Construction of 3MLD Capacity Sewerage Treatment Plant and Laying Sewerage Network to Zone 2 of Koyilandy Municipality

DETAILED PROJECT REPORT

Sewerage System to Koyilandy Municipality Phase - II

KERALA WATER AUTHORITY

PPD & Sewerage Vertical Circle,

Kozhikode

Koyilandy II

ACKNOWLEDGEMENTS

We wish to express our sincere gratitude to the Additional Chief Secretary (WRD) Sri. T K Jose IAS, Chairman KWA, Sri. Venkatesapathy S. IAS, Managing Director, KWA, Sri. Sreekumar G. Technical Member, KWA, Smt. C K Preethimol, Chief Engineer, PPD-WASCON & Sewerage Works, for the valuable guidance and support.

We express our gratitude to the authorities of Koyilandy municipality for their support, without which this endeavor would not have been possible. We extend our sincere gratitude to Sri. Jithin Gopinath, Contractor for timely completing the DGPS survey work.

We are thankful to Sri.T.K. Sureshkumar, Deputy Chief Engineer and Sri. Jayakumar. P. Executive Engineer for providing their virtual support

We express our gratefulness to all the PPD Camp Office Kozhikode staff for their valuable support and hard 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 Koyilandy municipality and improve people's living standards in Koyilandy municipality.

Sinith. P	Mujeeburahiman.P	Sreekala LB	Indulekha T.P
Assistant Engineer	Asst. Exe, Engineer	Exe. Engineer	Superintending Engineer

Executive Engineer
PPD Regional Office
Kerala Water Authority
Kozhikode-20

SUPERINTENDING ENGINEER
Regional Office
Project Planning and Development
Kerala Water Authority
Kozhikode

ASST. EXECUTIVE ENGINEER
Regional Office
Project Planning and Development
Kerala Water Authority
Kozhikode

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

CONTENTS

LIST OF TABLES

LIST OF FIGURES

APPENDIX

PROJECT AT A GLANCE

Sl. No.	Item	Description
1	Name of the Project	Sewerage System to Koyilandy Municipality -Phase II- Construction of 3 MLD capacity Sewage Treatment Plant and Laying Sewerage Network to zone II of Koyilandy Municipality
2	Name of District	Kozhikode
3	Name of Municipality	Koyilandy
4	Project area Covered	15 km2
5	Population Benefitted	20071 (2054)
6	STP Capacity	3 MLD
7	Total Network Length	46334 m
8	Number of Wells	1
9	Number of Pumping Stations	14
10	Number of Manholes	1791
11	Number of connections	3000
12	O&M for 10 Years (With GST-18% & including Electricity Charges)	Rs.350094891/-
13	Electricity charge for one year	Rs.140096016/-
14	Amount required for land acquisition	3 Crores
15	Total cost including 10years O&M cost	Rs. 1,52,00,00,000/-
16	Implementation agency	Kerala Water Authority
17	Period of execution	2 Years

SINITH P
ASSISTANT ENGINEER
Camp Office
oject Planning and Development U
Kerala Water Authority
Kozhikode

MUEEBU RAHIMAN. P
ASST. EXECUTIVE ENGINEER
Regional Office
Project Planning and Development
Kerala Water Authority

SREEKALA L.B
Executive Engineer
PPD Regional Office
Water Authority

INDULEKHA TP
SUPERINTENDING ENGINE
Regional Office
Project Planning and Developme
Kerala Water Authori
Kozhikode

CHIEF ENGINEER

PRICE

EST NO:2022/3342

General Abstract

SEWERAGE SYSTEM TO KOYILANDY MUNICIPALITY -PHASE 2- CONSTRUCTION OF 3 MLD CAPACITY SEWAGE TREATMENT PLANT AND LAYING SEWERAGE NET WORK TO ZONE 2 OF KOYILANDY MUNICIPALITY

(Dsor year: 2018)

Sl No	Heading Description	Amount
1	PART-A1- STP1- ESTIMATE NO: 2022/2718(WITHOUT GST)	33093324.83
2	PART-A2- STP2- ESTIMATE NO: 2022/2719(WITHOUT GST)	36328474.40
3	PART-A3- ELECTRO MECHANICAL- ESTIMATE NO: 2022/2720(WITHOUT GST)	43720111.80
4	PART-B- NETWORK- ESTIMATE NO: 2022/2721(WITHOUT GST)	755530350.23
5	PART- C- O&M ESTIMATE NO: 2022/2698(WITHOUT GST)	296690585.61
6	PART-D- CENTAGE CHARGES @10%OF (A B C)	116536284.70
7	PART-E- GST@18% OF (A B C)	209765312.40
8	PART-F- DPR PREPERATION CHARGES@2.5% OF (A B)	21716806.53
9	PART-G-UNFORESEEN ITEMS	6618749.50
	Total	1520000000.00
	Centage @	0.0%
	Centage Amount	0.00
	Provision for GST payments (in %) @	0.0%
	Amount reserved for GST payments	0.00
	Total & Centage	1520000000.00
	Lumpsum for round off	0.00
	GRAND TOTAL Rs	**1520000000.00**
	Rounded Grand Total Rs 1,52,00,00,000	
	Rupees One Hundred Fifty Two Crore Only	

SINITH P
ASSISTANT ENGINEER
Camp Office
Project Planning and Development Unit
Kerala Water Authority
Kozhikode

MUEEBU RAHIMAN. P
ASST. EXECUTIVE ENGINEER
Regional Office
Project Planning and Development
Kerala Water Authority
Ko

SREEKALA L.B
Executive Engineer
PPD Regional Office
Kerala Water Authority
Kozhikode-20

INDULEKHA T P
SUPERINTENDING ENGINEER
Regional Office
Project Planning and Development
Kerala Water Authority
Kozhikode

printed on 16-04-2022 14:04:59

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

EXECUTIVE SUMMARY

Environmental protection has long been recognised as a critical component of long-term development. A key factor in achieving this is proper sewage and septage management. Although the state has made significant progress in the drinking water sector, it has lagged far behind in the sewerage sector. Large-scale pollution of water resources has come from unplanned urbanisation and poor sewage management. This has become a complex problem for both the environment and public health. Recognizing the danger, the government has spent the last few years deliberating and taking steps to address it. Furthermore, the National Green Tribunal (NGT) has mandated the implementation of a sewerage system throughout the state in a timely way.

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 DPR preparation of sewerage projects.

The entire Koyilandi Municipality is divided into two main sewer zones based on topography, population, railway line, and other factors. This Detailed Engineering Report envisions the establishment of sewerage facilities to the Koyilandi Municipality's Zone II and is designed to meet the sewerage demand up to the year 2054, using 2023 as the base year and a design period of 30 years. The ultimate sewage load for this Zone is 3 MLD including non-domestic demand and infiltration. A septage zone is also proposed in areas where the population density is less than 1500.km2. Furthermore, septage treatment is proposed in densely populated areas where there is no road Network. Septage treatment fiscality is provided as co-treatment unit with the 4 MLD capacity Sewage Treatment Plant for Zone1.

The scheme covers 15 km²area in Koyilandi Municipality's zone-2 area with the design population of 20071(2054) This proposal includes construction and commissioning of 3 MLD STP with MBBR technology at Naderi, Koyilandi Municipality, laying sewer network of 46334 m, 1791 manholes, a pumping station at Puthuya kavil road and fourteen number of 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 52 crore

SINITH P
ASSISTANT ENGINEER
Camp Office
oject Planning and Development Unit
Kerala Water Authority
Kozhikode

MUJEEBU RAHIMAN P
ASST. EXECUTIVE ENGINEER
Regional Office
Project Planning and Development
Kerala Water Authority

SREEKALA. L B
Executive Engineer
PPD Regional Office
Kerala Water Authority
Kozhikode 20

INDULEKHA T P
SUPERINTENDING ENGINEER
Regional Office
Project Planning and Development

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

ABSTRACT OF ESTIMATE

Sl No	Heading Description	Amount in Rs.
1.	**SEWAGE TREATMENT PLANT**	
2.	RAW SEWAGE RECEIVING CHAMBER CUM WELL	5648950.08
3.	INLETCHEMBER/SCREENCHANNEL/GRIT CHEMBER/PARSHALLFLUME	3824911.70
4.	EQUALISATION TANK	5790183.07
5.	MBBR 1 & 2	9219828.74
6.	SECONDARY CLARIFIER	3963530.54
7.	SLUDGE SUMP	274703.05
8.	SLUDGE THICKNER	1080387.65
9.	THICKENED SLUDGE SUMP	511126.53
10.	FILTER FEED TANK	794747.58
11.	TREATED WATER TANK	1643792.46
12.	CENTRATE SUMP	341163.43
13.	SITE PREPERATION	3850416.60
14.	ADMINISTRATIVE/LABORATORY/CHEMICALHOUSE/ CONTROL ROOM BUILDING	4782474.92
15.	SECURITY CABIN	320279.13
16.	AIR BLOWER BUILDING	2834146.05
17.	CHLORINATION BUILDING	2456623.55
18.	COMPOUND WALL	2145551.14
19.	INTERNAL ROADS	2048864.99
20.	STORM WATER DRAINS	551910.65
21.	TRANSFORMER BUILDING	628364.03
22.	DG ROOM	534866.07
23.	CENTRIFUGE BUILDING	3285165.34
24.	PSF/ACF FOUNDATION	534973.21
25	SLUDGE SHED	654838.72
26	LANDSCAPING, GREEN BELT FORMATION AND REUSE OF TREATED WATER	400000.00

27	ODOUR CONTROL SYSTEM	8800000.00
28	PROVIDING SOLAR ENERGY SYSTEM	2500000.00
29	MECHANICAL WORKS	21935912.82
30	ELECTRICAL WORKS	10084198.98
31	CHARGES FOR POWER ALLOCATION TO KSEB AND POWER EXTENSION BY CABLE	9000000.00
32	TOOLS AND PLANTS	200000.00
33	PROVIDING SCADA SYSTEM	2500000.00
	SEWER NETWORK	
34	LAYING OF SEWER NETWORK	271190262.03
35	ROAD RESTORATION WORK OF LAYING OF SEWERS AND PUMPING MAIN.	49308544.64
36	CONSTRUCTION OF PUMPING STATIONS	1851220.18
37	COMPOUND WALL WITH GATE FOR PUMPING STATIONS	3339050.48
38	CONSTRUCTION OF SCREEN CHAMBER AND VALVE CHAMBER	1660910.15
39	CONSTRUCTION OF VALVE CHAMBER	255472.28
40	CONSTRUCTION OF CONTROL ROOM AND GENERATOR ROOM	1363783.85
41	PROVIDING CABLE TRENCHES	180779.77
42	BATH CUM TOILETS	357701.44
43	MECHANICAL, ELECTRICAL - PUMPSETS, GRIT CHAMBER SCREEN, GENERATOR, TRANSFORMER & ALLIED WORKS COMPLETE	4678495.52
44	PUMPING MAINS	11887473.58
45	LAYING HDPE PIPES VIA HDD METHOD ABOVE 3M DEPTH	63123751.14
46	CONSTRUCTION OF MAN HOLES	190839433.57
47	ROAD RESTORATION - TO PWD/NH	119907382.13
48	LIFTING STATIONS AND ALLIED WORKS	33386089.45
49	WATER SUPPLY AND SANATORY ARRANGEMENTS, ELECTRICAL WIRING IN PUMPING STATIONS	800000.00
50	LINE EXTENSION, DEPOSIT TO KSEB, ETC	1400000.00

	O&M FOR 10 YEARS	
51	O&M FOR STP	83605582.33
52	O&M FOR SEWERAGE NETWORK	72988987.28
53	ELECTRICITY CHARGES FOR 10 YEARS	140096016.00
	TOTAL	**1165362847**
	DPR Preparation Charge@2.5%	**21716806.53**
	CENTAGE@10%	**116536284.70**
	GST@18%	**209765312.40**
	LUMP SUM	**6618749.50**
	GRAND TOTAL	**1,52,00,00,000**
	Rupees One Hundred and Fifty Two Crores Only	

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SINITH P
ASSISTANT ENGINEER
Camp Office
Project Planning and Development Unit
Kerala Water Authority
Kozhikode

MUEEBU RAHIMAN. P
ASST. EXECUTIVE ENGINEER
Regional Office
Project Planning and Development
Kerala Water Authority
K

SREEKALA. L.B
Executive Engineer
PPD Regional Office
Kerala Water Authority
Kozhikode-20

INDULEKHA TP
SUPERINTENDING ENGINEER
Regional Office
Project Planning and Development
Kerala Water Authority

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.

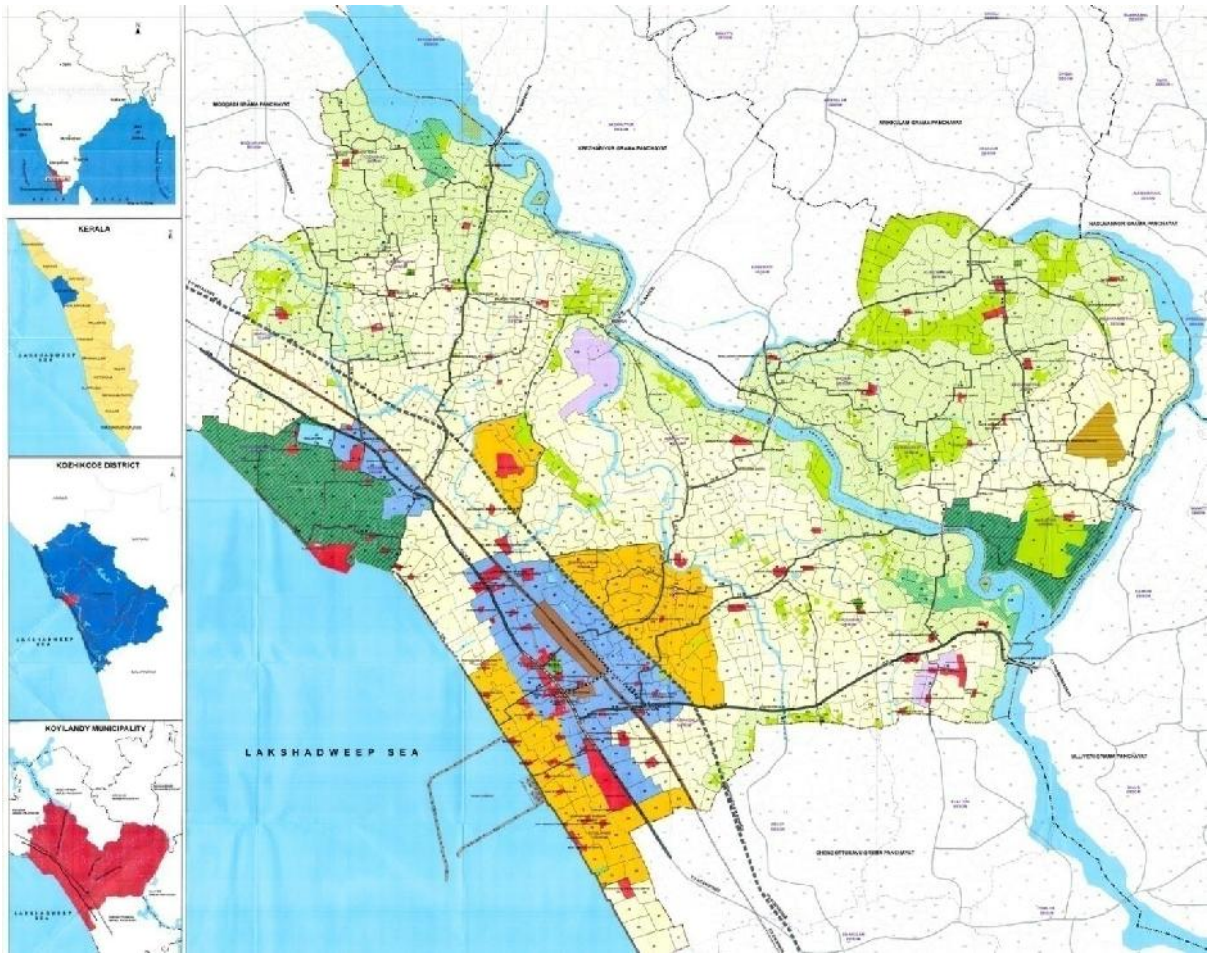
1.2 SCOPE OF THE REPORT

The scope of this work consists of planning and design of a comprehensive sewerage scheme for zone II of Koyilandy Municipality of Kozhikode 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

The historical town Koyilandy Municipality is located right in the middle of the coast of Kozhikode district, between Kozhikode and Vadakara, on National Highway 66. The historical place Kappad, where Vasco-da-gama landed in 1498 is near Koyilandy Municipality. India's first mangrove museum is situated in Koyilandy. Koyilandy is well connected to major towns like Kozhikode, Vatakara, Thamarassery, Balussery & Perambra.Koyilandy is the only port between Kozhikode and Thalassery. Municipality is Located on the north western bank of the river Korapuzha, which was considered as the traditional boundary between the erstwhile regions of North Malabar and South Malabar. Koyilandy is also one of the oldest ports in South India.

Koyilandy Municipality is well connected with road, rail and air. NH 66 passes through Municipality. Koyilandy Railway station is situated in the heart of city. The nearest airport is Kozhikode international airport situated at a distance of about 40 km from municipal area. The latitude for Koyilandy, Kerala, India is: 11.444647 and the longitude is: 75.693532. Koyilandy Municipality is in koyilandy Taluk of Kozhikode district and there are 44 Divisions in Koyilandy Municipality. The Municipality is under Vatakara Parliament Constituency and Koyilandy Assembly Constituency.



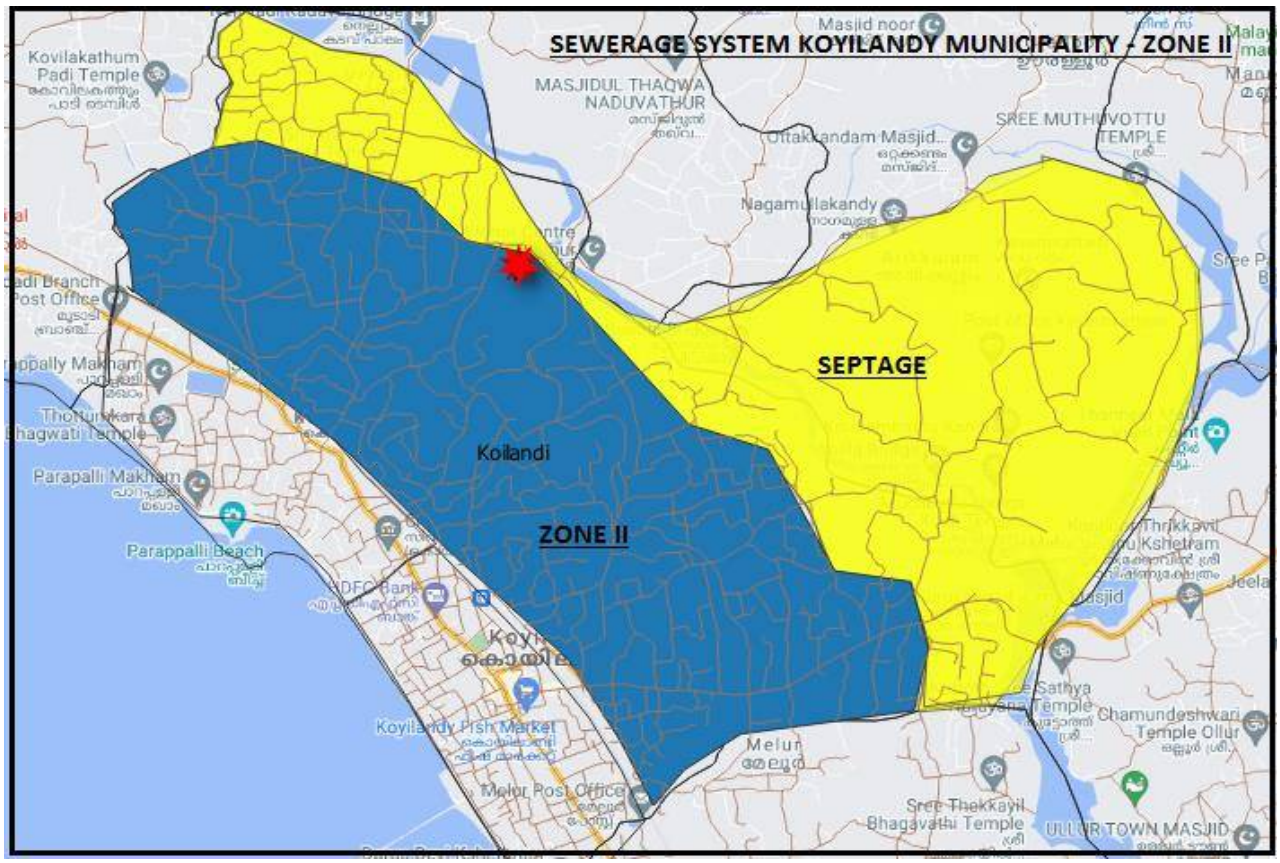


Figure 1.1: Project Area

1.4 POPULATION PATTERN

The Koyilandy Municipality has population of 72045 of which 38655 are males while 33387 are females as per report released by Census India 2011. Density of population is 2480.03/sq.km

Population as per 2011 census	Male	Female	Transgender	SC/ST
72045	38655	33387	3	3727

Table 1.1 Population Pattern

1.5 SOCIO-ECONOMIC PROFILE

As Koyilndy municipality is located nearly 20km from Kozhikode Corporation, the area is fast developing. There are many business establishments existing within the Municipality. The number of business establishments is increasing year by year as lots of construction activities are going on in Municipality. Literacy rate of Koyilandy is 95.11%, which is higher than Kerala average of 94.00%. A good number of people are engaged in business, employed in Government offices and private establishments. A minority of the population are agriculturists, the main agriculture product being coconut and arecanut. Small section of people in the coastal area is employed in fishing. The important public offices in Municipality are located in the Civil Station Building, Koyilandy Town.

