab&baseslab	2	3.140	1.8*1.8			20.348	
5m dia LS-9, Depth 5 . 3 8 m - Coverslab&baseslab	2	3.140	2.8*2.8			49.236	

	5m dia CW1, Depth 5 . 5 9 m - Coverslab&baseslab	2	3.140	2.8*2.8			49.236		
	5m dia LS-19, Depth 5 . 4 2 m - Coverslab&baseslab	2	3.140	2.8*2.8			49.236		
	Total Quantity						3127.140 sqm		
	Total Deducted Quantity						0.000 sqm		
	Net Total Quantity						3127.140 sqm		
	Say 3127.140 sqm @ Rs 393.69 / sqm							Rs 1231123.75	
24	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)								
	Qty vide item no 23	1	3127.140				3127.140		
	Total Quantity						3127.140 sqm		
	Total Deducted Quantity						0.000 sqm		
	Net Total Quantity						3127.140 sqm		
	Say 3127.140 sqm @ Rs 105.38 / sqm							Rs 329538.01	
25	13.65.1 Painting with black anti- corrosive bitumastic paint of approved brand and manufacture to give an even shade:Two or more coats on new work								
	Qty vide item no 23	1	3127.140				3127.140		
	Total Quantity						3127.140 sqm		
	Total Deducted Quantity						0.000 sqm		
	Net Total Quantity						3127.140 sqm		
	Say 3127.140 sqm @ Rs 122.47 / sqm							Rs 382980.84	
26	100.41.34 Supplying and fixing Rectangular CI manhole cover 455x610 mm with frame (low duty) charges including all cost, labour charges etc complete.								
	Fixing on Cover slab	26					26.000		
	Total Quantity						26.000 No		
	Total Deducted Quantity						0.000 No		
	Net Total Quantity						26.000 No		
	Say 26.000 No @ Rs 2745.75 / No							Rs 71389.50	
27	100.36.1 Filling water with 5000 litre tankers fitted in lorry and conveying water from a distance of 5 km (average) to								

the reservoir site and pumping the water into the reservoir of height not less than 3 m using 5 HP diesel engine pump set , hire for tanker lorry, tools and other appliances and cost of water etc. complete. "(Ref. No. 000, Technical Circular)"								
2m dia- LS1-depth 5.12m	1	3.140	1*1	5.120		16.077		
2m dia- LS2-depth 4.99m	1	3.140	1*1	4.990		15.669		
2m dia- LS6-depth 5.33m	1	3.140	1*1	5.330		16.737		
2m dia- LS7-depth 5.50m	1	3.140	1*1	5.500		17.270		
2m dia- LS10-depth 5.65m	1	3.140	1*1	5.650		17.742		
2m dia- LS11-depth 4.92m	1	3.140	1*1	4.920		15.449		
2m dia- LS12-depth 5.76m	1	3.140	1*1	5.760		18.087		
2m dia- LS13-depth 3.19m	1	3.140	1*1	3.190		10.017		
2m dia- LS14-depth 2.69m	1	3.140	1*1	2.690		8.447		
2m dia- LS18-depth 5.29m	1	3.140	1*1	5.290		16.611		
2m dia- LS21-depth 5.09m	1	3.140	1*1	5.090		15.983		
2m dia- LS22-depth 5.42m	1	3.140	1*1	5.420		17.019		
2m dia- LS23-depth 5.05m	1	3.140	1*1	5.050		15.857		
3m dia LS-3, Depth 5.87	1	3.140	1.5*1.5	5.870		41.472		
3m dia LS-4, Depth 5.99m	1	3.140	1.5*1.5	5.990		42.320		
3m dia LS-5, Depth 5.88m	1	3.140	1.5*1.5	1.500		10.598		
3m dia LS-8, Depth 5.39m	1	3.140	1.5*1.5	5.390		38.081		
3m dia CW2,Depth 5.39m	1	3.140	1.5*1.5	5.390		38.081		