1.6 GEOGRAPHICAL FEATURES

Koyilandy Municipality covers area of 29.0km square and the boundaries are

South- Chengottukavu panchayath

North- Moodadi Panchayath

East- Kanayankodu River and Arikkulam Panchayath

West- Arabian Sea The coast covers a length of 30km. The altitude varies from +1 at the coast to +16 in the sea.

1.7 RAINFALL & TEMPERATURE

Koyilandy Municipality has a mean annual temperature 27^{o}c. The mean annual rainfall is 3100mm. 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 58% 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.

SI No	Land use	Percentage
1	Residential	57.58
2	Transport	5.53
3	Agriculture	27.14
4	Water bodies	6.18
5	commercial	0.1
6	Common land	2.37
7	others	1.1

Table 1.2 Land use Pattern

1.9 SOIL TYPE

Three distinct soil types are dominant in the area. The western part of the Municipality, the coastal plain, comprises of alluvium, the fluvial plain covered dominantly by riverine, alluvium and the uplands comprise of lateritic soil. The coastal plain in the west comprises of older costal alluvium, recent costal alluvium, together with the present day beach sand along the coast. The recent coastal alluvium occurs just east of the beach environment, and further east is older coastal alluvium.

1.10 DRAINAGE AND DRAINAGE PATTERN

The river Korapuzha is passes through Municipality area. The Korapuzha River is formed by the confluence of the Agalapuzha with the Punurpuzha and joins the sea at Elathur. The Agalapuzha is more or less a backwater while at Punurpuzha originates from Arikkankkuni at about +610 m. The river has a length of 40km with a drainage area for 624km^2

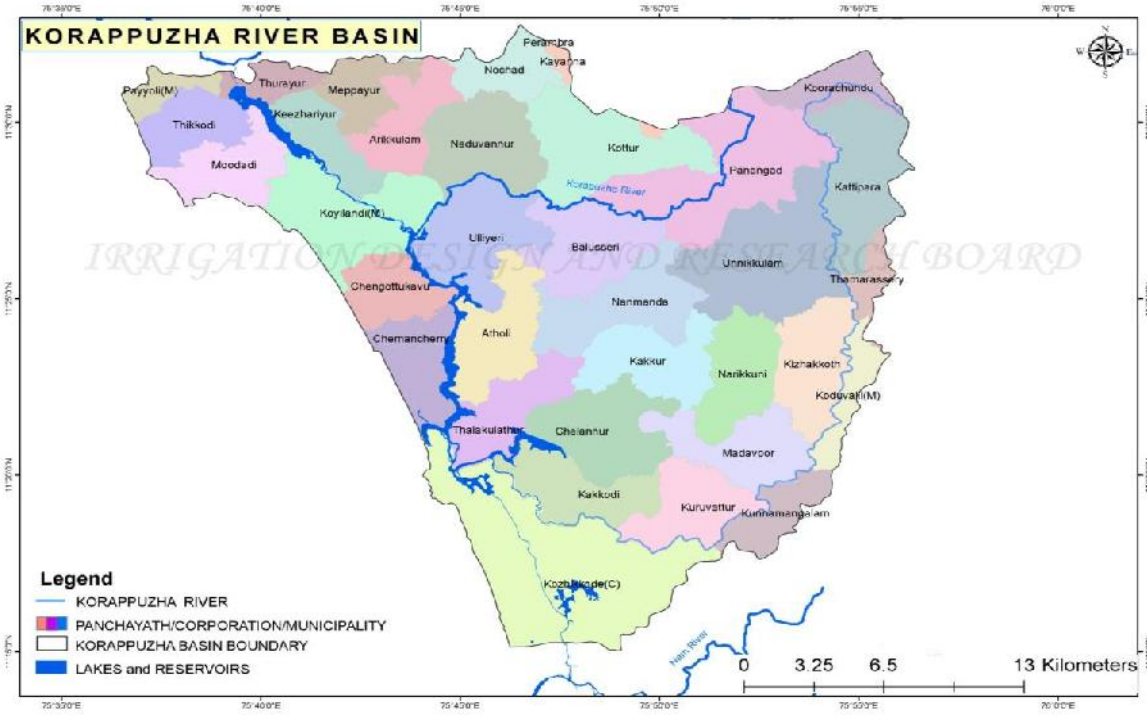


Figure 1.2 Korappuzha River Basin

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 Koyilandy Municipality is one among them. PPD and Sewerage Vertical Circle, Kozhikode is assigned with the task of preparation of DPR for sewerage scheme for Koyilandy 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 effected and the discharge of sewage waste has significantly been reduced moreover, the wastewater treatment plant produces by-products such as treated biosolids 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 Koyilandy inhabitants. Considering all the above advantages, there is no doubt that if we all cooperate at this time, 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, Koyilandy 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 five numbers of water supply system within the municipality area, they are

1. WSS to Kollam
2. WSS to Kakkarattukunnu
3. WSS to Varakkunnu
4. WSS to Komathkara
5. WSS to MoozhikkalMeethal

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 as a part of CWSS to Koyilandy and adj. panchayaths which is now in redundant stage are also not taken into account.

2.4.2 ONGOING AND PROPOSED WATER SUPPLY SYSTEM

The capacity of the present scheme is only 0.3 MLD, whereas The total water requirement is about 13MLD, thus, the city face water shortage An ongoing project, Koyilandy and adjoining panchayaths is intended to provide adequate drinking water to the entire population of Koyilandi Municipality, Kottur, Naduvannur, Arikulam, Keezhariyur, Thurayur ,Kayanna ,Atholi , Chemanchery , Chengottukave & Ulliyeri grama panchayath . It is proposed to draw clear water initialy from JICA Kozhikode scheme by tapping its transmission main at Kayanna which is 16 kms away from Peruvannamuzhi .Form this tapping point , it is proposed to transmit clear water to the service reservoirs .For Koyilandy municipality 3 OHSR/GLSR are constructed at Valiyamala (zone-1) ,near Irrigation Quarters (Koyilandy own ,zone2) and Kottakkunnu (zone 3) respectively.On line boosting using 30 HP centrifugal pumpset is proposed for the gravity main branch for service reservoir at Koyilandy zone 1 (valiyamala) since its ground level is high. Then later in next phase it is proposed to implement the required production components in Peruvannamuzhi. Till the intermediate demand year 2035, it is possible to draw the required quantity of clear water from JICA Kozhikode.

The distribution systems for the LSGI is scheduled in the next phase

Tank Location	Capacity (LL)	Type
Valiya Mala	17 LL	GLSR
Near Irrigation Quarters	23 LL	OHSR
Kottakkunnu	17 LL	OHSR

Table 2.1: Water Tank details

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, and sewage samples analysis 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.

2.6.1 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.

Fig. 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.

2.6.2 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. 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.

3.2.1 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 depends on quality of construction and water table levels. Infiltration can be considered 5000-50000 litters per day per hectare or 500-5000 litters per day per km length of sewers or 250-500 litters per day per manhole for sewers laid below ground water level.

3.2.2 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.

3.3 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.

S. N	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

Table 3.1: Design Period of Sewerage Components

3.4 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.

S.N	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

Table 3.2: Peak Factor

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.

3.5 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.

3.5.1DEPTH 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.

3.5.2 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) x (R2/3 .S1/2)] (in m/s)

For Circular Sections

V = (1/n) (3.968 x 10-3D2/3S1/2) Q = (1/n) (3.118 x 10-6D8/3S1/2)

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

3.5.3 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

3.5.4 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.

3.5.5 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.

S.N	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

Table 3.3: Recommended slope

3.5.6 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.

3.5.7 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

3.5.8 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 200 mm diameter have been suggested as minimum diameter in design of sewerage network.

3.6 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 cm75 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.

S. N	EVALUATION CRITERIA	RCC PIPES	DI PIPES	HDPE PIPES	DWC HDPE 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 manufacture.	Protective layers are Required to protect corrosion	Highly corrosion resistant	Highly corrosion resistant
4	Remarks on Cost	NP2isCheapest among all materials	Costlier than other pipes but cheaper than HDPE 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	Workability	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	Joining time is 2-5 minutes per joint
8	Maintenance	Almost nil if proper velocity is maintained.	Minimum	Pipe may get damaged due to rodding	Maintenance is low because of non adherence of sewage elements.
9	Previous Experience/Performance	In use for long period and performance 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, will lie underground for years.
10	Trenchless compatibility	Micro tunnelling	Micro tunnelling	HDD &Micro tunnelling	Not suitable for Trenchless

Table 3.4: Pipe material Comparison

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. uPVC pipes are smooth, light, 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.

3.6.1 BENEFITS OF HDPE PIPES FOR SEWERS

When compared to other common wastewater piping system materials, such as PVC, ductile iron, or concrete, HDPE 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 HDPE pipe is not attacked, corroded or degraded by H2S, ensuring a service life of 100 years.

- Anti-corrosive properties. HDPE 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. HDPE also resists other corrosive or harmful agents, including scaling and organics such as fungi, bacteria, and other microbial contaminants.

- Leak-free. HDPE 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. HDPE pipe is resistant to fatigue from water hammer and surge events in sewer force mains. HDPE pipe is also abrasion resistant, ensuring that flowing water and slurries won't damage the pipe throughout its service life.

- Lightweight. HDPE pipes are much lighter in weight compared with ductile iron or concrete alternatives, which makes transportation and installation significantly easier and safer.

- Cost-effectiveness. HDPE pipe is cost competitive with other sewer pipe options. HDPE 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, HDPE pipe is the ideal solution for wastewater systems.

However, HDPE 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 HDPE/ uPVC are most suitable and easy to use for trenchless as well as open cut trench method for pipe laying. The use of HDPE 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 HDPE pipe shall be preferred up to 200mm & occasionally upto 350mm (source- KWA pipe policy, page 19).

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

3.7 MANHOLES

3.7.1 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

Sl.No	Depth of Manhole(m)	Diameter of Manhole(m)
1	Up to 2.50m	1.2m
2	Above 2.50m and up to 9.0m	1.5 m

Table 3.5: Size of manholes provided

3.7.2 TYPE OF MANHOLES

3.7.2.1 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.

3.7.2.3 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.

3.7.2.4 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.

3.7.2.5 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.

3.7.3 MATERIAL OF CONSTRUCTION FOR MANHOLE

3.7.3.1 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 drawings.

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 150mmfor manholes upto1mdepth, and 200mmfor 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 l.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

3.7.3.2 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 upto 6.0m or more depth. This will make the construction very easy and faster. So the same are proposed for Kozhikode scheme.

3.7.3.3 HDPE 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. HDPE 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 4.2% is adopted for population projection, as the district average for the decade from 2001 to 2011 is 4.2%

Decimal increase	4.2%
Current Year	2022
Execution Period	2 Year
Design Year	2054
Design Period	30 Years

Based on topography, population etc municipality is divided into two sewer zones as below. Population for the zone 1 and 2 has been worked out and provided as per the projection the designed population is as follows

Sl No	Name	Area	2011	2021	2024	2039	2054
1	koyilandy	Municipality	72045	75071	75979	80766	85553
2	zone 1	Coastal Area	26274	27378	27709	29455	31201
3	zone 2	East Area	45771	47693	48270	51311	54352

Table 4.1: Population Projection

Zone	West	East	south	North
Zone- 1	Arabian sea	Railway line	Chengottukavu	Moodadi
Zone 2	Railway line	Arikkulam	Chengottukavu	Moodadi

Table 4.2: Zone Boundary

Based on the population density a septage zone is also proposed to area where population density is below 1500/km2. In addition, in the high density populated areas but where there is no road network, septage treatment is proposed. Since the Zone 2 area is not densely populated as coastal area, there are chances to migrate people due to the land availability. Hence a floating population of 2500 is added to the design population at 2054 year.

No	Type	Population 2011	Projected Population				Capacity
			2021	2024	2039	2054	
1	Municipality	72045	75071	75979	80766	85553	
2	Zone-1		20120	20373	21657	22941	4 MLD
3	Zone-2		17603	17825	18948	20714(including floating population 2500)	3 MLD
4	Septage Area		39448	39937	42420	44934	12KLD

Table 4.3: STP Capacity

Zone II coverage area of 15 km^2. The total length of sewer network comes to 46334 m. The proposed location of treatment plant is near Naderi. One number of Pumping station is proposed Puthiya Kavil road. The capacity of the plant is 3 MLD

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.

The system has been designed using EPASWWM software. 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 5.5 m from the existing ground level. However in a few places (20 pipes) more than 5.5 m depth of cutting provided to avoid additional lifting stations

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 separate collection System for each sub-Zone with a common STP

Zone II will have 14 lifting stations and 1 No pumping station. Sewage collected in well of LS-1 will be pumped to a MH No n3003. LS2 will be another lifting station which will pump to MH no 2582, LS3 will pump to MH no 2162, LS 4 to MH no 1571 and LS 5 to MH no 2443, LS 6 to MH no 1480, LS 7 to MH no MH-714, LS 8 to MH no 1877, LS 9 to MH no MH 602, LS 10, LS11, LS12 to MH no 566, LS 13 to MH no 266 and LS14 to n2726 Sewage collected in wet well is pumped directly to plant in Naderi.

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.

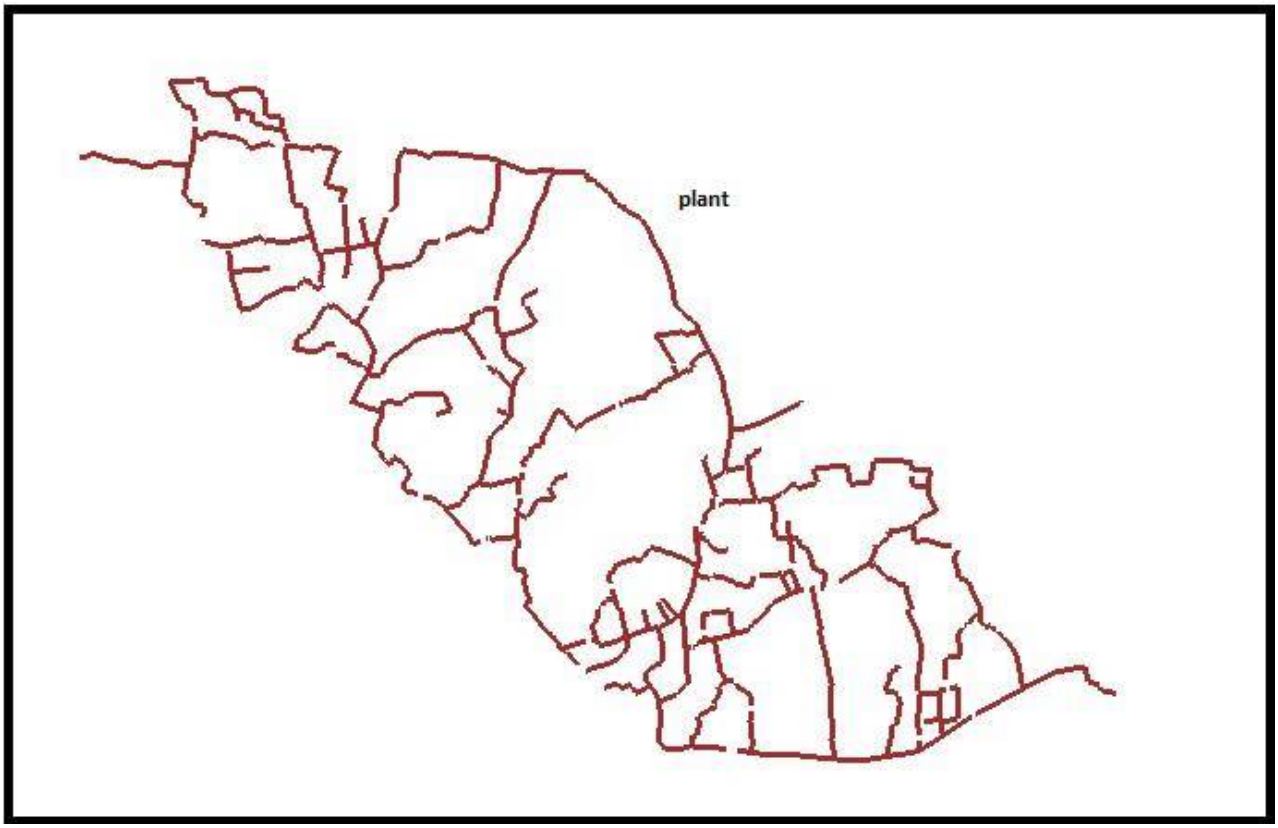


Figure 4.1: Network Sketch

4.2.1 DETAILS OF SEWER NETWORK

Abstract of sewer network is furnished below

SI NO	Diameter in mm	Pipe Material	Length in metres
1	200	HDPE PE100	42720
2	250	HDPE PE100	1573
3	315	HDPE PE100	1518
4	400	HDPE 100	523
	Total		**46334**

Table 4.4: Network details

Upto3 meter depth of sewer line open cutting is proposed and above 3 m depth pipe laying through HDD method is proposed. However, a few quantity (total 31 m in two places) 400mm HDPE above 3m depth is provided as open cutting for working easiness.

	200mm	250mm	315mm	400mm	Total
Open Cut in metres	31109	997	1488	523	34117
HDD in metres	11611	576	30	0	12217
Total	42720	1573	1518	523	46334

Table 4.5: Excavation Details

4.2.3 MANHOLES

Total number of manholes comes to 1791

Manhole depth in Meters	No of manholes
Up to 1.5	754
1.5 to 2.5	420
2.5 to 3.5	302
3.5 to 4.5	159
4.5 to 5.5	136
5.5 to 6.5	20
Total	**1791**

Table 4.6: Details of Manholes

4.3 PUMPING STATION AND RISING MAIN

4.3.1 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.

4.3.2 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. However in a few places (20 pipes) more than 5.5 m depth of cutting provided to avoid additional lifting stations. The location of pumping stations is at lower points of the network, but away from public and flood areas. Overflow is not allowed

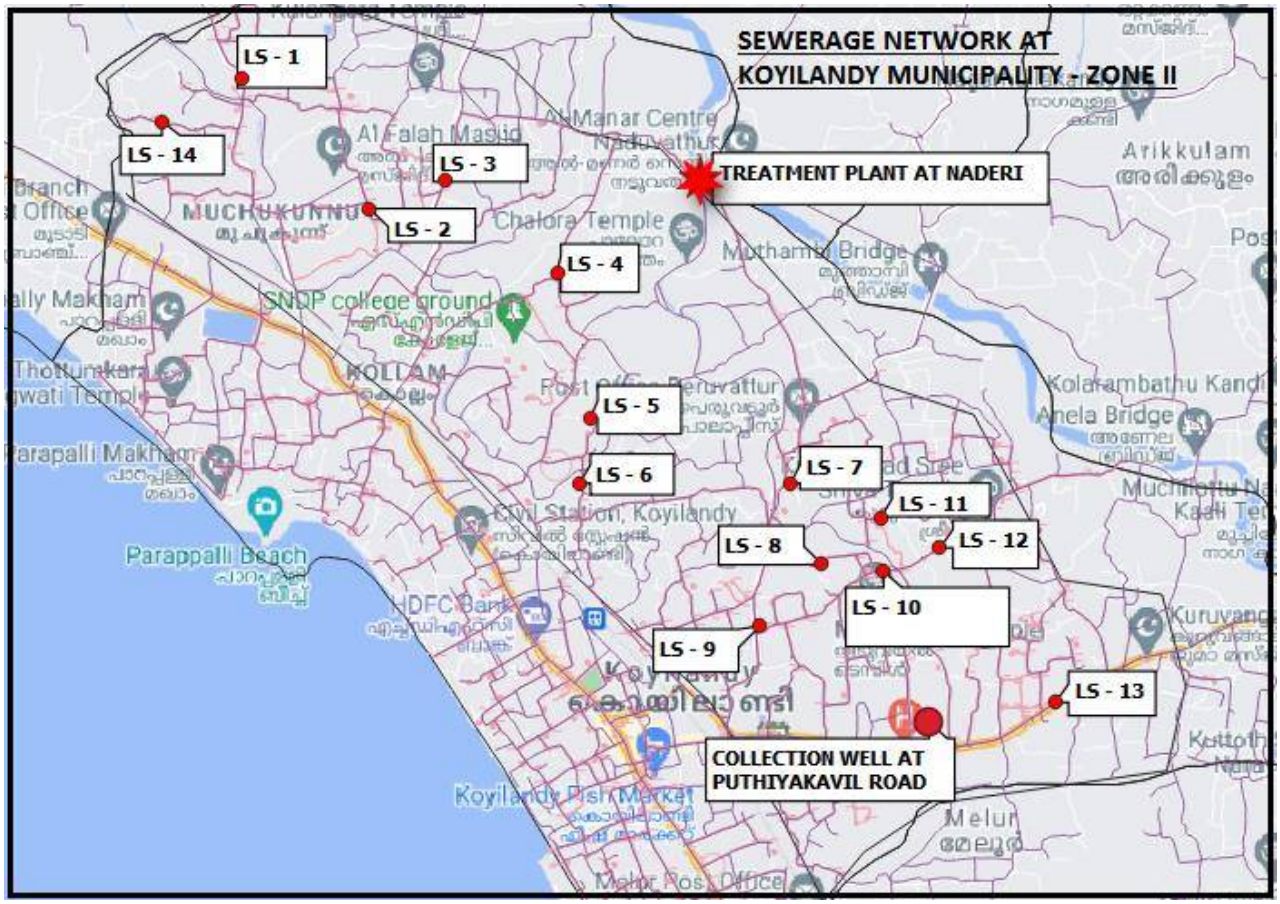


Figure. 4.2 LS/PS Location details

4.3.3 DETAILS OF PUMPING STATIONS

Sl No	Wet well No	Peak Flow in LPS	Detention Period in Minutes	Storage Capacity m3	SWD in Metres	Diameter in metres	Total Depth in metres
1	PH1	34.25	10	20.55	1.5	4.2	6.15
2	STP-PH	78.25	10	46.95	1.2	7	7.06

Table 4.7: Pumping station details

Figure 4.3 Proposed site for Pumping Station

4.3.4 DETAILS OF LIFTING STATIONS

Forteen number lifting stations are proposed at various places

Sl No	LS No	Peak Flow in LPS	Detention Period in Minutes	Storage Capacity m3	SWD in Metres	Diameter in metres	Total Depth in metres
1	LS1	3.01	10	1.81	1	1.6	6.09
2	LS2	5.72	10	3.43	1	2.1	6.9
3	LS3	8.26	10	4.96	1	2.6	6.33
4	LS4	17.21	10	10.33	1	3.7	6.7
5	LS5	1.42	10	0.85	1	1.2	6.49
6	LS6	3.31	10	1.99	1	1.6	6.21
7	LS7	1.21	10	0.73	1	1	5.73
8	LS8	3.87	10	2.32	1	1.8	6.31
9	LS9	6.75	10	4.05	1	2.3	6.53
10	LS10	15.26	10	9.16	1.8	2.6	6.62
11	LS11	6.84	10	4.1	1	2.3	6.39
12	LS12	5.41	10	3.25	1	2.1	6.64
13	LS13	4.21	10	2.52	1	1.8	5.79
14	LS14	5.94	10	3.52	1	2.2	4.22

Table 4.8: Lifting station details

4.3.5 PUMPING MAINS AND LIFTING MAINS

SI NO	Name	Length in metres	Diameter in mm	Material	Route
1	LS 1	40	100	DI	MH 3006to 3003
2	LS 2	40	100	DI	MH 2584 to 2582
3	LS 3	40	100	DI	MH 2159to 2162
4	LS 4	40	100	DI	MH1569 to 1571
5	LS5	50	100	DI	MH 2446to 2443
6	LS6	40	100	DI	MH1477to 1480
7	LS7	50	100	DI	MH711 to MH714
8	LS8	40	100	DI	MH1874 to 1871
9	LS9	50	100	DI	MH604 to 602
10	LS10	40	100	DI	MH 563to 566
11	LS11	500	100	DI	MH 75 to 566
12	LS12	380	100	DI	MH 579 to 566
13	LS13	40	100	DI	MH 270 to 266
14	LS-14	1050	100	DI	MH 2924 to 2726
7	PH 1 to plant	3850	200	DI	To plant
8	Well at STP to Receiving chamber	20	300	DI	Well to Receiving Chamber

Table 4.9: Pumping mains and Lifting mains

4.4 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.

4.4.1 DETAILS OF PUMP SETS

SI NO	Name	Number of Pup sets	HP	Type	Remarks
1	LS1	2	1	Submersible	
2	LS2	2	1	Submersible	
3	LS3	2	1.5	Submersible	
4	LS4	2	3.5	Submersible	
5	LS5	2	0.50	Submersible	
6	LS6	2	1	Submersible	
7	LS7	2	0.5	Submersible	
8	LS8	2	1	Submersible	
9	LS9	2	2	Submersible	
10	LS10	2	2	Submersible	
11	LS11	2	3	Submersible	
12	LS12	2	3	Submersible	
13	LS13	2	3	Submersible	
14	LS-14	2	3	Submersible	
15	PH1	2	27	Submersible	
16	STP-PH	2	25	Submersible	

Table 4.11: Details of pump sets

4.5 LAYING OF SEWER NETWORK

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

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 in conveniences to the public are desirable. Such measures and precautions include the erection and maintenance of signs (to forewarn public), barricades, bridges and detours; placing and maintenance of lights both for illumination and as danger signals; provision of watchmen to exclude unauthorized persons, particularly children from tress passing on the work.

2. Computation of the safe load carrying capacity of the pipe when installed and bedded in themannertobespecifiedusingasuitablefactorofsafetyandmakingcertainthedesignsupportin gstrengththus 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 orpermanentlysubmergedinwater.Thefillloadinsuchcaseswillbereducedandwillcorrespond to the buoyant weight of the fill material. However, effect of submergence could be ignored which provides an additional factor of safety, but it may be necessary to check whether a pipe is subject to flotation. Under submergence, the minimum height of the fill material that will be required to prevent flotation ignoring the frictional forces in the fill can be determined. Wherever sufficient height of fill material is not available, anti-flotation blocks should be provided.

4. All rigid pipes may be tested for strength in the laboratory by the three-edge bearing test (ultimate load).

5. Width of the trench specified for a particular job should be minimum in consonance with the requirements of adequate working space to allow access to all parts and joints of pipe.

6. The Field Engineer should keep in touch with the Design Engineer throughout the duration of the Project and any deviation from the design assumptions due to the exigencies of work, should be immediately investigated and corrective measures taken in time.

7. All pipes used on the work should be tested as per the IS specifications and test certificates of the manufacturers should be furnished for every consignment brought to the site.

8. Whenever shoring is used, the pulling out of planks on completion of work, should be carried out in stages and this should be properly supervised to ensure that the space occupied by the planks is properly backfilled.

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

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

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

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

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

4.6 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.

4.7 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 CHARECTERISTICS OF SEWAGE

5.2.1 INFLUENT CHARACTERISTICS

Parameters	**Units**	**Value**
Biochemical 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

Table 5.1: Influent Characteristics

5.2.2 EFFLUENT CHARACTERISTICS

Parameters	Units	Value
Biochemical 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

Table 5.2: Effluent Characteristics

5.3 CAPACITY CALCULATION OF STP

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

Last census Population 2011	15503 Persons
Floating population	2100
Population for sewerage zone-2011	17603
Decennial increase	4.2%
Current year	2022
Design period	30 Years
Execution period	2 Years
Projected population 2054	20714 Persons
Per capita water supply	150 LPCD
Waste water generated	80% of water supply
Quantity of waste water generated	2.412 MLD
Groundwater Infiltration for pipeline & Manholes	5000L/km/day
Total Ground water infiltration	0.1 MLD
Number of persons per house	5Persons
Average roof area	55m2
Rainfall intensity	100mm/day
Number of household sin 2054	40143Nos
Waste water generated accounted for Rain water	0.225 MLD
Non domestic demand	0.0.259MLD
Total sewerage load	2.996
Say	**3 MLD**

5.4 UNIT OPERATIONS IN TREATMENT OF SEWAGE

Sl No.	Unit	Function	Unit Operations /Phases
1	Primary	● Removal of rags, floating matter, grit, oil and grease etc.	● Screening ● Grit removal ● Oil and grease trap
2	Secondary	● Removal of Bio degradable organic matter and suspended solids ● Also include nutrient removal (Nitrate and Phosphate) in advanced technologies	● 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	● Polishing the effluent for reuse application	● Pathogen removal ● Chlorine compounds ● O_3 ,UV Radiation ● Membrane filtration ● Filtration variation ● Carbon Adsorption ● Iron exchange

Table 5.3: Unit Operations

5.5 THEPROPOSED PFD PROCESS FLOW DIAGRAM OF PROPOSED STP

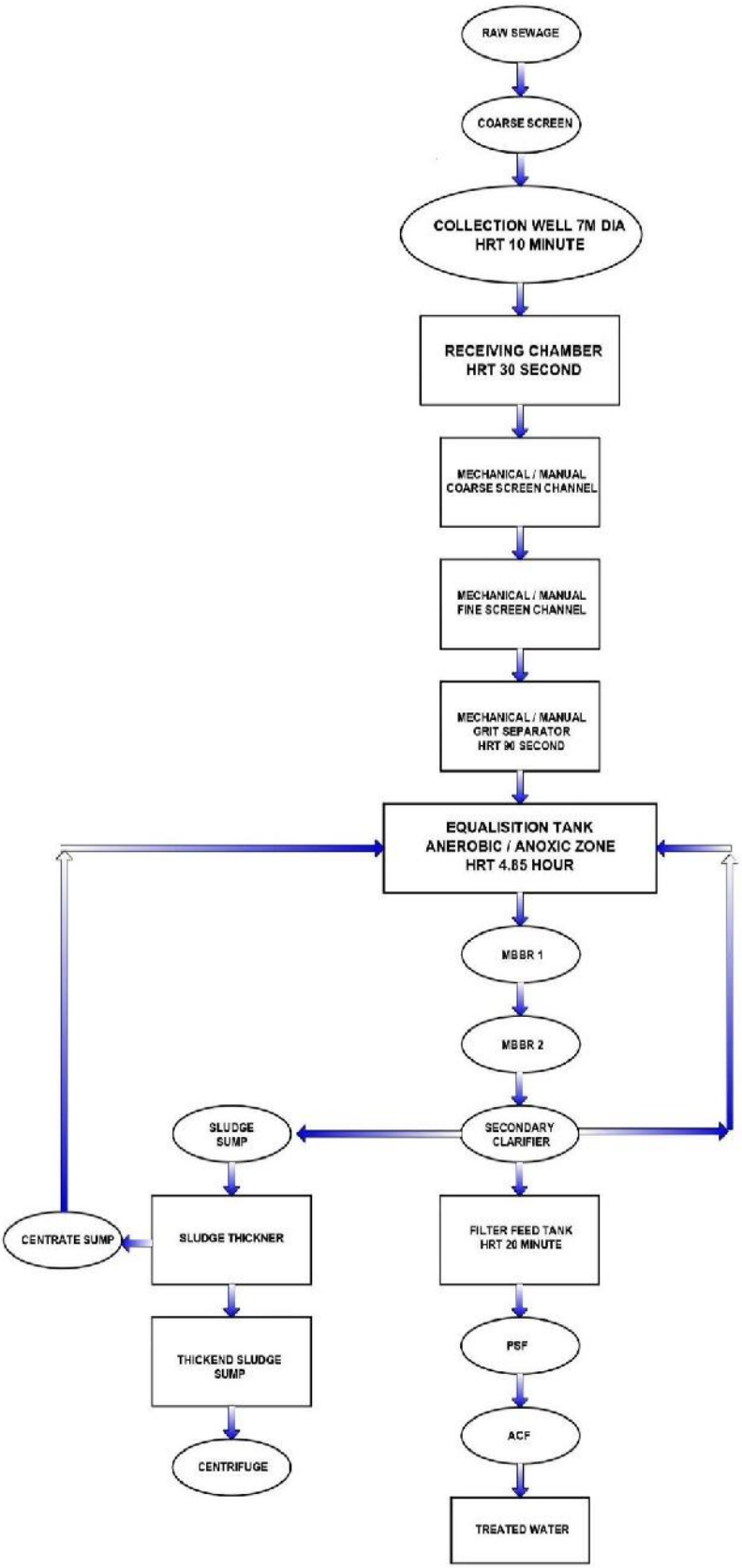


Figure 5.1 Process Flow Diagram

5.6 SELECTION OF TECHNOLOGY FOR THE PROPOSED STP

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 footprint
3. Better Stabilized sludge
4. Better Effluent Quality
5. Less sophisticated
6. Spare parts available
7. Lower lifecycle cost
8. Nil odour nuisance and other environmental hazards

5.6.1 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 HallvardÓdegaard 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 m2 /m3 and the void ratio. The specific surface area of MBBR carriers is typically in the range from 350 to 1200 m2 /m3 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

2. Single stage tertiary Nitrification 5. Pre-Anoxic Denitrification 6. Post-Anoxic Denitrification (Harlan H. Bengtson).

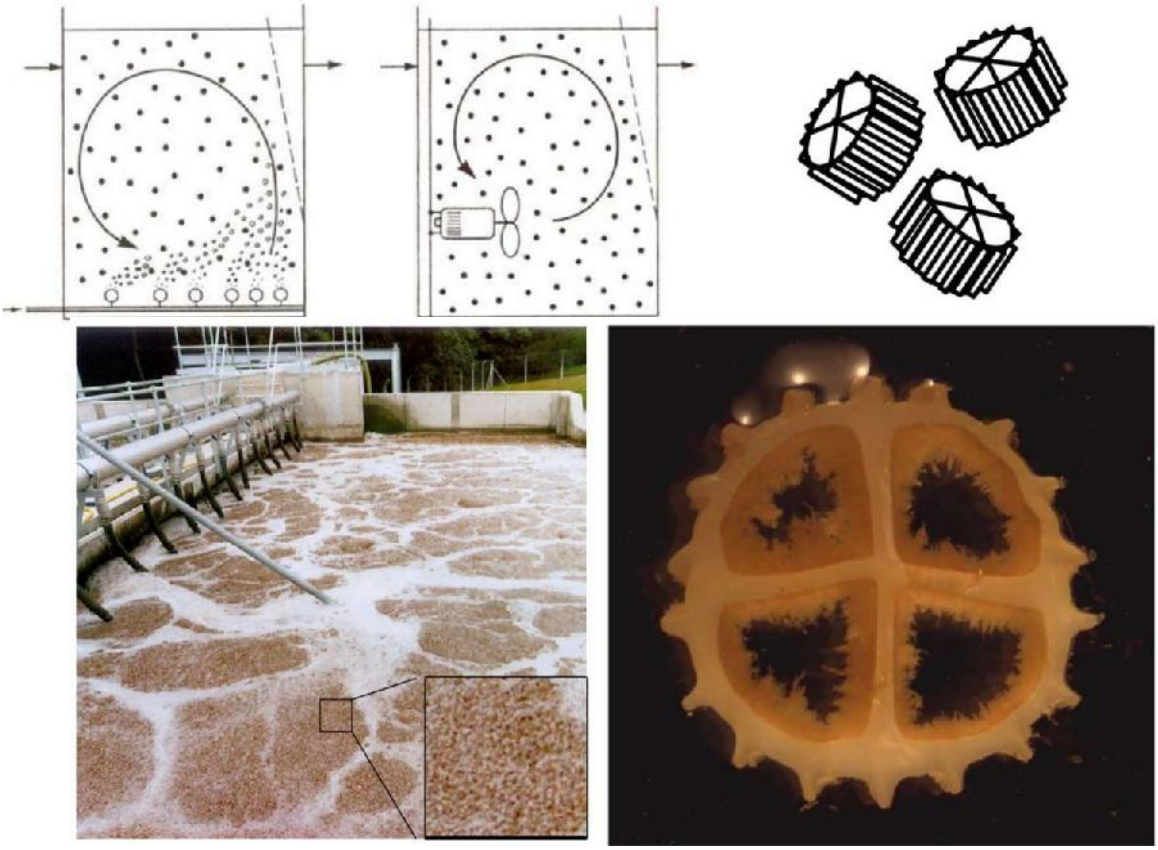


Fig. 5.2 MBBR Carrier media in a MBBR tank

The idea behind the development of the moving bed biofilm process was to adopt the best from both the activated sludge process and the biofilter 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. Ódegaard).

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 denitrification 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.

5.6.2 NITRIFICATION

Biological nitrification/denitrification is a twostep 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 qc 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.

5.6.3 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.

5.6.4 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.

5.6.5 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

5.7 PROPOSED TREATMENT UNITS

5.7.1 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 be130.43cum/hr whereas peak flow is taken as 326.09cum/hr. Dimension of receiving chamber is 2.25×1.0×2m with a free board of 0.5m.

5.7.2 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 bye passed to the manual screen chamber so that the treatment is continuously ensured. Sizes provided are:

Mechanical and Manual Coarse Screen Channel- 2.75x1x1, Screen with 60 degree inclination

Mechanical and Manual Fine Screen Channel-2.75x1x1, Screen with 45 degree inclination

5.7.3GRIT 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 3.0x3.0 x2.50 m.

5.7.4 APPROACH CHANNEL FOR PARSHALLFLUME

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.

5.7.5 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 4.85 hours. A circular with 16 m diameter proposed with a depth of 4.50m. Equalization tank is divided into Anaerobic and Anoxic areas with the help of baffle wall for denitrification

5.7.6 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.

5.7.7 MOVING BED BIOREACTOR (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 tank is designed with diameter 14.8m and 13.8m and a depth of 4.50m.

5.7.8 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. Two numbers (3W+1S) of air blowers of 46 HP each with a total air discharge of 4342.08 cum/ hr. are provided.

5.7.9 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) settle 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. One number

of secondary clarifier with 13.60m diameter and 3.3m depth is provided with a retention period of 3.10 hrs.

5.7.11 SLUDGE SUMP

Total sludge generated in the secondary clarifier is calculated as 914.46kg/day. Sludge sump is designed to have a hydraulic retention time of 2hrs. One number of sludge sump having circular shape with diameter 1.9m and depth 2.35 m is provided.

5.7.12 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 13.45cum/hr.

5.7.13 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. Sludge thickener with diameter 5.2m and depth 2.85m provided.

5.7.14 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 4.12cum/hr.

5.7.15 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.

5.7.16 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.

Fig 5.3: Pressure Sand Filter

Pressure sand filter is designed to have a dimension of 2.4mØ and 2.5m height (3 numbers). 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).

5.7.17 ACTIVATED CARBON FILTER(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 2.6mØx2.5m height (3 Numbers).

Fig5.4: Activated Carbon Filter

5.7.18 TREATED WATER TANK

The treated water is finally fed in to the treated water tank having a capacity of176.40 m^3. Treated water from Activated Carbon filter is pumped in to the treated water tank of dimension 6.6x6.6x3.35m. Hydraulic retention time of 60 minutes is given in the treated water tank.

5.7.19 CHORINE CONTACT TANK

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

5.7.20 EFFLUENT CHANNEL

Effluent Conveyance System called as Effluent Channel is provided to carry treated effluent from STP to the stream which leads to water body.

5.7.20 OUT FALL

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

5.8 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 is163HP/136KW and the installed capacity is350HP/260KW.The single largest motor capacity is 46HP (Air blower). An Indoor type transformer and a Generator is proposed with the following capacities.

a. Transformer : 250KVA

b. Generator : 250KVA

5.10 OTHER FACILITIES

Following provisions are also included in the proposal

5.7.21 Comfort room cum office in the laboratory

5.7.22 Internal Roads

5.7.23 Storm Water Drain

5.7.24 Providing Lawns

5.7.25 Planting trees

5.7.26 Bye-passing Arrangements

5.7.27 Walk ways for all major elevated units

5.7.28 Walkways/ground pavements

5.7.29 Water Supply and sanitation arrangements

5.7.30 Laboratory

5.11PLAN 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-FRIENDLYSYSTEM

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 utilization of space has been taken at the planning and design stage itself and using the natural treatment properties of the soil, such 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.

Treated Water disposal: The treated water can be used for gardening and floor washing in Sewage Treatment Plant. Treated water can be supplied to agricultural nurseries, industrial purposes, etc on demand. Surplus water can be discharged to nearest water body.

Sludge disposal & handling: The washed screenings, grit etc. will be daily removed to the disposal sites. Suitable arrangements will be made for disposal of sludge. Dewatering and packing unit after making cakes is proposed in the estimate. Sludge may be used as bio- compost (Fertilizer) on demand

5.13PRELIMINARY STRUCTURAL DESIGN OFCOMPONENTS

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 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.

Figure5.5- Proposed site for STP

Sl No	Components	Area required in cents	Latitude and Longitude
1	Sewage Treatment Plant	120 (Survey no: 4/5, panthalayini village)Private land	75.69902,11.46771
2	Wet well and Pump house, PH 1	5	75.70904,11.44115
3	Lifting Station, LS1	2	75.67612,11.47196
4	Lifting Station, LS2	2	75.68266,11.46549
5	Lifting Station, LS3	2	75.68621,11.46764
6	Lifting Station, LS4	2	75.69150,11.46248
7	Lifting Station, LS5	2	75.66319,11.45511
8	Lifting Station, LS6	2	75.69241,11.45283
9	Lifting Station, LS7	2	75.70336,11.45253
10	Lifting Station, LS8	2	75.70491,11.44911
11	Lifting Station, LS9	2	75.70145,11.44549
12	Lifting Station, LS10	2	76.76727,11.44825
13	Lifting Station, LS11	2	75.70811,11.44953
14	Lifting Station, LS12	2	75.70948,11.44881
15	Lifting Station, LS13	2	75.71679,11.14234
16	Lifting Station, LS14	2	75.67119,11.47047

Table 5.4: Land details

5.16 SMART MANAGEMENT AND ON-LINE MONITORING USING INTERNET OF THINGS (IoT)

Advancement in the field of digital technology has enabled the wastewater treatment system operators and managers to control and enhance the performance of various components of the system. Internet of things (IoT) 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 centralized 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 waterbody.

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 units in STP have been suggested.

5.17 ODOUR CONTROL METHODS

Odours are a complex combination of a wide variety of compounds; however, the 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.

Odor 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 odor 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 disadvantage of each.

D. Monitor odour missions from the treated air for process adjustments and for feedback to evaluate the solution’s effectiveness.

Hydrogen sulphide (H2 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 conditions. 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.

5.18 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 check list 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 screenings and 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 than7.

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 the release 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 a low 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. I fit 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.

• Cleans cum removal equipment regularly; otherwise, obnoxious odours and a nun sightly appearance will result.

• Keep cover plates in place except when operations or maintenance require the irremovable.

• 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.

5.19 CONTROLOF ODOUR BY CHEMICAL ADDITION

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

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

Table 5.5 Control of odour by chemical addition

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. 152 Crores including O&M for 10 years. Salient features of the estimate are detailed below

- The estimate is prepared with DSR 2018 and cost index 36.44%
- RCC M30 is proposed for all concrete works
- Sulphate Resistant Cement is proposed for the structures above plinth level
- Epoxy coating is provided for reinforcement bars.
- waterproofing treatment is proposed for STP structures
- Proposed STP site is low lying area, hence earth filling is proposed
- Odour control system by Activated Carbon (re-generable type) Scrubbers is proposed (90 Lakhs provided)
- Roof top type Solar Energy System is provided
- 250KVA Diesel Generator is proposed
- SCADA in Sewage Treatment Plant is proposed
- PWD approved rates are taken for PWD/NH road reformation
- O&M for 10 years is taken for STP and Sewer network
- Electricity charges is not included

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/labor, 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

6.4.1.1 Regular maintenance of the system for proper functioning

6.4.1.2 Preventing any breakdown of the system

6.4.1.3 Emergency operations to deal with clogged sewer lines or overflowing manholes

6.4.1.4 Preventing back flow of sewage into residence sand

6.4.1.5 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:

6.4.2.1 Inspection of sewers, sewer appurtenance sand Sewage Treatment Plant.

6.4.2.2 Cleaning of sewers and sewer appurtenances.

6.4.2.3 Checking manhole conditions for deposition of silt etc.

6.4.2.4 Replacing broken manhole covers.

6.4.2.5 Raising the manhole cover for the construction of culverts, resurfacing etc.

6.4.2.6 Approval of sewer connection applications and executing connections

6.4.2.7 Maintaining records of sewers and STP including:

6.4.2.8 Daily operation and maintenance report

6.4.2.9 Complaints register

6.4.2.10 Stock of equipment

6.4.2.11 Disposal of silt, garbage removed after cleanings ewer, manholes and treatment plants.

6.4.2.12 Removal of debris, brick bats etc. After any repair work.

6.4.2.13 Identifying locations where regular maintenance is needed (problem areas) in sewers and STP.

6.4.2.14 Ensuring work is carried out correctly and safely with due regards to health and safety regulations.

6.4.2.15 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 of 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`

6.5 ON COMPLETION OF MAINTENANCE WORKS RESTORE EVERYTHING TO THE ORIGINAL CONDITION. 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.