	3m dia LS-15, Depth 5.59m	1	3.140	1.5*1.5	5.590		39.494		
	3m dia LS-16, Depth 5.74m	1	3.140	1.5*1.5	5.740		40.554		
	3m dia LS-17, Depth 5.36m	1	3.140	1.5*1.5	5.360		37.869		
	3m dia LS-20, Depth 5.80m	1	3.140	1.5*1.5	5.800		40.978		
	3m dia LS-24, Depth 5.35m	1	3.140	1.5*1.5	5.350		37.798		
	5m dia LS-9, Depth 5.38m	1	3.140	2.5*2.5	5.380		105.583		
	5m dia CW1, Depth 5.59m	1	3.140	2.5*2.5	5.590		109.704		
	5m dia LS-19, Depth 5.42m	1	3.140	2.5*2.5	5.420		106.368		
	Total Quantity						889.865 Kilo litre		
	Total Deducted Quantity						0.000 Kilo litre		
	Net Total Quantity						889.865 Kilo litre		
	Say 889.865 Kilo litre @ Rs 182.79 / Kilo litre						Rs 162658.42		
28	2.25 Filling available excavated earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift up to 1.5 m.								
	2m dia- LS1-depth 5.12m	1	3.140*2.6	5.120	0.500		20.900		
	2m dia- LS2-depth 4.99m	1	3.140*2.6	4.990	0.500		20.370		
	2m dia- LS6-depth 5.33m	1	3.140*2.6	5.330	0.500		21.758		
	2m dia- LS7-depth 5.50m	1	3.140*2.6	5.500	0.500		22.452		
	2m dia- LS10-depth 5.65m	1	3.140*2.6	5.650	0.500		23.064		
	2m dia- LS11-depth 4.92m	1	3.140*2.6	4.920	0.500		20.084		
	2m dia- LS12-depth 5.76m	1	3.140*2.6	5.760	0.500		23.513		

2m dia- LS13-depth 3.19m	1	3.140*2.6	3.190	0.500		13.022	
2m dia- LS14-depth 2.69m	1	3.140*2.6	2.690	0.500		10.981	
2m dia- LS18-depth 5.29m	1	3.140*2.6	5.290	0.500		21.594	
2m dia- LS21-depth 5.09m	1	3.140*2.6	5.090	0.500		20.778	
2m dia- LS22-depth 5.42m	1	3.140*2.6	5.420	0.500		22.125	
2m dia- LS23-depth 5.05m	1	3.140*2.6	5.050	0.500		20.615	
3m dia LS-3, Depth 5.87	1	3.140*3.6	5.870	0.500		33.178	
3m dia LS-4, Depth 5.99m	1	3.140*3.6	5.990	0.500		33.856	
3m dia LS-5, Depth 5.88m	1	3.140*3.6	5.880	0.500		33.234	
3m dia LS-8, Depth 5.39m	1	3.140*3.6	5.390	0.500		30.465	
3m dia CW2,Depth 5.39m	1	3.140*3.6	5.390	0.500		30.465	
3m dia LS-15, Depth 5.59m	1	3.140*3.6	5.590	0.500		31.595	
3m dia LS-16, Depth 5.74m	1	3.140*3.6	5.740	0.500		32.443	
3m dia LS-17, Depth 5.36m	1	3.140*3.6	5.360	0.500		30.295	
3m dia LS-20, Depth 5.80m	1	3.140*3.6	5.800	0.500		32.782	
3m dia LS-24, Depth 5.35m	1	3.140*3.6	5.350	0.500		30.239	
5m dia LS-9, Depth 5.38m	1	3.140*5.6	5.380	0.500		47.301	
5m dia CW1, Depth 5.59m	1	3.140*5.6	5.590	0.500		49.148	
5m dia LS-19, Depth 5.42m	1	3.140*5.6	5.420	0.500		47.653	

	LS15 to MH id 317,L-5m	2	1.000				2.000	
	LS16 to MH id 193,L-5m	2	1.000				2.000	
	LS17 to MH id 210,L-5m	2	2.000				4.000	
	LS18 to MH id 1666,L-50m	2	0.500				1.000	
	LS19 to MH id 615,L-657m	2	6.000				12.000	
	LS20 to MH id 583,L-330m	2	2.000				4.000	
	CW3 to MH id 35,L-4570m	2	50.000				100.000	
	LS21 to MH id 220,L-5m	2	0.500				1.000	
	LS22 to MH id 639,L-5m	2	0.500				1.000	
	LS23 to MH id 301,L-5m	2	0.500				1.000	
	LS24 to MH id 646,L-5m	2	1.000				2.000	
							Total Quantity	230.000 Hp
							Total Deducted Quantity	0.000 Hp
							Net Total Quantity	230.000 Hp
							Say 230.000 Hp @ Rs 29037.50 / Hp	Rs 6678625.00
30	od347431/2021_2022 Supply and erection of Indoor Type Generator Suitable Capacity-up to 15 KVA)							
	LS1 to MH id 381,L-5m(0.5*0.746)/0.8=0.467	1					1.000	
	LS2 to MH id 1524,L-5m(0.5*0.746)/0.8=0.467	1					1.000	
	LS3 to MH id 403,L-5m(2*0.746)/0.8=1.865	1					1.000	