6.5.1 Sewerage Network.

6.5.2 Pumping Stations.

6.5.3 Sewage Treatment Plants.

6.6 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 analyze 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.

6.7 O &M CHARGES

O&M Charge for STP (10 years) including GST	Rs.9,86,54,587
O&M Charge for sewer network and allied works (10 years) including GST	Rs.8,61,27,005
Electricity Charges for 10 years including GST	Rs.16,53,13,299
Total	**Rs. 350094891.02 /-**

6.8 POWER CHARGES

Power calculation details appended separately. As per the calculation sheet attached, total electricity consumption for STP, well, pumping stations, etc for one year is 2001372 units. The total amount for electricity charges @ Rs7 per unit cost for one year comes to Rs.1,40,09,602/-. Electricity charges is not included in the detailed estimate due to the fluctuation in charges and Municipality has to bear the same.

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 OTHER PROJECTS

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.

7.4 IMPLIMENTATION SCHEDULE

Table 7.1: Implementation Schedule

		2022						2023					
		1 2	3 4	5 6	7 8	9 10	11 12	1 2	3 4	5 6	7 8	9 10	11 12
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.

7.5 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 3 MLD STP with MBBR technology at Naderi in Koyilandi Municipality, a sewer network of 46.334 km, 1791 manholes, one pumping station at Puthiya kavil road and fourteen lifting stations. Manholes at 30 m intervals and at all intersections are proposed to facilitate maintenance operations.
- Septage load from entire Koyilandi Municipality is proposed to be treated in the 4 MLD STP for Zone1 (Coastal area) where Co-treatment facility provided (DPR already prepared).
- 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.

APPENDICES

APPENDIX-I-DESIGN OF STP WITH MOVING BED BIOFILM-REACTOR (MBBR)						
Average flow	**3**	MLD				
Design flow	3.130	MLD	3130435	LPD	3130	m^3/day
Working hours	**23**		3130	KLD	130.43	m^3/hour
Assumed peak factor	**2.5**					
Peak design flow	7.83	MLD	7826087	LPD	7826	m^3/day
					326.09	m^3/hour
Raw Sewage Characteristics						
Average sewage flow entering the STP	130.43	m^3/hour				
Peak flow entering the STP	326.09	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	0.470	MLD				
Thickener overflow return BOD	**500**	mg/l				
Centrate from sludge dewatering as fraction of plant flow	**0.006**					
Centrate from sludge dewatering return	0.01878	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	130.43	m^3/hour				
Peak flow	326.09	m^3/hour				
	0.091	m^3/sec				
Average Retention Time for peak flow	**30**	sec	offset to wall	**0.3**	m	
Volume of the inlet chember	2.72	m^3	free board	**0.5**	m	
Assumed depth of flow	**1.5**	m	total height	**2**	m	
Area required for inlet chamber	1.81	m^2	wall thickness	**0.25**	m	
Length of the tank	**2.25**	m	slab thickness	**0.3**	m	
Breadth of the tank	0.81	fix	**1**	m	area in m^2	**7.035**
Mechanical Coarse Screen Channel						
Peak design flow	0.091	m^3/sec				
Number of screen	**1**					
Peak flow rate per screen	0.091	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	0.14	m				
Area required for screen	0.113	sqm				
Headloss through bar screen	0.01	m	*assuming head loss coefficient = 0.7*			
Assumed depth of flow after inserting bar screen	**0.2**	m	0.15	(control value)		
Width of channel required	0.57	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	0.76	*(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	0.0906	m^3/sec				
Number of screen	**1**					
Peak flow rate per screen	0.091	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	0.14	m	slab thickness	**0.30**	m	
Area required for screen	0.113	sqm				
Headloss through bar screen	0.01	m	*assuming head loss coefficient = 0.7*			
Assumed depth of flow after inserting bar screen	**0.2**	m	0.15	(control value)		
Width of channel required	0.57	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	0.78	*(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	0.091	m^3/sec				
Number of screen	**1**					
Peak flow rate per screen	0.091	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	0.19	m	slab thickness	**0.30**	m	
Area required for screen	0.11	sqm				
Headloss through bar screen	0.04	m	*assuming head loss coefficient = 0.7*			
Assumed depth of flow after inserting bar screen	**0.25**	m	0.23	(control value)		
Width of channel required	0.45	m	fix	**1**	m	
Clear bar spacing	**6**	mm	*(up to 6 mm)*			
Bar thickness	**10**	mm	*(5 to 15 mm)*			
Number of bars	**65**					
Clear bar spacing obtained	5.5	mm				
Inside width of screen (openings)	0.35	m				
Full height of channel	**1**	m	fb	**0.5**		
Angle of inclination	**45**	degree	0.79	rad		
Actual velocity at peak flow	1.12	*(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	3130	m^3/day				
Rate of screening quantity	**0.015**	m^3/1000 m^3				
Daily screening quantity	0.0470	m^3/day				
Grit Separator Chamber						
Number of grit units	**1**	SB	**1**			
Peak flow	0.0906	m^3/sec				
Flow in one unit	0.0906	m^3/sec				
Grit particle size	**0.2**	mm				
HRT	**90**	sec	*(45 to 90 sec, typical 60)*			

Volume of grit chamber	8.15	m^3				
SOR	**900**	$m^3/m^2/day$	*(empirical, from observations)*			
	0.010	$m^3/m^2/sec$				
Area required	8.70	m^2	wall thickness	**0.25**	m	
SWD	**2.00**	m	slab thickness	**0.30**	m	
Side of square channel	2.95	m	offset to wall	**0.3**	m	
Fix length	**3**	m	freeboard	**0.5**	m	
Fix width	**3**	m	area given	9	m^2	OK
Shape factor	**0.85**		volume given	18.00	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 Nr < 1, apply Stoke's law to get terminal velocity vp*				
N_r	6	*apply Newton's equation*				
assumed velocity in m/sec	**0.0146**					
Nr	2				area in m^2	**16.81**
drag coefficient Cd	11.95					
vp in m/sec	0.019					
Critical displacement velocity, Vc	0.0190	m/sec		R_t	1.50	
Horizontal velocity of flow, Vh	0.0151	m/sec	OK	R_v	1.26	
Equalisation Tank						
Number of units	**1**					
Average design flow	130.43	m^3/hour				
Volume of tank required	**789.00**	m^3	*from detailed analysis*			
HRT	6.05	hours	free board	**0.50**	m	
SWD	**4**	m	offset to wall	**0.45**	m	
Area required for each tank	197.25	m^2	wall thickness	**0.3**	m	
Diameter of circular tank	15.85	m	fix	**16**	m	
Side if square tank	14.04	m	fix length	**14.5**	m	
Thickness of foundation slab	**0.45**	m	fix breadth	**14.5**	m	
Actual capacity provided	804.2	m^3	circular	OK		
	841.00	m^3	rectangular	OK	area in m^2	**256.00**
Moving Bed Bio-Reactor (MBBR)-Single Stage						
Number of tanks proposed	**1**					
Average design flow/tank	3130.43	m^3/day				
Number of streams	**1**					
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	886.27	kg/day				
Quantity of BOD to be removed per day	854.97	kg/day				
Volume of reactor required	221.57	m^3				
Surface area loading rate (SALR) for BOD removal	**7.50**	$g/m^2/day$				
Required carrier surface area	118169.40	m^2				
Specific surface area of carrier	**450.00**	m^2/m^3				
Required carrier volume	262.60	m^3				
Volume of media required	**40%**					
	88.63	m^3	depth of base	**0.9**	m	
Volume of tank required-BOD loading rate/volume method	310.19	m^3	slab thickness	**0.35**	m	
Volume of tank required- SALR method	656.50	m^3	offset to wall	**0.45**	m	
Volume of each tank	656.50	m^3	total height	**4.50**	m	
SWD	**4**	m	wall thickness	**0.30**	m	
Area of each tank	164.12	m^2	fix dia	**14.8**	m	
Diameter of circular tank	14.46	m	length	**13.2**	m	
Side of square tank	12.81	m	breadth	**13.2**	m	

Actual capacity provided-circular	688.14	m^3	OK			
Actual capacity provided-rectangular	696.96	m^3	OK			
Fix capacity	**688.14**	m^3				
Actual volume of media obtained	275.26	m^3				
Actual carrier surface area	123865.20	m^2				
Volume of liquid in the tank	578.04	m^3				
Hydraulic Retension Time at design average flow	4.43	hours	265.9	minutes		
Hydraulic Retension Time at peak flow	1.77	hours	106.4	minutes		
SARR for the given SALR	6.94	$g/m^2/day$			area in m^2	**216.09**
Estimated BOD removal rate	859.31	kg/day				
Actual BOD removal rate %	96.96	BOD of effluent		8.61	mg/l	ok
Moving Bed Bio-Reactor (MBBR)-Single Stage Nitrification						
Number of tanks proposed	**1**					
Average design flow/tank	3130.43	m^3/day				
Number of streams	**1**					
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**	^oC				
$SARR_{max}$	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	125.22	kg/day				
Required carrier surface area	142073.33	m^2/day				
Specific surface area of carrier	**600.00**	m^2/m^3				
Required carrier volume	236.79	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	591.97	m^3	offset to wall	**0.45**	m	
Volume of each tank	591.97	m^3	total height	**3.50**	m	
SWD	**4**	m	wall thickness	**0.30**	m	
Area of each tank	147.99	m^2	fix dia	**13.8**	m	
Diameter of circular tank	13.73	m	fix length	**12.2**	m	
Side of square tank	12.17	m	fix breadth	**12.2**	m	
Actual capacity provided-circular	598.29	m^3	OK			
Actual capacity provided-rectangular	595.36	m^2	OK			
Fix capacity	**598.29**	m^3				
Actual volume of media obtained	239.32	m^3				
Actual carrier surface area	143589.60	m^2			area in m^2	**187.69**
Volume of liquid in the tank	502.56	m^3				
Hydraulic Retension Time at design average flow	3.85	hours	231.18	minutes		
Hydraulic Retension Time at peak flow	1.54	hours	92.47	minutes		
Estimated NH_3-N removal rate	116.11	kg/day				
NH_3-N of effluent	2.91	mg/l				
BOD SALR	0.22	$g/m^2/day$	*should be < 0.5 to achieve good nitrification*			
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 $CaCO_3$	632.47	kg/day				
Equiv wt. of $CaCO_3$	50.00	g/equivalent				
Equiv wt. of $NaHCO_3$	84.00	g/equivalent				

Daily $NaHCO_3$ requirement	1062.54	kg/day $NaHCO_3$				
Blower air requirement						
BOD loading/tank	886.27	kg/day				
NH_3-N loading rate/tank	125.22	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	1329.41	kg/day				
Oxygen required for NH_3-N loading	544.70	kg/day				
Percentage of O_2 in air	**21.00**					
Weight of air required-BOD loading	6330.50	kg/day				
Weight of air required-NH_3-N loading	2593.79	kg/day				
Density of air	**1.225**	kg/m^3				
Volume of air-BOD loading	5167.76	m^3/day				
Volume of air-NH_3-N loading	2117.38	m^3/day				
Air transfer efficiency of diffuser	**0.100**					
Quantity of air required-BOD loading	51677.58	m^3/day				
Quantity of air required-NH_3-N loading	21173.79	m^3/day				
Factor of saftey	**1.10**					
Volume of air required-BOD loading	2368.56	m^3/hour				
Volume of air required-NH_3-N loading	970.47	m^3/hour				
Volume of equalisation tank	789.00	m^3				
Normal inflow	0.036	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	789.00	m^3				
Volume of air required for ET	986.25	m^3/hour				
Volume of air required for ST	16.81	m^3				
Total air required	4342.08	m^3/hour				
Capacity of blower	4342.00	m^3/hour				
Number of blowers working	**3.00**	SB	**1**			
Air required per blower	1447.33	m^3/hour				
Pressure given	**0.60**	kg/cm^2	5.89	m		
Volumetric efficiency	**70%**					
Power required for blower motor	45.39	HP		kw		
Fix power of blower motor	**46.00**	HP				
Energy/tank	2437.94	kwh				
Alum solution tank						
number of units	**1**					
dosage of alum	**50**	ppm				
requirement for 8 hours	52.170	kg				
volume of solution at 10% strength/unit	0.470	m^3				
length of tank	**1**	m				
breadth of tank	**1**	m				
liquid depth	0.47	m				
total depth	**0.75**	m				
solution flow rate	0.0588	m^3/hour				
Lime solution tank						
number of units	**1**					
dosage of lime	**35**	ppm				
requirement for 8 hours	36.52	kg				
volume of solution at 10% strength/unit	0.34	m3				
length of tank	**1**	m				
breadth of tank	**1**	m				
liquid depth	0.34	m				
total depth	**0.6**	m				
solution flow rate	0.04250	m^3/hour				
Secondary Clarifier						
No. of Tanks	1					

Average Flow in each tank	3130.43	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	125.22	m^2				
Diametre Required for Secondary Settling Tank	12.63	m				
Assumed Detention Period	3.10	hrs				
Volume	404.35	m^3		FB	0.5	
Depth of the Clarifier assumed	2.80	m				
Area of the Clarifier	144.41	m^2				
Provide Secondary Clarifier of Diametrer	13.60	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	3130.43	m^3/day				
TSS	400	mg/l				
BOD	283.11	mg/l				
Assumed TSS Sludge	**30%**					
Assumed BOD Sludge	**35%**					
Sludge generated-TSS	375.7	kg/day				
Sludge generated-BOD	310.2	kg/day				
Total sludge	685.85	kg/day				
% sludge with 1.02 specific gravity	**10%**					
Sludge volume per day/tank	67.24	m^3/day				
	2.80	m^3/hour				
Assumed HRT	**2**	hours	freeboard	**0.35**	m	
Volume of tank	5.60	m^3	slab thickness	**0.3**	m	
Assumed SWD	**2**	m	offset to wall	**0.3**	m	
Area of the tank	2.80	m^2	wall thickness	**0.25**	m	
Diameter of circular tank	1.89	m	fix	**1.9**	m	
Actual capacity provided	5.67	m^3			area in m^2	**3.00**
Pump for Sludge transfer to Thickner						
Number of pumps	**1.00**	W	**1**	SB		
Specific gravity of liquid	**1.03**					
Tipe of pump set	fugal sewage transfer-non clog					
Working hours	**5.00**	hours				
Discharge required	13.45	m^3/hour	0.003736	m^3/sec		
Required head	**15.00**	m				
Velocity in sludge transfer pipe adopted	**0.70**	m/sec				
Pipe diameter required	82.43	mm	fix	**100**	mm	
Efficiency	**50%**					
Power required	1.49	HP	fix	**2.00**	HP	
Energy	5.57	kwh				
Sludge Thickener						
Number of units	**1**					
Total sludge	685.85	kg/day				
Solids Loading Rate	**40**	kg/m^2/day				
Thickening area required	17.15	m^2				
Surface Loading Rate	**12**	m^3/m^2/day				
Thickening area required	5.60	m^2	freeboard	**0.35**	m	
Maximum area	17.15	m^2	slab thickness	**0.35**	m	
Area of distribution chamber	**20%**		offset to wall	**0.35**	m	
Total area required	20.58	m^2	wall thickness	**0.3**	m	
Diameter of circular tank	5.12	m	fix	**5.2**	m	
Thickening area available	21.24	m^2				
SWD	**2.5**	m				
Actual volume provided	53.09	m^3				

Thickened sludge consistency	**3%**	of total sludge volume				
Thickened sludge volume	20.58	m^3/day			area in m^2	**6.50**
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	20.58	m^3/day				
Working hours of centrifuge	**5.00**	hours				
Discharge required	4.12	m^3/hour	1.1E-03	m^3/sec		
Head required	**15.00**	m				
Efficiency	**50%**					
Power required	0.46	fix	**1.00**	HP		
Energy	1.705	kwh				
Sludge Centrifuge and Dosing Tanks						
Number of centrifuges	**1**	SB	**1**			
Capacity of centrifuge	**0.25**	m^3/hour				
Poly electrolyte dozing for centrifuge & thickener	**10%**					
Sludge volume	685.85	kg/day				
Dose	**2**	kg/1000 kg				
Quantity of Poly Electrolyte	1.37	kg/day				
Concentration	**0.1**					
Volume of tanks @ 24 hour	1.37	m^3				
	1371.69	litres				
Volume	57.15	litres/hour				
Volume required for 8 hours	0.46	m^3				
Liquid depth of tank	**1**	m				
Area required	0.46	m^2				
side of square tank	0.68	m	fix	**0.6**	area in m^2	**0.72**
HRT	**30**	minutes	offset to wall	**0.3**	m	
Average flow	130.43	m^3/hour	wall thickness	**0.25**	m	
Volume of tank	65.22	m^3	slab thickness	**0.35**	m	
Assumed liquid depth	**2.5**	m	freeboard	**0.35**	m	
Area of the tank	26.09	m^2			area in m^2	**28.09**
side of square tank	5.11	m	fix	**4.2**	m	
Filter feed tank						
HRT	**20**	minutes	offset to wall	**0.3**	m	
Average flow	130.43	m^3/hour	wall thickness	**0.25**	m	
Volume of tank	43.48	m^3	slab thickness	**0.3**	m	
Assumed liquid depth	**2.5**	m	freeboard	**0.35**	m	
Area of the tank	17.39	m^2				
side of square tank	4.17	m	fix length	**4.2**	m	
			fix breadth	**4.2**	m	
Volume provided	44.10	OK			area in m^2	**28.09**
Pressure Sand Filter						
Number of units	**3**					
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	**34.68**
Activated Carbon Filter						
Number of units	**3**					
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	tivated Carbon				area in m^2	**38.88**
Pump for clarified water to PSF and ACF						
Type of pump set	CF					
Number of pumps	**2.00**	W	**1**	SB		
Discharge of clarified water required/pum set	65.22	m^3/hour				
Working hours of pumps	**20.00**	hours				
Discharge required/pump set	78.26	m^3/hour	2.2E-02	m^3/sec		
Head required	**40.00**	m				
Efficiency	**60%**					
Power required	19.32	fix	**20.00**	HP		
Energy	288.31	kwh				
Treated Water Tank						
HRT	**60**	minutes	offset to wall	**0.3**	m	
Average flow	130.43	m^3/hour	wall thickness	**0.3**	m	
Volume of the tank	130.4	m^3	slab thickness	**0.35**	m	
Assumed liquid depth	**3**	m	freeboard	**0.35**	m	
Area of the tank	43.48	m^2				
Number of tanks	**1**		fix length	**6.6**	m	
Area of one tank	43.48	m^2	fix breadth	**6.6**	m	
Side of square tank	6.59	m				
Volume provided	130.68	m^3	OK			

APPENDIX-II-Eqalization tank				
Anaerobic Zone				
Vlume		789.00	m^3	
Detention time		6.05		
HRT of Anerobic Zone		1 hr		
Volume		130.4348	131	
Area		37.42857		
Segment width		2.339286	4	circular
Anoxic Zone				
NH4-N influent		40	mg/l	
NH4-N effluent		5	mg/l	
Influent nitrogen loading		160	Kg	
operating temperature		$25^{o}c$		
5 % Nitrogen Assimilated in BOD removal		12	mg/l	
NH3-N to be Nitrified		23	mg/l	
NO3-N Generated @75% Nitrification of NH3-N		17.25	mg/l	
NO3-N effluent		4	mg/l	
NO3-N to be Dentirified		13.25	mg/l	
MLVSS/MLSS		0.72	assumed	
Specific denitrification rate, Udn		0.04	/d	.04 to .42
Dissolved oxygen		0.5	mg/l	
Overall denitrification rate		0.030772		
MLSS in aeration tank		4000	mg/l	
Anoxic Retentioin time HRTdn		0.134556	per day	
		3.229347	hr	
Volume required		421.2191	m^3	
Volume available in Equalization tank for anoxic region		658.57	m^3	
So ok				
RAS Recycle ratio Assumed		0.5		
Internal recycle ratio (Nitrate recycle)		4.1		
Total quantity of sewage to be pumped to next unit		886.941		
Capacity of each pump				

General Abstract

SEWERAGE SYSTEM TO KOYILANDY MUNICIPALITY -PHASE 2- CONSTRUCTION OF 3 MLD CAPACITY SEWAGE TREATMENT PLANT AND LAYING SEWERAGE NET WORK TO ZONE 2 OF KOYILANDY MUNICIPALITY

(Dsor year: **2018**)

Sl No	Heading Description	Amount
1	**PART-A1- STP1- ESTIMATE NO: 2022/2718(WITHOUT GST)**	33093324.83
2	**PART-A2- STP2- ESTIMATE NO: 2022/2719(WITHOUT GST)**	36328474.40
3	**PART-A3- ELECTRO MECHANICAL- ESTIMATE NO: 2022/2720(WITHOUT GST)**	43720111.80
4	**PART-B- NETWORK- ESTIMATE NO: 2022/2721(WITHOUT GST)**	755530350.23
5	**PART- C- O&M ESTIMATE NO: 2022/2698(WITHOUT GST)**	296690585.61
6	**PART-D- CENTAGE CHARGES @10%OF (A B C)**	116536284.70
7	**PART-E- GST@18% OF (A B C)**	209765312.40
8	**PART-F- DPR PREPERATION CHARGES@2.5% OF (A B)**	21716806.53
9	**PART-G-UNFORESEEN ITEMS**	6618749.50
	Total	**1520000000.00**
	Centage @	**0.0%**
	Centage Amount	**0.00**
	Provision for GST payments (in %) @	**0.0%**
	Amount reserved for GST payments	**0.00**
	Total & Centage	**1520000000.00**
	Lumpsum for round off	**0.00**
	GRAND TOTAL Rs	**1520000000.00**
		Rounded Grand Total Rs 1,52,00,00,000
		Rupees One Hundred Fifty Two Crore Only

General Abstract

SEWERAGE SYSTEM TO KOYILANDY MUNICIPALITY PHASE 2 - CONSTRUCTION OF 3MLD CAPACITY SEWAGE TREATMENT PLANT AND LAYING SEWERAGE NETWORK TO ZONE 2 OF KOYILANDY MUNICIPALITY - PART A- STP1

(Dsor year: **2018**)

Sl No	Heading Description	Amount
1	**RAW SEWAGE RECEIVING CHAMBER CUM WELL**	5648950.08
2	**INLET CHEMBER/SCREEN CHANEL/GRIT CHEMBER/PARSHALLFLUME**	3824911.70
3	**EQUALISATION TANK**	5790183.07
4	**MBBR 1 & 2**	9219828.74
5	**SECONDARY CLARIFIER**	3963530.54
6	**SLUDGE SUMP**	274703.05
7	**SLUDGE THICKNER**	1080387.65
8	**THICKENED SLUDGE SUMP**	511126.53
9	**FILTER FEED TANK**	794747.58
10	**TREATED WATER TANK**	1643792.46
11	**Centrate Sump**	341163.43
	Total	**33093324.83**
	Centage @	**0.0%**
	Centage Amount	**0.00**
	Provision for GST payments (in %) @	**18.0%**
	Amount reserved for GST payments	**5956798.47**
	Total & Centage	**39050123.30**
	Lumpsum for round off	**0.00**
	GRAND TOTAL Rs	**39050123.30**
		Rounded Grand Total Rs 3,90,50,123
		Rupees Three Crore Ninety Lakh Fifty Thousand One Hundred and Twenty Three Only

General Abstract

SEWERAGE SYSTEM TO KOYILANDY MUNICIPALITY PHASE 2 - CONSTRUCTION OF 3MLD CAPACITY SEWAGE TREATMENT PLANT AND LAYING SEWERAGE NETWORK TO ZONE 2 OF KOYILANDY MUNICIPALITY - PART B- STP2

(Dsor year: **2018**)

Sl No	Heading Description	Amount
1	**Site Preperation**	3850416.60
2	**Administrative/Laboratory/Chemical House / Control Room Building**	4782474.92
3	**Security Cabin**	320279.13
4	**Air Blower Building**	2834146.05
5	**Chlorination Building**	2456623.55
6	**Compound Wall**	2145551.14
7	**Internal Roads**	2048864.99
8	**Storm Water Drains**	551910.65
9	**Transformer Building**	628364.03
10	**DG Room**	534866.07
11	**Centrifuge Building**	3285165.34
12	**PSF/ACF Foundation**	534973.21
13	**Sludge Shed**	654838.72
14	**Landscaping, green belt formation and re-use of treated water**	400000.00
15	**Odour Control system**	8800000.00
16	**Providing Solar energy system**	2500000.00
	Total	**36328474.40**
	Centage @	**0.0%**
	Centage Amount	**0.00**
	Provision for GST payments (in %) @	**18.0%**
	Amount reserved for GST payments	**6539125.39**
	Total & Centage	**42867599.79**
	Lumpsum for round off	**0.00**
	GRAND TOTAL Rs	**42867599.79**
		Rounded Grand Total Rs 4,28,67,600
		Rupees Four Crore Twenty Eight Lakh Sixty Seven Thousand Six Hundred Only

General Abstract

SEWERAGE SYSTEM TO KOYILANDY MUNICIPALITY -PHASE 2- CONSTRUCTION OF 3 MLD CAPACITY SEWAGE TREATMENT PLANT AND LAYING SEWERAGE NET WORK TO ZONE 2 OF KOYILANDY MUNICIPALITY- PART- C- ELECTRO-MECHANICAL-2

(Dsor year: **2018**)

Sl No	Heading Description	Amount
1	**MECHANICAL WORKS**	21935912.82
2	**ELECTRICAL WORKS**	10084198.98
3	**Charges for Power allocation to KSEB and power extension by cable**	9000000.00
4	**Tools and Plants**	200000.00
5	**Providing SCADA system**	2500000.00
	Total	**43720111.80**
	Centage @	**0.0%**
	Centage Amount	**0.00**
	Provision for GST payments (in %) @	**18.0%**
	Amount reserved for GST payments	**7869620.12**
	Total & Centage	**51589731.92**
	Lumpsum for round off	**0.00**
	GRAND TOTAL Rs	**51589731.92**
		Rounded Grand Total Rs 5,15,89,732
		Rupees Five Crore Fifteen Lakh Eighty Nine Thousand Seven Hundred and Thirty Two Only

General Abstract

SEWERAGE SYSTEM TO KOYILANDY MUNICIPALITY PHASE 2 - CONSTRUCTION OF 3MLD CAPACITY SEWAGE TREATMENT PLANT AND LAYING SEWERAGE NETWORK TO ZONE 2 OF KOYILANDY MUNICIPALITY - PART D- NETWORK

(Dsor year: **2018**)

Sl No	Heading Description	Amount
1	**Laying of sewer network**	271190262.03
2	**Road Restoration work of laying of sewers and pumping main.**	49308544.64
3	**Construction of Pumping stations**	1851220.18
4	**Compound wall with gate for Pumping stations**	3339050.48
5	**Construction of screen chamber and Valve chamber**	1660910.15
6	**Construction of Valve chamber**	255472.28
7	**Construction of Control room and Generator Room**	1363783.85
8	**Providing Cable Trenches**	180779.77
9	**Bath cum Toilets**	357701.44
10	**Mechanical, Electrical - Pumpsets, grit chamber screen, generator, transformer & allied works complete**	4678495.52
11	**Pumping mains**	11887473.58
12	**Laying PE pipes via HDD Method above 3m depth**	63123751.14
13	**Construction of Man holes**	190839433.57
14	**Road Restoration - to PWD/NH**	119907382.13
15	**Lifting Stations and Allied work**	33386089.45
16	**Water Supply and Sanatory arrangements, Electrical wiring in pumping stations**	800000.00
17	**Line extension , Deposit to KSEB, etc**	1400000.00

Total	**755530350.23**
Centage @	**0.0%**
Centage Amount	**0.00**
Provision for GST payments (in %) @	**18.0%**
Amount reserved for GST payments	**135995463.04**
Total & Centage	**891525813.27**
Lumpsum for round off	**0.00**
GRAND TOTAL Rs	**891525813.27**

Rounded Grand Total Rs 89,15,25,813

Rupees Eighty Nine Crore Fifteen Lakh Twenty Five Thousand Eight Hundred and Thirteen Only

General Abstract

SEWERAGE SYSTEM TO KOYILANDY MUNICIPALITY PHASE 2 - CONSTRUCTION OF 3MLD CAPACITY SEWAGE TREATMENT PLANT AND LAYING SEWERAGE NETWORK TO ZONE 2 OF KOYILANDY MUNICIPALITY - PART E- O&M

(Dsor year: **2018**)

Sl No	Heading Description	Amount
1	**STP-Providing skilled and experienced personnals for the monitoring of the day to day operation and maintenance of the all systems for STP**	4765399.85
2	**STP-Periodical cleaning STP units**	7435.00
3	**STP-Upkeep of Civil structures, maintaining Landscaping etc.**	133765.68
4	**STP-Annual Chemicals charges**	415975.75
5	**STP-Major repairs and maintenance of Electro Mechanical work (Break down maintanence).**	60000.00
6	**STP-Others**	764893.00
7	**STP-Annual Operation and Maintenance for 9 years (2nd year to 10th year)**	77458113.05
8	**SEWER- O&M OF WET WELLS AND CONNECTED WORKS**	2248943.85
9	**SEWER- O&M OF CIVIL, ELECTRICAL, MECHANICAL WORKS, O&M OF LIFTING STATIONS, ETC**	1174278.40
10	**SEWER-O&M OF SEWER LINE**	1943615.05
11	**SEWER-O&M for 2nd year to 10th Year**	67622149.98
12	**Electricity Charges for 10 years @ Rs14009601.6/year**	140096016.00
	Total	**296690585.61**
	Centage @	**0.0%**
	Centage Amount	**0.00**
	Provision for GST payments (in %) @	**18.0%**
	Amount reserved for GST payments	**53404305.41**
	Total & Centage	**350094891.02**
	Lumpsum for round off	**0.00**
	GRAND TOTAL Rs	**350094891.02**
		Rounded Grand Total Rs 35,00,94,891
		Rupees Thirty Five Crore Ninety Four Thousand Eight Hundred and Ninety One Only

Detailed Estimate

SEWERAGE SYSTEM TO KOYILANDY MUNICIPALITY PHASE 2 - CONSTRUCTION OF 3MLD CAPACITY SEWAGE TREATMENT PLANT AND LAYING SEWERAGE NETWORK TO ZONE 2 OF KOYILANDY MUNICIPALITY - PART A- STP1

(Dsor year: **2018**)

Sl No	Description	No	L	B	D	CF	Quantity	Remark
1RAW SEWAGE RECEIVING CHAMBER CUM WELL (Cost Index:36.44 %)								
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	10.000	10.000			100.000	
	Total Quantity						100.000 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						100.000 sqm	
	Say 100.000 sqm @ Rs 109.63 / sqm						**Rs 10963.00**	
2	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							
		1	3.140/4	8.000*8	1.500		75.360	
	Total Quantity						75.360 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						75.360 cum	
	Say 75.360 cum @ Rs 298.80 / cum						**Rs 22517.57**	
3	od328597/2021_2022 Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas(exceeding 30cm in depth,150cm in width as well as 10 sqm on plan) including disposal of excavated earth disposed earth to be levelled and neatly dressed for Manhole 2nd depth 1.5m to 3m							
		1	3.140/4	8*8	1.500		75.360	
	Total Quantity						75.360 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						75.360 cum	

						Say 75.360 cum @ Rs 322.41 / cum	**Rs 24296.82**	
4	od328598/2021_2022 Fabricating MS Kerb of size using 8 mm thick MS plate including cost ms plate and 10mm dia anger bar welded to the kerb and conveyance charges of MS plate,all fabrication charges, charges of painting outer side of the steel work with two or more coat deluxe multi surface paint to give an even shade over an under coat of primer erection tying anger bar with reinforcement placing in position etc complete:							
	For Kerb	1	3.140	7.700			24.178	
						Total Quantity	24.178 metre	
						Total Deducted Quantity	0.000 metre	
						Net Total Quantity	24.178 metre	
						Say 24.178 metre @ Rs 6489.86 / metre	**Rs 156911.84**	
5	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 Kerb	1	3.140*7.7	0.500	0.300		3.627	
		1*1/2	3.14*7.7	0.500	0.500		3.023	
	For steining up to ground	1	3.14*7.7	0.350	7.350		62.198	
						Total Quantity	68.848 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	68.848 cum	
						Say 68.848 cum @ Rs 8611.41 / cum	**Rs 592878.36**	
6	od328600/2021_2022 Sinking wells (third depth) 7.00 m inside below spring level in all classes of soil to lines and levels and plumb by scooping out earth from inside and below the steining using necessary appliances including hire and labour for the same including dumping the spoil beyond the initial lead of 50 m etc. complete. Total depth 3 to 4.5m (vide KWA SoR KW.5.4)							
		1			1.500		1.500	
						Total Quantity	1.500 metre	
						Total Deducted Quantity	0.000 metre	
						Net Total Quantity	1.500 metre	
						Say 1.500 metre @ Rs 42951.76 / metre	**Rs 64427.64**	
7	od328601/2021_2022 Sinking wells (4th depth) 7.00 m inside below spring level in all classes of soil to lines and levels and plumb by scooping out earth from inside and below the steining using necessary appliances including hire and labour for the same including dumping the spoil beyond the initial lead of 50 m etc. complete. Total depth 4.5 to 6.0m (vide KWA SoR KW.5.4)							

		1			1.500		1.500	
	Total Quantity						1.500 metre	
	Total Deducted Quantity						0.000 metre	
	Net Total Quantity						1.500 metre	
	Say 1.500 metre @ Rs 68382.01 / metre						**Rs 102573.01**	
8	od328602/2021_2022 Sinking wells (5th depth) 7.00 m inside below spring level in all classes of soil to lines and levels and plumb by scooping out earth from inside and below the steining using necessary appliances including hire and labour for the same including dumping the spoil beyond the initial lead of 50 m etc. complete. Total depth 6 to 7.5m (vide KWA SoR KW.5.4)							
		1			1.350		1.350	
	Total Quantity						1.350 metre	
	Total Deducted Quantity						0.000 metre	
	Net Total Quantity						1.350 metre	
	Say 1.350 metre @ Rs 72489.71 / metre						**Rs 97861.11**	
9	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)							
	bottom portion like cap of hemisphere0.166*3.14*0.6(3*16)+0.36	1	0.166*3.14*0.6	(3*16)+0.36			15.125	
	Total Quantity						15.125 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						15.125 cum	
	Say 15.125 cum @ Rs 6857.61 / cum						**Rs 103721.35**	
10	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 bottom plugging	1	3.14/4	7*7	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 8040.95 / cum						**Rs 61867.07**	

11	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	7*7	0.300		11.540	
						Total Quantity	11.540 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	11.540 cum	
						Say 11.540 cum @ Rs 9142.09 / cum	**Rs 105499.72**	
12	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.							
	Top portionTop portion	1	3.14/4	7.7*7.7	0.300		13.963	
	bottom portion like cap of hemisphere10.166*3.14*0.60(3*16)+0.36	1	0.166*3.14*0.60	(3*16)+0.36			15.125	
	pcc For bottom plugging	1	3.14/4	7*7	0.200		7.694	
						Total Quantity	36.782 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	36.782 cum	
						Say 36.782 cum @ Rs 941.23 / cum	**Rs 34620.32**	
13	5.22.4 Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth levelHot rolled deformed bars							
	(68.848+11.54+8.368) @120kg/m3	1	88.756		120.000		10650.720	
						Total Quantity	10650.720 kilogram	
						Total Deducted Quantity	0.000 kilogram	
						Net Total Quantity	10650.720 kilogram	
						Say 10650.720 kilogram @ Rs 98.92 / kilogram	**Rs 1053569.22**	
14	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).							
	bottom across the well for providing guide pipe of pump set and chain	1	7.700	0.300	0.600		1.386	
	Slab for working plat form over the well and beam	1	3.14/4	7.7*7.7	0.150		6.982	
						Total Quantity	8.368 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	8.368 cum	
						Say 8.368 cum @ Rs 11564.93 / cum	**Rs 96775.33**	
15	od328605/2021_2022 Centering and shuttering including strutting propping etc and removal of form etc. Well Steining for circular works							
	outer of kerb	1	3.14*7.7		0.800		19.343	
	inner of kerb	1	3.14*7		0.800		17.584	
	steining up to ground level outer	1	3.14*7.7		7.350		177.709	
	steining up to ground level inner	1	3.14*7		7.350		161.553	
						Total Quantity	376.189 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	376.189 sqm	
						Say 376.189 sqm @ Rs 301.51 / sqm	**Rs 113424.75**	
16	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	7.700	0.300+0.6 *2			11.550	
						Total Quantity	11.550 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	11.550 sqm	
						Say 11.550 sqm @ Rs 653.89 / sqm	**Rs 7552.43**	

17	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	7.7*7.7			46.543	
						Total Quantity	46.543 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	46.543 sqm	
						Say 46.543 sqm @ Rs 820.89 / sqm	**Rs 38206.68**	
18	19.16 Providing orange colour safety foot rest of minimum 6 mm thick plastic encapsulated as per IS: 10910 on 12 mm dia steeel bar conforming to IS:1786, having minimum cross section as 23 mm x 25 mm and over all minimum length 263 mm and width as 165 mm with minimum 112 mm space between protruded legs having 2 mm tread on top surface by ribbing or chequering besides necessary and adequate anchoring projections on tail length on 138 mm as per standard drawing and suitable to with stand the bend test and chemical resistance test as per specifications and having manufactures permanent identification mark to be visible even after fixing including fixing in manholes with 30x20x15 cm cement concrete block 1:3:6 (1cement: 3 coarse sand: 6 graded stone aggregate 20 mm nominal size)Complete as per design							
	steps	1	4*14				56.000	
						Total Quantity	56.000 No	
						Total Deducted Quantity	0.000 No	
						Net Total Quantity	56.000 No	
						Say 56.000 No @ Rs 548.42 / No	**Rs 30711.52**	
19	14.72 Providing and fixing double scaffolding system (cup lock type) on the exterior side, upto seven story hight made with 40 mm dia. M.S. tube 1.5 m centre to centre, horizontal & vertical tubes joining with cup & lock system with M.S. tubes, M.S. tube challies, M.S. clamps and M.S. staricase system in the scaffolding for working platform etc. and maintaining it in a serviceable condition for the required duration as approved and removing it there after. The scaffolding system shall be stiffened with bracings, runners, connection with the building etc wherever required for inspection of work at required location with essential safety features for the workmen etc. complete as per directions and approval of Engineer- in Charge. The elevational area of the scaffolding shall be measured for payment purpose. The payment will be made once irrespective of duration of scaffolding. Note:- This item to be used for maintenance work judicially, necessary deduction for scaffolding in the existing item to be done .							
		1	3.140	7.700	7.700		186.171	
						Total Quantity	186.171 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	186.171 sqm	

						Say 186.171 sqm @ Rs 305.56 / sqm	**Rs 56886.41**	
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)							
	Bottom of well	1	3.14/4	7*7			38.465	
	inside of steining	1	3.14*7		7.350		161.553	
	working plat form under side	1	3.14/4	7*7			38.465	
	working platform top	1	3.14/4	7.7*7.7			46.543	
	face of beam	1	7.700	0.300	0.6*2		2.772	
						Total Quantity	287.798 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	287.798 sqm	
						Say 287.798 sqm @ Rs 403.73 / sqm	**Rs 116192.69**	
21	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							
	Bottom of well	1	3.14/4	7*7			38.465	
	inside of steining	1	3.14*7		7.350		161.553	
	working plat form under side	1	3.14/4	7*7			38.465	
	working platform top	1	3.14/4	7.7*7.7			46.543	
	face of beam	1	7.700	0.300	0.6*2		2.772	
						Total Quantity	287.798 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	287.798 sqm	
						Say 287.798 sqm @ Rs 224.31 / sqm	**Rs 64555.97**	
22	od328606/2021_2022 Conveying disposing the excess earth and debries etc.by lorry up to 5Km s							
		1	100.000				100.000	
						Total Quantity	100.000 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	100.000 cum	
						Say 100.000 cum @ Rs 142.17 / cum	**Rs 14217.00**	
23	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	60.000	8.000		1790.400	
	Total Quantity						1790.400 Kwh	
	Total Deducted Quantity						0.000 Kwh	
	Net Total Quantity						1790.400 Kwh	
	Say 1790.400 Kwh @ Rs 37.18 / Kwh						**Rs 66567.07**	
24	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	60.000	8.000		3580.800	
	Total Quantity						3580.800 Kwh	
	Total Deducted Quantity						0.000 Kwh	
	Net Total Quantity						3580.800 Kwh	
	Say 3580.800 Kwh @ Rs 18.56 / Kwh						**Rs 66459.65**	
25	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 884.27 / Day						**Rs 44213.50**	
26	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	10.000	5.000	1.500		75.000	
	Total Quantity						75.000 cum	
	Total Deducted Quantity						0.000 cum	

						Net Total Quantity	75.000 cum	
						Say 75.000 cum @ Rs 558.99 / cum	**Rs 41924.25**	
27	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	10.000	5.000	1.500		75.000	
						Total Quantity	75.000 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	75.000 cum	
						Say 75.000 cum @ Rs 666.03 / cum	**Rs 49952.25**	
28	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)							
		1	10.000	5.000	1.500		75.000	
						Total Quantity	75.000 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	75.000 cum	
						Say 75.000 cum @ Rs 773.07 / cum	**Rs 57980.25**	
29	100.1.4 Excavating trenches of required width for pipes, cables, etc including excavation for sockets, and dressing of sides, ramming of bottoms, depth exceeding 4.5m in depth but not exceeding 6 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 : 4.5m to 6.0m All kinds of soil. (Ref. Item No. 2.12 of DSR)							
		1	10.000	5.000	1.500		75.000	
						Total Quantity	75.000 cum	
						Total Deducted Quantity	0.000 cum	

						Net Total Quantity	75.000 cum	
						Say 75.000 cum @ Rs 880.11 / cum	**Rs 66008.25**	
30	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 consolidatingeach deposited layer by ramming, watering, etc. and disposing of surplus excavated soil as directed, within a lead of 50 m :" Ordinary Rock. (Ref. Item No. 2.13.1 of DSR)							
		1	10.000	5.000	1.100		55.001	
						Total Quantity	55.001 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	55.001 cum	
						Say 55.001 cum @ Rs 811.82 / cum	**Rs 44650.91**	
31	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.							
		1	10*2+5*2		6.500		195.000	
						Total Quantity	195.000 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	195.000 sqm	
						Say 195.000 sqm @ Rs 753.83 / sqm	**Rs 146996.85**	
32	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	7.700	3.000	0.300		6.931	
						Total Quantity	6.931 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	6.931 cum	