LS4 to MH id 451,L-5m(2*0.746)/0.8=1.865	1					1.000	
LS5 to MH id 1552,L-5m(3*0.746)/0.8=2.798	1					1.000	
LS6 to MH id538,L-5m(1*0.746)/0.8=0.93	1					1.000	
LS7 to MH id 148,L-5m(1*0.746)/0.8=0.93	1					1.000	
LS8 to MH id 741,L-5m(2*0.746)/0.8=1.865	1					1.000	
LS9 to MH id 605,L-5m(3*0.746)/0.8=2.798	1					1.000	
CW1 to MH id132,L-2190(20*0.746)/0.8=18.65	1				2.0	2.000	
LS10 to MH id 48,L-5m(1*0.746)/0.8=0.93	1					1.000	
LS11 to MH id 104,L-5m(0.5*0.746)/0.8=0.467	1					1.000	
LS12 to MH id 739,L-5m(1*0.746)/0.8=0.93	1					1.000	
CW2 to MH id748,L-1550(10*0.746)/0.8=9.325	1					1.000	
LS13 to MH id 524,L-390M(2*0.746)/0.8=1.865	1					1.000	
LS14 to MH id 376,L-245M(0.5*0.746)/0.8=0.467	1					1.000	
LS15 to MH id 317,L-5m(1*0.746)/0.8=0.93	1					1.000	
LS16 to MH id 193,L-5m(1*0.746)/0.8=0.93	1					1.000	

	LS17 to MH id 210,L-5m(2*0.746)/0.8=1.865	1					1.000		
	LS18 to MH id 1666,L-50m(0.5*0.746)/0.8=0.467	1					1.000		
	LS19 to MH id 615,L-657m(6*0.746)/0.8=5.595	1					1.000		
	LS20 to MH id 583,L-330m,(2*0.746)/0.8=1.865	1					1.000		
	CW3 to MH id 35,L-4570m,(50*0.746)/0.8=46.625	1			4.0		4.000	46.625 kva/15= 3.10, say - 4	
	LS21 to MH id 220,L-5m(0.5*0.746)/0.8=0.467	1					1.000		
	LS22 to MH id 639,L-5m(0.5*0.746)/0.8=0.467	1					1.000		
	LS23 to MH id 301,L-5m(0.5*0.746)/0.8=0.467	1					1.000		
	LS24 to MH id 646,L-5m,(1*0.746)/0.8=0.93	1					1.000		
	Total Quantity						31.000 Nos		
	Total Deducted Quantity						0.000 Nos		
	Net Total Quantity						31.000 Nos		
	Say 31.000 Nos @ Rs 348450.00 / Nos						Rs 10801950.00		
31	od347432/2021_2022 Automatic Control system								
		26					26.000		
	Total Quantity						26.000 No		
	Total Deducted Quantity						0.000 No		
	Net Total Quantity						26.000 No		
	Say 26.000 No @ Rs 100000.00 / No						Rs 2600000.00		