						Say 6.931 cum @ Rs 7413.74 / cum	**Rs 51384.63**	
33	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 wiork upto plinth level							
	Base slab	1	7.900	2.350	0.300		5.570	
	side wall	2	7.900	0.300	6.800		32.232	
		3	2.3500	0.300	6.800		14.382	
	innerwall	1	5.000	0.300	6.800		10.200	
	roof slab	1	7.900	2.3500	0.100		1.857	
						Total Quantity	64.241 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	64.241 cum	
						Say 64.241 cum @ Rs 9947.98 / cum	**Rs 639068.18**	
34	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 .							
	Base slab	1	7.900	2.350	0.300	330.0	1837.936	
	side wall	2	7.900	0.300	6.800	330.0	10636.560	
		3	2.3500	0.300	6.800	330.0	4746.060	
	innerwall	1	5.000	0.300	6.800	330.0	3366.000	
	roof slab	1	7.900	2.350	0.100	330.0	612.646	
						Total Quantity	21199.202 kg	
						Total Deducted Quantity	0.000 kg	
						Net Total Quantity	21199.202 kg	
						Say 21199.202 kg @ Rs 1.36 / kg	**Rs 28830.91**	
35	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/m3	1	120.000	64.241			7708.920	
						Total Quantity	7708.920 kilogram	

						Total Deducted Quantity	0.000 kilogram	
						Net Total Quantity	7708.920 kilogram	
						Say 7708.920 kilogram @ Rs 98.92 / kilogram	**Rs 762566.37**	
36	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	21.000		0.300		6.300	
	side wall	4	7.900		6.800		214.880	
		6	2.350		6.800		95.880	
	innerwall	2	5.000		6.800		68.000	
	roof slab	1	7.900	2.350			18.565	
	PCC	1	22.000		0.300		6.600	
						Total Quantity	410.225 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	410.225 sqm	
						Say 410.225 sqm @ Rs 337.42 / sqm	**Rs 138418.12**	
37	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	4	7.900		6.800		214.880	
		4	2.3500		6.800		63.920	
	innerwall	2	5.000		6.800		68.000	
	roof slab	1	7.900	2.350			18.565	
						Total Quantity	365.365 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	365.365 sqm	
						Say 365.365 sqm @ Rs 721.70 / sqm	**Rs 263683.92**	
38	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							
	side wall	4	7.900		6.800		214.880	
		4	2.350		6.800		63.920	
	innerwall	2	5.000		6.800		68.000	
						Total Quantity	346.800 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	346.800 sqm	
						Say 346.800 sqm @ Rs 573.87 / sqm	**Rs 199018.12**	
39	22.23.2 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 horizontal surface one coat @1.10 kg per sqm.							
	Base slab	1	21.000		0.300		6.300	
	roof slab	1	7.900	2.350			18.565	
						Total Quantity	24.865 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	24.865 sqm	
						Say 24.865 sqm @ Rs 442.27 / sqm	**Rs 10997.04**	
Sl No	Description	No	L	B	D	CF	Quantity	Remark
2INLET CHEMBER/SCREEN CHANEL/GRIT CHEMBER/PARSHALLFLUME (Cost Index:36.44 %)								
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							
	Reciving chamber footing	4	1.600	1.600	1.500		15.361	
	Reciving 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 215.37 / cum	**Rs 29166.48**	
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)							
	Reciving chamber footing	4	1.600	1.600	0.200		2.049	
	Reciving 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 7413.74 / cum	**Rs 133884.73**	
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 wiork upto plinth level							

	Reciving n chamber footing Size 1.2x1.2x0.9m	4	1.200	1.200	0.150		0.864	
		4	0.700	0.700	0.750		1.470	
	Reciving and Distribution chamber footing Size 1.5x1.5x0.9m	6	1.500	1.500	0.150		2.025	
		6	0.900	0.900	0.750		3.646	
	Grit chamber Footing Size1.8x1.8x0.9m	6	1.800	1.800	0.150		2.916	
		6	1.100	1.100	0.750		5.446	
	Parshalflume and Distribution chamber footing Size 1.5x1.5x0.9m	6	1.500	0.150	0.150		0.203	
		6	0.900	0.900	0.750		3.646	
	Staircase column footing Size 1.2x1.2x0.9m	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 9947.98 / cum	**Rs 229460.11**	
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							
	SUPPORTING STRUCTURE							
	Plinth level beam	1	83.000	0.250	0.450		9.338	
	Reciving chamber column 250x400	4	0.250	0.400	2.550		1.020	
	Reciving and Distribution chamber column 250x450	6	0.250	0.450	3.550		2.397	
	Grit chamber Column250x500	6	0.250	0.500	2.000		1.500	
	Parshalflume and Distribution chamber column250x450	6	0.250	0.450	3.550		2.397	
	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	
	FLOOR STRUCTURE							
	Reciving chamber base slab	1	2.750	1.500	0.200		0.826	
	Reciving chamber side wall	1	2.750	0.250	2.000		1.375	
		2	1.000	0.250	2.000		1.000	
		1	2.750	0.250	1.000		0.688	
	Coarse and fine screen chamber base slab	1	7.250	2.750	0.200		3.988	

	Coarse and fine screen chamber side wall	2	7.250	0.250	1.000		3.625	
	Coarse and fine screen chamber side wall	1	6.250	0.250	1.000		1.563	
	Coarse and fine screen chamber shorter wall	4	2.000	0.250	1.000		2.000	
	Distribution chamber base slab	1	1.250	2.750	0.200		0.688	
	Grit chamber base slab -side portion	2	4.600	1.000	0.200		1.840	
	Grit chamber -side portion wall	4	2.600	0.250	1.000		2.600	
	Grit chamber base slab -Centre portion	1	7.000	1.000	0.200		1.401	
	Grit chamber base slab -Extra concrete	16*0.5	1.500	1.500	0.150		2.700	
	Grit Chamber sidewall	2	7.000	0.250	2.300		8.050	
	Grit Chamber sidewall	3	3.000	0.250	2.300		5.175	
	parshelflume and distribution chamber base slab	1	5.750	2.750	0.200		3.163	
	parshelflume and distribution chamber side wall	2	5.750	0.250	0.800		2.301	
	parshalflume and distribution chamber short wall	1	2.000	0.250	0.800		0.400	
	Allround Platform slab	1	58.000	1.000	0.150		8.700	
	Platform beam	15	1.000	0.250	0.400		1.500	
	Staircase -steps	18	1.000	0.300	0.150		0.810	
	Stair slab	2	6.000	1.000	0.150		1.800	
	Staircase -landing	1	1.000	1.000	0.150		0.150	
		1	1.700	1.000	0.150		0.255	
	For openings	18	1.000	0.700	0.250		-3.150	
						Total Quantity	74.013 cum	

						Total Deducted Quantity	-3.150 cum	
						Net Total Quantity	70.863 cum	
						Say 70.863 cum @ Rs 11610.43 / cum	**Rs 822749.90**	
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 .							
	FLOOR STRUCTURE							
	Reciving chamber base slab	1	2.750	1.500	0.200	330.0	272.250	
	Reciving chamber side wall	1	2.750	0.250	2.000	330.0	453.750	
		2	1.000	0.250	2.000	330.0	330.000	
		1	2.750	0.250	1.000	330.0	226.875	
	Coarse and fine screen chamber base slab	1	7.250	2.750	0.200	330.0	1315.875	
	Coarse and fine screen chamber side wall	2	7.250	0.250	1.000	330.0	1196.250	
	Coarse and fine screen chamber side wall	1	6.250	0.250	1.000	330.0	515.625	
	Coarse and fine screen chamber shorter wall	4	2.000	0.250	0.300	330.0	198.000	
	Distribution chamber base slab	1	1.250	2.750	0.200	330.0	226.875	
	Grit chamber base slab -side portion	2	4.600	1.000	0.200	330.0	607.200	
	Grit chamber -side portion wall	4	2.600	0.250	1.000	330.0	858.000	
	Grit chamber base slab -Centre portion	1	7.000	1.000	0.200	330.0	462.001	
	Grit chamber base slab -Extra concrete	16*0.5	1.500	1.500	0.150	330.0	891.000	
	Grit Chamber sidewall	2	7.000	0.250	2.300	330.0	2656.500	
	Grit Chamber sidewall	3	3.000	0.250	2.300	330.0	1707.750	

	parshelflume and distribution chamber base slab	1	5.750	2.750	0.200	330.0	1043.625	
	parshelflume and distribution chamber side wall	2	5.750	0.250	0.800	330.0	759.001	
	parshalflume and distribution chamber short wall	1	2.000	0.250	0.800	330.0	132.000	
						Total Quantity	13852.577 kg	
						Total Deducted Quantity	0.000 kg	
						Net Total Quantity	13852.577 kg	
						Say 13852.577 kg @ Rs 1.36 / kg	**Rs 18839.50**	
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							
	From item no 3 @120 kg/m3	1			23.066	120.0	2767.920	
	From item no 4 @120 kg/m3	1			73.000	120.0	8760.000	
						Total Quantity	11527.920 kilogram	
						Total Deducted Quantity	0.000 kilogram	
						Net Total Quantity	11527.920 kilogram	
						Say 11527.920 kilogram @ Rs 98.92 / kilogram	**Rs 1140341.85**	
7	od328596/2021_2022 Extra for providing sulphate resistant cement for the structures above plinth level.							
	ITEM 3&4	1	96.060				96.060	
						Total Quantity	96.060 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	96.060 cum	
						Say 96.060 cum @ Rs 1899.47 / cum	**Rs 182463.09**	
8	5.9.1 Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete							
	Reciving n chamber footing Size 1.2x1.2x0.15m	4	4.800		0.150		2.880	

	RecEiving n chamber footing Size 1.2x1.2x0.75m	4	2.800		0.750		8.400	
	Reciving and Distribution chamber footing Size 1.5x1.5x0.9m	6	6.000		0.150		5.400	
	Reciving and Distribution chamber footing Size 1x1.1x0.75m	6	4.000		0.750		18.000	
	Grit chamber Footing Size1.8x1.8x0.15m	6	7.200		0.150		6.480	
	Grit chamber Footing Size1.4x1.4x0.75m	6	5.600		0.750		25.200	
	Parshalflume and Distribution chamber footing Size 1.5x1.5x0.9m	6	6.000		0.150		5.400	
	Parshalflume and Distribution chamber footing Size 1.5x1.5x0.9m	6	1.000		0.750		4.500	
	Staircase column footing Size 1.2x1.2x0.9m	3	4.800		0.150		2.160	
	Staircase column footing Size 1.2x1.2x0.75m	3	2.800		0.750		6.300	
	Pedastral column-Reciving chamber	4	1.300		0.400		2.080	
	Pedastral column-Reciving and Distribution chamber	6	1.400		0.400		3.360	
	Pedastral 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	98.561 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	98.561 sqm	
						Say 98.561 sqm @ Rs 337.42 / sqm	**Rs 33256.45**	
9	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.							
	FLOOR STRUCTURE							
	Reciving chamber side wall	2	2.750		2.000		11.000	
		4	1.000		2.000		8.000	
		2	2.750		0.425		2.338	
	Coarse and fine screen chamber side wall	4	7.250		1.000		29.000	
	Coarse and fine screen chamber side wall	2	6.250		1.000		12.500	
	Coarse and fine screen chamber shorter wall	8	2.000		0.425		6.800	
	Grit chamber -side portion wall	8	2.600		1.000		20.800	
	Grit Chamber sidewall	4	7.000		2.300		64.400	
	Grit Chamber sidewall	6	3.000		2.300		41.400	
	parshelflume and distribution chamber side wall	4	5.750		1.000		23.000	
	parshalflume and distribution chamber short wall	2	2.000		1.000		4.000	
	parshalflume and distribution chamber short wall	4	2.250		0.425		3.825	
						Total Quantity	227.063 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	227.063 sqm	
						Say 227.063 sqm @ Rs 721.70 / sqm	**Rs 163871.37**	

10	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	1.000			2.250	
	Coarse and fine screen chamber base slab	2	10.000	1.000			20.000	
	Grit chamber base slab -side portion	2	7.730				15.460	
	Grit chamber base slab -Centre portion	2	10.890				21.780	
	parshelfume and distribution chamber base slab	1	5.750	2.500			14.375	
	FLOOR STRUCTURE							
	Reciving chamber base slab	1	2.750	1.500			4.125	
	Coarse and fine screen chamber base slab	1	7.250	2.750			19.938	
	Distribution chamber base slab	1	1.250	2.750			3.438	
	Grit chamber base slab -side portion	2	4.600	1.000			9.200	
	Grit chamber base slab -Centre portion	1	7.000	1.000			7.000	
	Grit chamber base slab -Extra concrete	16*0.5	1.500	1.500			18.000	
	parshelflume and distribution chamber base slab	1	5.750	2.750			15.813	
						Total Quantity	151.379 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	151.379 sqm	
						Say 151.379 sqm @ Rs 820.89 / sqm	**Rs 124265.51**	
11	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	58.000	1.150			66.700	
	PLINTH BEAM (GL)	1	83.000	1.150			95.450	
	verandha beam	15	1.000	1.050			15.750	
	Staircase -steps	18	1.000	1.150			20.700	
	Staircase -landing	1	1.000	1.000			1.000	
		1	1.700	1.000			1.700	
						Total Quantity	201.300 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	201.300 sqm	
						Say 201.300 sqm @ Rs 653.89 / sqm	**Rs 131628.06**	
12	5.9.6 Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts							
	Reciving chamber column 250x400	4	0.250*2+0.4*2		2.550		13.260	
	Reciving and Distribution chamber column 250x450	6	0.250*2+0.45*2		3.550		29.820	
	Grit chamber Column250x500	6	0.250*2+0.5*2		2.000		18.000	
	Parshalflume and Distribution chamber column250x450	6	0.250*2+0.45*2		3.550		29.820	
	Staircase column 200x400	1	1.300		1.500		1.951	
	Staircase column 200x400	1	1.300		3.000		3.901	
	Staircase column 200x400	1	1.300		5.000		6.500	
						Total Quantity	103.252 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	103.252 sqm	
						Say 103.252 sqm @ Rs 869.05 / sqm	**Rs 89731.15**	
13	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	83.000	1.400			116.200	
	Reciving chamber column 250x400	4	1.300		2.550		13.260	
	Reciving and Distribution chamber column 250x450	6	1.400		3.550		29.820	
	Grit chamber Column250x500	6	1.500		2.050		18.450	
	Parshalflume and Distribution chamber column250x450	6	1.400		3.550		29.820	
	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	
	Reciving chamber base slab- top and bottom	2	2.250	1.000			4.500	
	Reciving chamber side wall out side	1	5.750		2.200		12.650	
	Reciving chamber side wall inside	1	5.250		2.200		11.550	
	Coarse and fine screen chamber base slab-top and bottom	2	8.500	2.375			40.375	
	Coarse and fine screen chamber side wall	6	8.250		1.000		49.500	
	Grit chamber base slab -side portion -top and bottom	4	4.600	1.000			18.400	
	Grit chamber base slab -Centre portion -top and botom	4	6.000	3.000			72.000	
	Grit Chamber sidewall-inside and out side	4	7.000		2.500		70.000	

		6	3.500		2.500		52.500	
	parshallflume and distribution chamber base slab-top and bottom	2	5.000	2.000			20.000	
	parshelfume and distribution chamber side wall-inside and out side	4	5.750		1.000		23.000	
	Allround verandha slab-top and bottom	2	58.000	1.150			133.400	
	verandha -edge	1	58.000	0.150			8.700	
	verandha beam	15	1.000	1.050			15.750	
	Staircase -steps	18	1.000	1.150			20.700	
	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	
	For openings in wall	18	1.000	0.700			-12.600	
						Total Quantity	789.675 sqm	
						Total Deducted Quantity	-12.600 sqm	
						Net Total Quantity	777.075 sqm	
						Say 777.075 sqm @ Rs 403.73 / sqm	**Rs 313728.49**	
14	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	789.675				789.675	
						Total Quantity	789.675 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	789.675 sqm	
						Say 789.675 sqm @ Rs 224.31 / sqm	**Rs 177132.00**	
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							
	Reciving chamber side wall inside	1	5.250		2.200		11.550	
	Coarse and fine screen chamber side wall	2	7.500		1.000		15.000	
	Coarse and fine screen chamber side wall-middle	4	2.750		1.000		11.000	
	Coarse and fine screen chamber-cross wall	9	2.250		0.425		8.607	
	Grit Chamber receiving portion - inside	2	11.700		1.000		23.400	
	Grit Chamber -inside	2	12.000		2.500		60.000	
	parshelfume and distribution chamber side wall-inside	2	5.000		1.000		10.000	
	parshelfume and distribution chamber cross wall-inside	1	5.000		1.000		5.000	
	For openings	18	1.000	0.700			-12.600	
						Total Quantity	144.557 sqm	
						Total Deducted Quantity	-12.600 sqm	
						Net Total Quantity	131.957 sqm	
						Say 131.957 sqm @ Rs 573.87 / sqm	**Rs 75726.16**	
16	22.23.2 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 horizontal surface one coat @1.10 kg per sqm.							
	Reciving chamber base slab- top	1	2.250	1.000			2.250	
	Coarse and fine screen chamber base slab-top	1	7.500	2.250			16.875	
	Grit chamber base slab -side portion -top	2	4.600	1.000			9.200	
	Grit chamber base slab -Centre portion -top	2	3.000	3.000			18.000	
	parshallflume and distribution chamber base slab-top and bottom	1	5.000	2.000			10.000	
						Total Quantity	56.325 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	56.325 sqm	
						Say 56.325 sqm @ Rs 442.27 / sqm	**Rs 24910.86**	
17	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	700.000				700.000	
						Total Quantity	700.000 kg	
						Total Deducted Quantity	0.000 kg	
						Net Total Quantity	700.000 kg	
						Say 700.000 kg @ Rs 191.08 / kg	**Rs 133756.00**	
Sl No	Description	No	L	B	D	CF	Quantity	Remark
3EQUALISATION TANK (Cost Index:36.44 %)								

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	17.800	17.800	0.500		124.360	
	Total Quantity						124.360 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						124.360 cum	
	Say 124.360 cum @ Rs 215.37 / cum						**Rs 26783.41**	
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 PCC	3.14/4	17.800	17.800	0.200		49.744	
	Total Quantity						49.744 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						49.744 cum	
	Say 49.744 cum @ Rs 7413.74 / cum						**Rs 368789.08**	
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 wiork upto plinth level							
	For Base slab	3.14	8.750	8.750	0.300		72.122	
	Total Quantity						72.122 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						72.122 cum	
	Say 72.122 cum @ Rs 9947.98 / cum						**Rs 717468.21**	
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							
	c/c	3.14	16.300	4.000	0.300		61.419	
	Baffle wall	1	10.600	4.000	0.100		4.240	
	Walkway	3.14	17.600	1.000	0.100		5.527	
	cantilever beams	8	1.000	0.250	0.250		0.500	
	Stair-step	29	1.000	0.50*0.30*0.15			0.653	
	Stair - Landing	11	1.000	1.000	0.120		1.320	
	Stair- Waist	11	6.300	1.000	0.120		8.316	
	Walkway to MBBR	11	2.000	1.200	0.120		3.168	
						Total Quantity	85.143 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	85.143 cum	
						Say 85.143 cum @ Rs 11610.43 / cum	**Rs 988546.84**	
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).							
	Item No. 3&4	1	72.122+85.143				157.265	
						Total Quantity	157.265 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	157.265 cum	
						Say 157.265 cum @ Rs 82.61 / cum	**Rs 12991.66**	
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 .							
	Item no. 3&4	1	157.265		330.000		51897.450	
						Total Quantity	51897.450 kg	
						Total Deducted Quantity	0.000 kg	
						Net Total Quantity	51897.450 kg	
						Say 51897.450 kg @ Rs 1.36 / kg	**Rs 70580.53**	

7	od328596/2021_2022 Extra for providing sulphate resistant cement for the structures above plinth level.							
	Item no 3&4	1	157.265				157.265	
						Total Quantity	157.265 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	157.265 cum	
						Say 157.265 cum @ Rs 1899.47 / cum	**Rs 298720.15**	
8	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/m3	1	157.265		120.000		18871.800	
						Total Quantity	18871.800 kilogram	
						Total Deducted Quantity	0.000 kilogram	
						Net Total Quantity	18871.800 kilogram	
						Say 18871.800 kilogram @ Rs 98.92 / kilogram	**Rs 1866798.46**	
9	od328599/2021_2022 Extra for providing epoxy coating for reinforcement bars.							
	@120kg/m3	1	157.265		120.000		18871.800	
						Total Quantity	18871.800 kg	
						Total Deducted Quantity	0.000 kg	
						Net Total Quantity	18871.800 kg	
						Say 18871.800 kg @ Rs 2.32 / kg	**Rs 43782.58**	
10	5.9.1 Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete							
	Floor Slab Side	3.14	17.500	0.300			16.485	
						Total Quantity	16.485 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	16.485 sqm	
						Say 16.485 sqm @ Rs 337.42 / sqm	**Rs 5562.37**	
11	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.							
	Inside	3.14	16.000	4.300			216.032	
	Outside	3.14	16.600	4.300			224.134	

	Baffle wall	2	10.600	4.000			84.800	
						Total Quantity	524.966 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	524.966 sqm	
						Say 524.966 sqm @ Rs 721.70 / sqm	**Rs 378867.96**	
12	5.9.3 Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform							
	Walkway	3.14	17.600	1.000			55.265	
	Stair- Landing	1	1.000	1.000			1.000	
	Stair- Waist	1	6.300	1.000			6.300	
	Stair- Step	29	1.000	0.150			4.350	
	Walkway to MBBR	1	2.000	1.000			2.000	
						Total Quantity	68.915 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	68.915 sqm	
						Say 68.915 sqm @ Rs 820.89 / sqm	**Rs 56571.63**	
13	5.9.5 Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers							
		8	1.000	0.750			6.000	
						Total Quantity	6.000 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	6.000 sqm	
						Say 6.000 sqm @ Rs 653.89 / sqm	**Rs 3923.34**	
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)							
	Qty vide Item No:10	1	1.000	16.485			16.485	
	For base floor	1	3.140	8.000	8.000		200.960	
	For walkway top	1	3.140	17.300	1.300		70.619	
	Qty vide Item No:11	1	1.000	524.966			524.966	
	Qty vide Item No:12	1	1.000	68.915			68.915	
	Qty vide Item No:13	1	1.000	6.000			6.000	
						Total Quantity	887.945 sqm	

						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	887.945 sqm	
						Say 887.945 sqm @ Rs 403.73 / sqm	**Rs 358490.03**	
15	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	16.600	4.300		224.134	
	Walkway	1	3.140	17.300	1.000		54.322	
	Beams	8	1.000	0.750			6.000	
						Total Quantity	284.456 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	284.456 sqm	
						Say 284.456 sqm @ Rs 224.31 / sqm	**Rs 63806.33**	
16	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							
	Tank	3.14	16.000	4.200			211.008	
	Baffle	1	10.600	4.000			42.400	
						Total Quantity	253.408 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	253.408 sqm	
						Say 253.408 sqm @ Rs 573.87 / sqm	**Rs 145423.25**	
17	22.23.2 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 horizontal surface one coat @1.10 kg per sqm.							
	For Base floor	3.14/4	16.000	16.000			200.960	
						Total Quantity	200.960 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	200.960 sqm	
						Say 200.960 sqm @ Rs 442.27 / sqm	**Rs 88878.58**	
18	100.36.1 Filling water with 5000 litre tankers fited 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 appliences and cost of water etc. complete. "(Ref. No. 000, Technical Circular)"							
		3.14	8.000	8.000	4.300		864.128	
						Total Quantity	864.128 Kilo litre	
						Total Deducted Quantity	0.000 Kilo litre	
						Net Total Quantity	864.128 Kilo litre	
						Say 864.128 Kilo litre @ Rs 185.67 / Kilo litre	**Rs 160442.65**	
19	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	700.000				700.000	
						Total Quantity	700.000 kg	
						Total Deducted Quantity	0.000 kg	
						Net Total Quantity	700.000 kg	
						Say 700.000 kg @ Rs 191.08 / kg	**Rs 133756.00**	
Sl No	Description	No	L	B	D	CF	Quantity	Remark
4MBBR 1 & 2 (Cost Index:36.44 %)								
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							
	tank 1	3.14	8.150	8.150	0.550		114.712	

	tank 2	3.14	7.650	7.650	0.550		101.069	
						Total Quantity	215.781 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	215.781 cum	
						Say 215.781 cum @ Rs 215.37 / cum	**Rs 46472.75**	
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)							
	tank 1	3.14	8.150	8.150	0.200		41.714	
	tank 2	3.14	7.650	7.650	0.200		36.753	
						Total Quantity	78.467 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	78.467 cum	
						Say 78.467 cum @ Rs 7413.74 / cum	**Rs 581733.94**	
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 wiork upto plinth level							
	tank 1	3.14	8.150	8.150	0.350		72.999	
	tank 2	3.14	7.650	7.650	0.350		64.317	
						Total Quantity	137.316 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	137.316 cum	
						Say 137.316 cum @ Rs 9947.98 / cum	**Rs 1366016.82**	
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 WALLS(TANK 1)	3.14	15.100	0.300	4.500		64.009	
	FOR WALLS (TANK 2)	3.14	14.100	0.300	4.500		59.770	
	Walkway(1)	1	16.400	1.000	0.100		1.640	
	WALKWAY(2)	1	15.400	1.000	0.100		1.540	
	Cantilever beams	10	1.000	0.250	0.250		0.625	
						Total Quantity	127.584 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	127.584 cum	
						Say 127.584 cum @ Rs 11610.43 / cum	**Rs 1481305.10**	
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).							
	Qty vide item 3&4	1	264.900				264.900	
						Total Quantity	264.900 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	264.900 cum	
						Say 264.900 cum @ Rs 82.61 / cum	**Rs 21883.39**	
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 .							
	ITEM No 3&4	1	264.900		330.000		87417.000	
						Total Quantity	87417.000 kg	
						Total Deducted Quantity	0.000 kg	
						Net Total Quantity	87417.000 kg	
						Say 87417.000 kg @ Rs 1.36 / kg	**Rs 118887.12**	
7	od328596/2021_2022 Extra for providing sulphate resistant cement for the structures above plinth level.							
		1	264.900				264.900	
						Total Quantity	264.900 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	264.900 cum	

	Say 264.900 cum @ Rs 1899.47 / cum						**Rs 503169.60**	
8	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/m3	1	264.900	120.000			31788.000	
	Total Quantity						31788.000 kilogram	
	Total Deducted Quantity						0.000 kilogram	
	Net Total Quantity						31788.000 kilogram	
	Say 31788.000 kilogram @ Rs 98.92 / kilogram						**Rs 3144468.96**	
9	od328599/2021_2022 Extra for providing epoxy coating for reinforcement bars.							
	@120kg/m3	1	264.900	120.000			31788.000	
	Total Quantity						31788.000 kg	
	Total Deducted Quantity						0.000 kg	
	Net Total Quantity						31788.000 kg	
	Say 31788.000 kg @ Rs 2.32 / kg						**Rs 73748.16**	
10	5.9.1 Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete							
	For tank 1	1	3.14*16		0.350		17.584	
	For tank 2	1	3.14*15		0.350		16.485	
	Total Quantity						34.069 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						34.069 sqm	
	Say 34.069 sqm @ Rs 337.42 / sqm						**Rs 11495.56**	
11	5.9.2 Centering and shuttering including strutting, etc. and removal of form for:Walls (any thickness) including attached pilasters, butteresses, plinth and string courses etc.							
	For tank (1) walls outside	1	3.14*15.4	4.500			217.602	
	Wall outside	1	3.14*14.8	4.500			209.124	
	For tank (2) wall outside	1	3.14*14.4	4.500			203.472	
	Wall inside	1	3.14*13.8	4.500			194.994	
	Total Quantity						825.192 sqm	

						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	825.192 sqm	
						Say 825.192 sqm @ Rs 721.70 / sqm	**Rs 595541.07**	
12	5.9.3 Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform							
	Walkway	1	16.400		0.100		1.640	
		1	15.400		0.100		1.540	
						Total Quantity	3.180 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	3.180 sqm	
						Say 3.180 sqm @ Rs 820.89 / sqm	**Rs 2610.43**	
13	5.9.5 Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers							
	Cantilever beam	10	1.000	0.750			7.500	
						Total Quantity	7.500 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	7.500 sqm	
						Say 7.500 sqm @ Rs 653.89 / sqm	**Rs 4904.18**	
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)							
	Item No:10	1	34.069				34.069	
	Item No:11	1	825.192				825.192	
	Item No:12	1	3.180				3.180	
	Item No:13	1	7.500				7.500	
						Total Quantity	869.941 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	869.941 sqm	
						Say 869.941 sqm @ Rs 403.73 / sqm	**Rs 351221.28**	
15	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							
	Tank1	1	3.14*15.4	4.500			217.602	

	Tank2	1	3.14*14.4	4.500			203.472	
	Walkway	1	16.400	1.000			16.400	
		1	15.400	1.000			15.400	
	Beams	3	1.000	0.250			0.750	
						Total Quantity	453.624 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	453.624 sqm	
						Say 453.624 sqm @ Rs 224.31 / sqm	**Rs 101752.40**	
16	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							
	For tank 1 inside	3.14	14.800		4.500		209.125	
	For tank 2 inside	3.14	13.800		4.500		194.994	
						Total Quantity	404.119 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	404.119 sqm	
						Say 404.119 sqm @ Rs 573.87 / sqm	**Rs 231911.77**	
17	22.23.2 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 horizontal surface one coat @1.10 kg per sqm.							
		3.14/4	14.800	14.800			171.947	

		3.14/4	13.800	13.800			149.496	
						Total Quantity	321.443 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	321.443 sqm	
						Say 321.443 sqm @ Rs 442.27 / sqm	**Rs 142164.60**	
18	100.36.1 Filling water with 5000 litre tankers fited 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 appliences and cost of water etc. complete. "(Ref. No. 000, Technical Circular)"							
	tank 1	3.14/4	14.8*14.8		4.500		773.759	
	tank 2	3.14/4	13.8*13.8		4.500		672.730	
						Total Quantity	1446.489 Kilo litre	
						Total Deducted Quantity	0.000 Kilo litre	
						Net Total Quantity	1446.489 Kilo litre	
						Say 1446.489 Kilo litre @ Rs 185.67 / Kilo litre	**Rs 268569.61**	
19	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	900.000				900.000	
						Total Quantity	900.000 kg	
						Total Deducted Quantity	0.000 kg	
						Net Total Quantity	900.000 kg	
						Say 900.000 kg @ Rs 191.08 / kg	**Rs 171972.00**	
Sl No	Description	No	L	B	D	CF	Quantity	Remark
5SECONDARY CLARIFIER (Cost Index:36.44 %)								
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	3.140	6.65*6.65	1.000	1.3	180.517	
						Total Quantity	180.517 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	180.517 cum	

						Say 180.517 cum @ Rs 215.37 / cum	**Rs 38877.95**	
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	3.140	6.65*6.65	0.200		27.772	
						Total Quantity	27.772 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	27.772 cum	
						Say 27.772 cum @ Rs 7413.74 / cum	**Rs 205894.39**	
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 wiork upto plinth level							
	Basement Floor	1	3.140	7.1*7.1	0.300	1.15	54.610	
						Total Quantity	54.610 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	54.610 cum	
						Say 54.610 cum @ Rs 9947.98 / cum	**Rs 543259.19**	
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	3.14	13.900	0.300	3.300		43.210	
	chamber	3.14	12.700	0.900	0.100		3.590	
	Walkway	3.14	14.800	1.200	0.100		5.577	
	Cantilever beam	8	1.200	0.250	0.250		0.600	

	RCC HOLLOW COLUMN	3.14	0.500	0.100	4.400		0.691	
						Total Quantity	53.668 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	53.668 cum	
						Say 53.668 cum @ Rs 11610.43 / cum	**Rs 623108.56**	
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).							
	Qty Vide Item No:3 &4	1	108.278				108.278	
						Total Quantity	108.278 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	108.278 cum	
						Say 108.278 cum @ Rs 82.61 / cum	**Rs 8944.85**	
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:3	1	108.278		330.000		35731.741	
						Total Quantity	35731.741 kg	
						Total Deducted Quantity	0.000 kg	
						Net Total Quantity	35731.741 kg	
						Say 35731.741 kg @ Rs 1.36 / kg	**Rs 48595.17**	
7	od328596/2021_2022 Extra for providing sulphate resistant cement for the structures above plinth level.							
	Qty Vide Item No:3&4	1	108.278				108.278	
						Total Quantity	108.278 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	108.278 cum	
						Say 108.278 cum @ Rs 1899.47 / cum	**Rs 205670.81**	
8	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:3&4@120kg/m3	1	108.278	120.000			12993.360	
						Total Quantity	12993.360 kilogram	

						Total Deducted Quantity	0.000 kilogram	
						Net Total Quantity	12993.360 kilogram	
						Say 12993.360 kilogram @ Rs 98.92 / kilogram	**Rs 1285303.17**	
9	od328599/2021_2022 Extra for providing epoxy coating for reinforcement bars.							
	Qty Vide Item No:3&4@120kg/m3	1	108.278	120.000			12993.360	
						Total Quantity	12993.360 kg	
						Total Deducted Quantity	0.000 kg	
						Net Total Quantity	12993.360 kg	
						Say 12993.360 kg @ Rs 2.32 / kg	**Rs 30144.60**	
10	5.9.1 Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete							
		3.14	1.800	0.600			3.392	
						Total Quantity	3.392 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	3.392 sqm	
						Say 3.392 sqm @ Rs 337.42 / sqm	**Rs 1144.53**	
11	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.							
	Wall Inside including clear water channel	3.14	13.600		3.600		153.735	
	Wall outside including walk way	3.14	15.400		3.600		174.082	
	RCC Hollow column center	3.14*2	0.300		4.600		8.667	
						Total Quantity	336.484 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	336.484 sqm	
						Say 336.484 sqm @ Rs 721.70 / sqm	**Rs 242840.50**	
12	5.9.3 Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform							
	chamber	3.14	13.100	0.500			20.567	

	Walkway	3.14	15.400	1.200			58.028	
						Total Quantity	78.595 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	78.595 sqm	
						Say 78.595 sqm @ Rs 820.89 / sqm	**Rs 64517.85**	
13	5.9.5 Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers							
		8	1.200	0.750			7.200	
						Total Quantity	7.200 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	7.200 sqm	
						Say 7.200 sqm @ Rs 653.89 / sqm	**Rs 4708.01**	
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)							
	Inside floor	3.14	7.400	7.400			171.947	
	Wall inside	3.14	13.600	3.300			140.924	
	wall otside	3.14	14.200	3.300			147.141	
	RCC Hollow column outside	3.14	0.400	4.400			5.527	
	chamber	1	13.100	1.800			23.580	
	walkway	1	3.140	15.400	1.200		58.028	
						Total Quantity	547.147 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	547.147 sqm	
						Say 547.147 sqm @ Rs 403.73 / sqm	**Rs 220899.66**	
15	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							
	Outer wall including RCC walk way	1	3.140	5.900	15.400		285.301	
						Total Quantity	285.301 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	285.301 sqm	

						Say 285.301 sqm @ Rs 224.31 / sqm	**Rs 63995.87**	
16	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							
	For wall	3.14/4	13.600	13.600		1.15	166.973	
	For column	3.14	0.400	5.400			6.783	
						Total Quantity	173.756 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	173.756 sqm	
						Say 173.756 sqm @ Rs 573.87 / sqm	**Rs 99713.36**	
17	22.23.2 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 horizontal surface one coat @1.10 kg per sqm.							
	For floor	3.14/4	13.600	13.600			145.194	
						Total Quantity	145.194 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	145.194 sqm	
						Say 145.194 sqm @ Rs 442.27 / sqm	**Rs 64214.95**	
18	100.36.1 Filling water with 5000 litre tankers fited 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 appliences and cost of water etc. complete.							

	"(Ref. No. 000, Technical Circular)"							
		3.14/4	13.600	13.600	3.600		522.697	
	Total Quantity						522.697 Kilo litre	
	Total Deducted Quantity						0.000 Kilo litre	
	Net Total Quantity						522.697 Kilo litre	
	Say 522.697 Kilo litre @ Rs 185.67 / Kilo litre						**Rs 97049.15**	
19	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 191.08 / kg						**Rs 114648.00**	
Sl No	Description	No	L	B	D	CF	Quantity	Remark
	6SLUDGE SUMP (Cost Index:36.44 %)							
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							
	FOR TRENCH	3.14/4	3.300	3.300	0.500		4.275	
	Total Quantity						4.275 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						4.275 cum	
	Say 4.275 cum @ Rs 215.37 / cum						**Rs 920.71**	
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 PCC	3.14/4	3.300	3.300	0.200		1.710	
	Total Quantity						1.710 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						1.710 cum	
	Say 1.710 cum @ Rs 7413.74 / cum						**Rs 12677.50**	

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 wiork upto plinth level							
	FOR BASE SLAB	3.14/4	3.100	3.100	0.300		2.264	
						Total Quantity	2.264 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	2.264 cum	
						Say 2.264 cum @ Rs 9947.98 / cum	**Rs 22522.23**	
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 TANK WALLS	3.14	2.200	0.300	2.350		4.871	
	COVER SLAB	3.14/4	2.500	2.500	0.120		0.589	
	Manhole	1	0.500	0.500	0.120		-0.030	
						Total Quantity	5.460 cum	
						Total Deducted Quantity	-0.030 cum	
						Net Total Quantity	5.430 cum	
						Say 5.430 cum @ Rs 11610.43 / cum	**Rs 63044.63**	
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	7.694				7.694	
						Total Quantity	7.694 cum	
						Total Deducted Quantity	0.000 cum	

						Net Total Quantity	7.694 cum	
						Say 7.694 cum @ Rs 82.61 / cum	**Rs 635.60**	
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							
	@120kg/m3	1	7.694	120.000			923.280	
						Total Quantity	923.280 kilogram	
						Total Deducted Quantity	0.000 kilogram	
						Net Total Quantity	923.280 kilogram	
						Say 923.280 kilogram @ Rs 98.92 / kilogram	**Rs 91330.86**	
7	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 .							
		1	7.694		330.000		2539.020	
						Total Quantity	2539.020 kg	
						Total Deducted Quantity	0.000 kg	
						Net Total Quantity	2539.020 kg	
						Say 2539.020 kg @ Rs 1.36 / kg	**Rs 3453.07**	
8	od328599/2021_2022 Extra for providing epoxy coating for reinforcement bars.							
	@120kg/m3	1	7.694	120.000			923.280	
						Total Quantity	923.280 kg	
						Total Deducted Quantity	0.000 kg	
						Net Total Quantity	923.280 kg	
						Say 923.280 kg @ Rs 2.32 / kg	**Rs 2142.01**	
9	od328596/2021_2022 Extra for providing sulphate resistant cement for the structures above plinth level.							
		1	7.694				7.694	
						Total Quantity	7.694 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	7.694 cum	
						Say 7.694 cum @ Rs 1899.47 / cum	**Rs 14614.52**	
10	5.9.1 Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete							

	FOR PCC	1	3.140	3.300	0.200		2.073	
	FOR FLOOR SLAB	1	3.140	3.100	0.300		2.921	
						Total Quantity	4.994 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	4.994 sqm	
						Say 4.994 sqm @ Rs 337.42 / sqm	**Rs 1685.08**	
11	5.9.2 Centering and shuttering including strutting, etc. and removal of form for:Walls (any thickness) including attached pilasters, butteresses, plinth and string courses etc.							
	FOR TANK WALLS	1	2*3.14	2.200	2.470		34.126	
						Total Quantity	34.126 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	34.126 sqm	
						Say 34.126 sqm @ Rs 721.70 / sqm	**Rs 24628.73**	
12	5.9.3 Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform							
	Cover slab	3.14/4	1.900	1.900			2.834	
						Total Quantity	2.834 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	2.834 sqm	
						Say 2.834 sqm @ Rs 820.89 / sqm	**Rs 2326.40**	
13	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 TANK WALL	2*3.14	2.200		2.350		32.468	
	FOR BASE SLAB	3.14/4	1.900	1.900			2.834	
	FOR COVERING SLAB	2*3.14/4	2.200	2.200			7.599	
						Total Quantity	42.901 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	42.901 sqm	
						Say 42.901 sqm @ Rs 403.73 / sqm	**Rs 17320.42**	
14	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 WALL OUTSIDE	3.14	2.500	2.350			18.448	
	FOR COVERING SLAB OUTSIDE	3.14/4	2.500	2.500			4.907	
						Total Quantity	23.355 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	23.355 sqm	
						Say 23.355 sqm @ Rs 224.31 / sqm	**Rs 5238.76**	
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							
	TANK WALL INSIDE	3.14	1.900		2.350		14.021	
	FOR COVERING SLAB BOTTOM	3.14/4	1.900	1.900			2.834	
						Total Quantity	16.855 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	16.855 sqm	
						Say 16.855 sqm @ Rs 573.87 / sqm	**Rs 9672.58**	
16	22.23.2 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 horizontal surface one coat @1.10 kg per sqm.							
	FOR BASE SLAB	3.14/4	1.900	1.900			2.834	

						Total Quantity	2.834 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	2.834 sqm	
						Say 2.834 sqm @ Rs 442.27 / sqm	**Rs 1253.39**	
17	100.36.1 Filling water with 5000 litre tankers fited 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 appliences and cost of water etc. complete. "(Ref. No. 000, Technical Circular)"							
	FOR TANK INSIDE	3.14/4	1.900	1.900	2.350		6.660	
						Total Quantity	6.660 Kilo litre	
						Total Deducted Quantity	0.000 Kilo litre	
						Net Total Quantity	6.660 Kilo litre	
						Say 6.660 Kilo litre @ Rs 185.67 / Kilo litre	**Rs 1236.56**	
Sl No	Description	No	L	B	D	CF	Quantity	Remark
7SLUDGE THICKNER (Cost Index:36.44 %)								
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	5.8*5.8	0.500		13.204	
						Total Quantity	13.204 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	13.204 cum	
						Say 13.204 cum @ Rs 215.37 / cum	**Rs 2843.75**	
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	5.8*5.8	0.100		2.641	
						Total Quantity	2.641 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	2.641 cum	
						Say 2.641 cum @ Rs 7413.74 / cum	**Rs 19579.69**	
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 wiork upto plinth level							
		1	3.14/4	5.8*5.8	0.350	1.15	10.629	
						Total Quantity	10.629 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	10.629 cum	
						Say 10.629 cum @ Rs 9947.98 / cum	**Rs 105737.08**	
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	3.14	5.500	0.300	2.850		14.766	
	chamber	3.14	5.700	0.500	0.100		0.895	
		3.14	5.200	0.300	0.100		0.490	
	Walkway	3.14	6.800	1.000	0.100		2.136	
	Cantilever beam	4	1.000	0.250	0.250		0.250	
	Step	19	0.50*.3*.15	1.000			0.428	
	Step Waist	1	5.600	1.000	0.120		0.672	
						Total Quantity	19.637 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	19.637 cum	
						Say 19.637 cum @ Rs 11610.43 / cum	**Rs 227994.01**	
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).							