32	od347433/2021_2022 Control Room and Generator Room							
		26					26.000	
	Total Quantity						26.000 No	
	Total Deducted Quantity						0.000 No	
	Net Total Quantity						26.000 No	
	Say 26.000 No @ Rs 320279.00 / No						Rs 8327254.00	
SI No	Description	No	L	B	D	CF	Quantity	Remark
14Water Supply and Sanatory arrangements, Electrical wiring in pumping stations								
	Lump-Sum Total						Rs 540000.00	
SI No	Description	No	L	B	D	CF	Quantity	Remark
15Line extension , Deposit to KSEB, etc								
	Lump-Sum Total						Rs 1080000.00	
SI No	Description	No	L	B	D	CF	Quantity	Remark
16Sewer Network - Operation and Maintanance cost for 1st Year (Cost Index:33.05 %)								
1	od347390/2021_2022 Labour for operation the well and connected works as per the direction of departmental officers. 							
		1					1.000	
	Total Quantity						1.000 No	
	Total Deducted Quantity						0.000 No	
	Net Total Quantity						1.000 No	
	Say 1.000 No @ Rs 2193073.63 / No						Rs 2193073.63	
2	od347393/2021_2022 Sewer line,well maintenance - Sewer cleaners including necessary accessories required for cleaning of sewer lines with safety equipment and vehicles							
		2					2.000	
	Total Quantity						2.000 No	
	Total Deducted Quantity						0.000 No	
	Net Total Quantity						2.000 No	
	Say 2.000 No @ Rs 1808005.60 / No						Rs 3616011.20	
3	od347397/2021_2022 Annul maintenance(Day today if needed) of electrical, civil ,mechanical and other connected items and including replacement damaged of electrical , mechanical and civil, Including painting of items as per the direction of departmental officials							
		1					1.000	
	Total Quantity						1.000 No	

							Total Deducted Quantity	0.000 No
							Net Total Quantity	1.000 No
							Say 1.000 No @ Rs 1509950.00 / No	Rs 1509950.00
4	od347400/2021_2022 Consumables Fuel for generator,chemicals ,Cotton waste ,Lubricants (oil and Grease)soap ,Glass ware,safety equipment etc							
		1					1.000	
							Total Quantity	1.000 No
							Total Deducted Quantity	0.000 No
							Net Total Quantity	1.000 No
							Say 1.000 No @ Rs 7620601.50 / No	Rs 7620601.50
Sl No	Description	No	L	B	D	CF	Quantity	Remark
17Sewer Network -Operation and Maintanse Cost for 2 nd Year to 10 th Year (Cost Index:33.05 %)								
1	od347389/2021_2022 Sewer Network - Operation and Maintenance for 9 year (Second year to 10 th year)							
Sewer Network - Operation and Maintenance for 9 year (Second year to 10 th year)								
	2 nd Year-Add 8% to 1st year	1	1.080				1.080	
	3 rd Year-Add 16% to 1st year	1	1.160				1.160	
	4 th Year-Add 24% to 1st year	1	1.240				1.240	
	5 th Year-Add 32% to 1st year	1	1.320				1.320	
	6 th Year-Add 40% to 1st year	1	1.400				1.400	
	7 th Year-Add 48% to 1st year	1	1.480				1.480	
	8 th Year-Add 56% to 1st year	1	1.560				1.560	
	9 th Year-Add 64% to 1st year	1	1.640				1.640	
	10th Year-Add 72% to 1st year	1	1.720				1.720	
							Total Quantity	12.600 No
							Total Deducted Quantity	0.000 No
							Net Total Quantity	12.600 No

SI No	Description	No	L	B	D	CF	Quantity	Remark
Say 12.600 No @ Rs 14939636.33 / No							Rs 188239417.76	
18 Sewer connection Charges (Cost Index:33.05 %)								
1	od21014/2022_2023 Sewer Connection Charges- Including material,labour and connection deposite charges							
	Sewer connection charges	5000					5000.000	
Total Quantity							5000.000 No	
Total Deducted Quantity							0.000 No	
Net Total Quantity							5000.000 No	
Say 5000.000 No @ Rs 10000.00 / No							Rs 50000000.00	
SI No	Description	No	L	B	D	CF	Quantity	Remark
19 Electricity charges for networks (Cost Index:33.05 %)								
1	od21359/2022_2023 Electricity charges for network Rs.7831177.20/Year							
	Network electricity charges for 10 Year@7831177.20/year	10					10.000	
Total Quantity							10.000 No	
Total Deducted Quantity							0.000 No	
Net Total Quantity							10.000 No	
Say 10.000 No @ Rs 7831177.20 / No							Rs 78311772.00	
Total							1403124177.68	
Centage @							10.0%	
Centage Amount							140312417.77	
Provision for GST payments (in %) @							18.0%	
Amount reserved for GST payments							252562351.98	
Total & Centage							1795998947.43	
Lumpsum for round off							0.00	
GRAND TOTAL Rs							1795998947.43	
Rounded Grand Total Rs							1,79,59,98,947	
Rupees One Hundred Seventy Nine Crore Fifty Nine Lakh Ninety Eight Thousand Nine Hundred and Forty Seven Only								