	Qty Vide Item No: 3	1	10.629				10.629	
	Qty Vide Item No: 4	1	19.637				19.637	
						Total Quantity	30.266 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	30.266 cum	
						Say 30.266 cum @ Rs 82.61 / cum	**Rs 2500.27**	
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: 3	1	10.629		330.000		3507.570	
	Qty Vide Item No: 4	1	19.637		330.000		6480.210	
						Total Quantity	9987.780 kg	
						Total Deducted Quantity	0.000 kg	
						Net Total Quantity	9987.780 kg	
						Say 9987.780 kg @ Rs 1.36 / kg	**Rs 13583.38**	
7	od328596/2021_2022 Extra for providing sulphate resistant cement for the structures above plinth level.							
	Qty Vide Item No: 3	1	10.629				10.629	
	Qty Vide Item No: 4	1	19.637				19.637	
						Total Quantity	30.266 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	30.266 cum	
						Say 30.266 cum @ Rs 1899.47 / cum	**Rs 57489.36**	
8	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: 3@120km/m3	1	10.629	120.000			1275.480	
	Qty Vide Item No: 4@120km/m3	1	19.637	120.000			2356.440	
						Total Quantity	3631.920 kilogram	
						Total Deducted Quantity	0.000 kilogram	
						Net Total Quantity	3631.920 kilogram	
						Say 3631.920 kilogram @ Rs 98.92 / kilogram	**Rs 359269.53**	
9	od328599/2021_2022							

	Extra for providing epoxy coating for reinforcement bars.							
	Qty Vide Item No: 3@120km/m3	1	10.629	120.000			1275.480	
	Qty Vide Item No: 4@120km/m3	1	19.637	120.000			2356.440	
						Total Quantity	3631.920 kg	
						Total Deducted Quantity	0.000 kg	
						Net Total Quantity	3631.920 kg	
						Say 3631.920 kg @ Rs 2.32 / kg	**Rs 8426.05**	
10	5.9.1 Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete							
		3.14	5.800	0.100			1.822	
						Total Quantity	1.822 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	1.822 sqm	
						Say 1.822 sqm @ Rs 337.42 / sqm	**Rs 614.78**	
11	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.							
	Wall Inside	3.14	5.200		2.850		46.535	
	Wall outside	3.14	5.800		3.150		57.368	
						Total Quantity	103.903 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	103.903 sqm	
						Say 103.903 sqm @ Rs 721.70 / sqm	**Rs 74986.80**	
12	5.9.3 Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform							
	chamber	3.14	5.700	0.500			8.949	
	Walkway	3.14	6.800	1.000			21.352	
	Stair -step	19	0.500	0.300	0.150		0.428	
	Stair Waist	1	5.600	1.000	0.120		0.672	
						Total Quantity	31.401 sqm	
						Total Deducted Quantity	0.000 sqm	

						Net Total Quantity	31.401 sqm	
						Say 31.401 sqm @ Rs 820.89 / sqm	**Rs 25776.77**	
13	5.9.5 Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers							
		4	1.000	0.750			3.000	
						Total Quantity	3.000 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	3.000 sqm	
						Say 3.000 sqm @ Rs 653.89 / sqm	**Rs 1961.67**	
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)							
	Qty Vide Item No:10	1	1.822				1.822	
	Qty Vide Item No:11	1	103.903				103.903	
	Qty Vide Item No:12	1	31.401				31.401	
	Qty Vide Item No:13	1	3.000				3.000	
						Total Quantity	140.126 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	140.126 sqm	
						Say 140.126 sqm @ Rs 403.73 / sqm	**Rs 56573.07**	
15	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							
	Outer wall	1	3.140	5.800	3.150		57.368	
	Walkway	1	3.140	6.800	1.000		21.352	
	Beams	4	1.000	0.750			3.000	
						Total Quantity	81.720 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	81.720 sqm	
						Say 81.720 sqm @ Rs 224.31 / sqm	**Rs 18330.61**	
16	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							
		3.14	6.800	2.850			60.854	
						Total Quantity	60.854 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	60.854 sqm	
						Say 60.854 sqm @ Rs 573.87 / sqm	**Rs 34922.28**	
17	22.23.2 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 horizontal surface one coat @1.10 kg per sqm.							
	FOR FLOOR	3.14/4	5.200	5.200		1.15	24.411	
						Total Quantity	24.411 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	24.411 sqm	
						Say 24.411 sqm @ Rs 442.27 / sqm	**Rs 10796.25**	
18	100.36.1 Filling water with 5000 litre tankers fited 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 appliences and cost of water etc. complete. "(Ref. No. 000, Technical Circular)"							
		3.14/4	5.200	5.200	2.850		60.496	
						Total Quantity	60.496 Kilo litre	
						Total Deducted Quantity	0.000 Kilo litre	
						Net Total Quantity	60.496 Kilo litre	
						Say 60.496 Kilo litre @ Rs 185.67 / Kilo litre	**Rs 11232.29**	

19	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	250.000				250.000	
	Total Quantity						250.000 kg	
	Total Deducted Quantity						0.000 kg	
	Net Total Quantity						250.000 kg	
	Say 250.000 kg @ Rs 191.08 / kg						**Rs 47770.00**	
Sl No	Description	No	L	B	D	CF	Quantity	Remark
8THICKENED SLUDGE SUMP (Cost Index:36.44 %)								
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							
	FOR TRUNCH	3.14	2.300	2.300	0.500		8.306	
	Total Quantity						8.306 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						8.306 cum	
	Say 8.306 cum @ Rs 215.37 / cum						**Rs 1788.86**	
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 PCC	3.14	2.300	2.300	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 7413.74 / cum						**Rs 24635.86**	
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 wiork upto plinth level							
	FOR BASE SLAB	3.14/4	4.400	4.400	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 9947.98 / cum	**Rs 45362.79**	
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 COVERING SLAB	3.14/4	3.800	3.800	0.120		1.361	
	Manhole	1	0.500	0.500	0.120		-0.030	
	FOR TANK WALL	3.14	3.500	0.300	2.500		8.243	
						Total Quantity	9.604 cum	
						Total Deducted Quantity	-0.030 cum	
						Net Total Quantity	9.574 cum	
						Say 9.574 cum @ Rs 11610.43 / cum	**Rs 111158.26**	
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).							
	ITEM 3 & 4	1	14.134				14.134	
						Total Quantity	14.134 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	14.134 cum	
						Say 14.134 cum @ Rs 82.61 / cum	**Rs 1167.61**	
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 .							

		1	12.803	330.000			4224.991	
	Total Quantity						4224.991 kg	
	Total Deducted Quantity						0.000 kg	
	Net Total Quantity						4224.991 kg	
	Say 4224.991 kg @ Rs 1.36 / kg						**Rs 5745.99**	
7	od328596/2021_2022 Extra for providing sulphate resistant cement for the structures above plinth level.							
	ITEM 3&4	1	14.134				14.134	
	Total Quantity						14.134 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						14.134 cum	
	Say 14.134 cum @ Rs 1899.47 / cum						**Rs 26847.11**	
8	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/m3	1	14.184	120.000			1702.080	
	Total Quantity						1702.080 kilogram	
	Total Deducted Quantity						0.000 kilogram	
	Net Total Quantity						1702.080 kilogram	
	Say 1702.080 kilogram @ Rs 98.92 / kilogram						**Rs 168369.75**	
9	od328599/2021_2022 Extra for providing epoxy coating for reinforcement bars.							
	@120kg/m3	1	14.184	120.000			1702.080	
	Total Quantity						1702.080 kg	
	Total Deducted Quantity						0.000 kg	
	Net Total Quantity						1702.080 kg	
	Say 1702.080 kg @ Rs 2.32 / kg						**Rs 3948.83**	
10	5.9.1 Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete							
	FOR PCC	3.14	4.600		0.200		2.889	
	FOR BASE SLAB	3.14	4.400		0.300		4.145	
	Total Quantity						7.034 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						7.034 sqm	

						Say 7.034 sqm @ Rs 337.42 / sqm	**Rs 2373.41**	
11	5.9.2 Centering and shuttering including strutting, etc. and removal of form for:Walls (any thickness) including attached pilasters, butteresses, plinth and string courses etc.							
	FOR SIDE WALLS	2*3.14	3.500		2.620		57.588	
						Total Quantity	57.588 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	57.588 sqm	
						Say 57.588 sqm @ Rs 721.70 / sqm	**Rs 41561.26**	
12	5.9.3 Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform							
	FOR COVERING SLAB	3.14/4	3.800	3.800			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 820.89 / sqm	**Rs 9100.39**	
13	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 FLOOR SLAB	3.14/4	3.200	3.200			8.039	
	TANK WALL	2*3.14	3.500		2.500		54.950	
	COVERING SLAB	2*3.14	1.750	1.750			19.233	
						Total Quantity	82.222 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	82.222 sqm	
						Say 82.222 sqm @ Rs 403.73 / sqm	**Rs 33195.49**	
14	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 WALL OUTSIDE	3.14	3.800		2.620		31.262	
	COVERING SLAB TOP	3.14/4	3.800	3.800			11.336	

						Total Quantity	42.598 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	42.598 sqm	
						Say 42.598 sqm @ Rs 224.31 / sqm	**Rs 9555.16**	
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							
	TANK WALL INSIDE	3.14	3.200		2.500		25.120	
	COVERING SLAB INSIDE	3.14/4	3.200	3.200			8.039	
						Total Quantity	33.159 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	33.159 sqm	
						Say 33.159 sqm @ Rs 573.87 / sqm	**Rs 19028.96**	
16	22.23.2 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 horizontal surface one coat @1.10 kg per sqm.							
	FOR FLOOR SLAB	3.14/4	3.200	3.200			8.039	
						Total Quantity	8.039 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	8.039 sqm	
						Say 8.039 sqm @ Rs 442.27 / sqm	**Rs 3555.41**	

17	100.36.1 Filling water with 5000 litre tankers fited 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 appliences and cost of water etc. complete. "(Ref. No. 000, Technical Circular)"							
	SLUDGE SUMP	3.14/4	3.200	3.200	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 185.67 / Kilo litre	**Rs 3731.41**	
Sl No	Description	No	L	B	D	CF	Quantity	Remark
	9FILTER FEED TANK (Cost Index:36.44 %)							
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	5.500	5.500	0.500		15.125	
						Total Quantity	15.125 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	15.125 cum	
						Say 15.125 cum @ Rs 215.37 / cum	**Rs 3257.47**	
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	5.500	5.500	0.200		6.051	
						Total Quantity	6.051 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	6.051 cum	
						Say 6.051 cum @ Rs 7413.74 / cum	**Rs 44860.54**	
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 wiork upto plinth level							
		1	5.300	5.300	0.300		8.427	
	Total Quantity						8.427 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						8.427 cum	
	Say 8.427 cum @ Rs 9947.98 / cum						**Rs 83831.63**	
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							
	Long Wall	2	4.700	0.250	2.850		6.698	
	Short Wall	2	4.200	0.250	2.850		5.985	
	Total Quantity						12.683 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						12.683 cum	
	Say 12.683 cum @ Rs 11610.43 / cum						**Rs 147255.08**	
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	21.110				21.110	
	Total Quantity						21.110 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						21.110 cum	
	Say 21.110 cum @ Rs 82.61 / cum						**Rs 1743.90**	
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 .							
		1	21.110		330.000		6966.300	
	Total Quantity						6966.300 kg	

						Total Deducted Quantity	0.000 kg	
						Net Total Quantity	6966.300 kg	
						Say 6966.300 kg @ Rs 1.36 / kg	**Rs 9474.17**	
7	od328596/2021_2022 Extra for providing sulphate resistant cement for the structures above plinth level.							
		1	21.110				21.110	
						Total Quantity	21.110 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	21.110 cum	
						Say 21.110 cum @ Rs 1899.47 / cum	**Rs 40097.81**	
8	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/m3	1	21.110	120.000			2533.200	
						Total Quantity	2533.200 kilogram	
						Total Deducted Quantity	0.000 kilogram	
						Net Total Quantity	2533.200 kilogram	
						Say 2533.200 kilogram @ Rs 98.92 / kilogram	**Rs 250584.14**	
9	od328599/2021_2022 Extra for providing epoxy coating for reinforcement bars.							
	@120kg/m3	1	21.110	120.000			2533.200	
						Total Quantity	2533.200 kg	
						Total Deducted Quantity	0.000 kg	
						Net Total Quantity	2533.200 kg	
						Say 2533.200 kg @ Rs 2.32 / kg	**Rs 5877.02**	
10	5.9.1 Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete							
	PCC	4	5.500	0.200			4.400	
	Base	4	5.300	0.300			6.360	
						Total Quantity	10.760 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	10.760 sqm	
						Say 10.760 sqm @ Rs 337.42 / sqm	**Rs 3630.64**	

11	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.							
	Outside wall	4	4.700	2.850			53.581	
	Inside wall	4	4.200	2.850			47.880	
						Total Quantity	101.461 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	101.461 sqm	
						Say 101.461 sqm @ Rs 721.70 / sqm	**Rs 73224.40**	
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)							
	Outside wall	4	4.700	2.850			53.581	
	Inside wall	4	4.200	2.850			47.880	
	Base	4	5.300	0.300			6.360	
						Total Quantity	107.821 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	107.821 sqm	
						Say 107.821 sqm @ Rs 403.73 / sqm	**Rs 43530.57**	
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							
		4	4.700	2.850			53.581	
						Total Quantity	53.581 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	53.581 sqm	
						Say 53.581 sqm @ Rs 224.31 / sqm	**Rs 12018.75**	
14	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							
	Inside wall	4	4.200	2.850			47.880	
	Outside wall	4	4.700	2.850			53.581	
						Total Quantity	101.461 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	101.461 sqm	
						Say 101.461 sqm @ Rs 573.87 / sqm	**Rs 58225.42**	
15	22.23.2 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 horizontal surface one coat @1.10 kg per sqm.							
	Floor	1	4.200	4.200			17.640	
						Total Quantity	17.640 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	17.640 sqm	
						Say 17.640 sqm @ Rs 442.27 / sqm	**Rs 7801.64**	
16	100.36.1 Filling water with 5000 litre tankers fited 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 appliences and cost of water etc. complete. "(Ref. No. 000, Technical Circular)"							
		1	4.200	4.200	2.850		50.274	
						Total Quantity	50.274 Kilo litre	
						Total Deducted Quantity	0.000 Kilo litre	
						Net Total Quantity	50.274 Kilo litre	
						Say 50.274 Kilo litre @ Rs 185.67 / Kilo litre	**Rs 9334.37**	
Sl No	Description	No	L	B	D	CF	Quantity	Remark
10TREATED WATER TANK (Cost Index:36.44 %)								

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	8.100	8.100	0.500		32.805	
	Total Quantity						32.805 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						32.805 cum	
	Say 32.805 cum @ Rs 215.37 / cum						**Rs 7065.21**	
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	8.100	8.100	0.200		13.122	
	Total Quantity						13.122 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						13.122 cum	
	Say 13.122 cum @ Rs 7413.74 / cum						**Rs 97283.10**	
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 wiork upto plinth level							
		1	8.100	8.100	0.300		19.683	
	Total Quantity						19.683 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						19.683 cum	
	Say 19.683 cum @ Rs 9947.98 / cum						**Rs 195806.09**	
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							
	Long Wall	2	7.200	0.300	3.350		14.473	
	Short Wall	2	6.000	0.300	3.350		12.060	
						Total Quantity	26.533 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	26.533 cum	
						Say 26.533 cum @ Rs 11610.43 / cum	**Rs 308059.54**	
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).							
	ITEM 3&4	1	46.216				46.216	
						Total Quantity	46.216 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	46.216 cum	
						Say 46.216 cum @ Rs 82.61 / cum	**Rs 3817.90**	
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 .							
		1	46.216		330.000		15251.280	
						Total Quantity	15251.280 kg	
						Total Deducted Quantity	0.000 kg	
						Net Total Quantity	15251.280 kg	
						Say 15251.280 kg @ Rs 1.36 / kg	**Rs 20741.74**	
7	od328596/2021_2022 Extra for providing sulphate resistant cement for the structures above plinth level.							
		1	46.216				46.216	
						Total Quantity	46.216 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	46.216 cum	
						Say 46.216 cum @ Rs 1899.47 / cum	**Rs 87785.91**	
8	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/m3	1	46.216	120.000			5545.920	
						Total Quantity	5545.920 kilogram	
						Total Deducted Quantity	0.000 kilogram	
						Net Total Quantity	5545.920 kilogram	
						Say 5545.920 kilogram @ Rs 98.92 / kilogram	**Rs 548602.41**	
9	od328599/2021_2022 Extra for providing epoxy coating for reinforcement bars.							
	@120kg/m3	1	46.216	120.000			5545.920	
						Total Quantity	5545.920 kg	
						Total Deducted Quantity	0.000 kg	
						Net Total Quantity	5545.920 kg	
						Say 5545.920 kg @ Rs 2.32 / kg	**Rs 12866.53**	
10	5.9.1 Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete							
	FOR PCC	1	2*8.1+2*8.1	0.200			6.480	
	FOR BASE SLAB	1	2*7.3+2*7.3	0.300			8.760	
						Total Quantity	15.240 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	15.240 sqm	
						Say 15.240 sqm @ Rs 337.42 / sqm	**Rs 5142.28**	
11	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.							
	Inside Wall	1	2*6.6+2*6.6		3.350		88.440	
	Outside Wall	1	2*7.2+2*7.2		3.350		96.480	
						Total Quantity	184.920 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	184.920 sqm	
						Say 184.920 sqm @ Rs 721.70 / sqm	**Rs 133456.76**	

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)							
	Inside Wall	1	2*6.6+2*6.6		3.350		88.440	
	Outside Wall	1	2*7.2+2*7.2		3.650		105.120	
	Inside floor	1	6.600	6.600			43.560	
						Total Quantity	237.120 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	237.120 sqm	
						Say 237.120 sqm @ Rs 403.73 / sqm	**Rs 95732.46**	
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	2*7.2+2*7.2		3.650		105.120	
						Total Quantity	105.120 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	105.120 sqm	
						Say 105.120 sqm @ Rs 224.31 / sqm	**Rs 23579.47**	
14	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							
	FOR WALLS	1	2*6.6+2*6.6		3.350		88.440	
						Total Quantity	88.440 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	88.440 sqm	

						Say 88.440 sqm @ Rs 573.87 / sqm	**Rs 50753.06**	
15	22.23.2 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 horizontal surface one coat @1.10 kg per sqm.							
		1	9.800	6.000			58.801	
						Total Quantity	58.801 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	58.801 sqm	
						Say 58.801 sqm @ Rs 442.27 / sqm	**Rs 26005.92**	
16	100.36.1 Filling water with 5000 litre tankers fited 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 appliences and cost of water etc. complete. "(Ref. No. 000, Technical Circular)"							
		1	6.600	6.600	3.350		145.926	
						Total Quantity	145.926 Kilo litre	
						Total Deducted Quantity	0.000 Kilo litre	
						Net Total Quantity	145.926 Kilo litre	
						Say 145.926 Kilo litre @ Rs 185.67 / Kilo litre	**Rs 27094.08**	
Sl No	Description	No	L	B	D	CF	Quantity	Remark
11Centrate Sump (Cost Index:36.44 %)								
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							
	FOR TRENCH	3.14/4	3.600	3.600	0.500		5.087	
						Total Quantity	5.087 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	5.087 cum	

						Say 5.087 cum @ Rs 215.37 / cum	**Rs 1095.59**	
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)							
	FOR PCC	3.14/4	3.600	3.600	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 7413.74 / cum	**Rs 15086.96**	
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 wiork upto plinth level							
	FOR BASE SLAB	3.14/4	3.600	3.600	0.300		3.053	
						Total Quantity	3.053 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	3.053 cum	
						Say 3.053 cum @ Rs 9947.98 / cum	**Rs 30371.18**	
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 COVERING SLAB	3.14/4	2.800	2.800	0.120		0.739	
	FOR TANK WALLS	3.14	2.500	0.300	2.500		5.888	
	FOR MANHOLE	1	0.500	0.500	0.120		-0.030	

						Total Quantity	6.627 cum	
						Total Deducted Quantity	-0.030 cum	
						Net Total Quantity	6.597 cum	
						Say 6.597 cum @ Rs 11610.43 / cum	**Rs 76594.01**	
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).							
	ITEM 3&4	1	9.650				9.650	
						Total Quantity	9.650 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	9.650 cum	
						Say 9.650 cum @ Rs 82.61 / cum	**Rs 797.19**	
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 .							
	F O R B A S E SLAB&SIDE WALLS	1	8.933		330.000		2947.890	
						Total Quantity	2947.890 kg	
						Total Deducted Quantity	0.000 kg	
						Net Total Quantity	2947.890 kg	
						Say 2947.890 kg @ Rs 1.36 / kg	**Rs 4009.13**	
7	od328596/2021_2022 Extra for providing sulphate resistant cement for the structures above plinth level.							
	ITEM 3&4	1	9.650				9.650	
						Total Quantity	9.650 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	9.650 cum	
						Say 9.650 cum @ Rs 1899.47 / cum	**Rs 18329.89**	
8	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/m3	1	9.650			120.0	1158.000	
						Total Quantity	1158.000 kilogram	
						Total Deducted Quantity	0.000 kilogram	
						Net Total Quantity	1158.000 kilogram	

	Say 1158.000 kilogram @ Rs 98.92 / kilogram						**Rs 114549.36**	
9	od328599/2021_2022 Extra for providing epoxy coating for reinforcement bars.							
	@120kg/m3	1	9.650			120.0	1158.000	
	Total Quantity						1158.000 kg	
	Total Deducted Quantity						0.000 kg	
	Net Total Quantity						1158.000 kg	
	Say 1158.000 kg @ Rs 2.32 / kg						**Rs 2686.56**	
10	5.9.1 Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete							
	FOR PCC	3.14	3.600		0.200		2.261	
	FOR FLOOR SLAB	3.14	3.400		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 337.42 / sqm						**Rs 1843.66**	
11	5.9.2 Centering and shuttering including strutting, etc. and removal of form for:Walls (any thickness) including attached pilasters, butteresses, plinth and string courses etc.							
	FOR TANK WALL	2*3.14	2.500		2.600		40.820	
	Total Quantity						40.820 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						40.820 sqm	
	Say 40.820 sqm @ Rs 721.70 / sqm						**Rs 29459.79**	
12	5.9.3 Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform							
	FOR COVERING SLAB	3.14/4	2.200	2.200			3.800	
	Manhole	1	0.500	0.500			-0.250	
	Total Quantity						3.800 sqm	
	Total Deducted Quantity						-0.250 sqm	
	Net Total Quantity						3.550 sqm	
	Say 3.550 sqm @ Rs 820.89 / sqm						**Rs 2914.16**	

13	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 FLOOR SLAB	3.14/4	2.200	2.200			3.800	
	TANK WALL INSIDE AND OUTSIDE	2*3.14	2.500	2.500			39.250	
	COVERING SLAB	2*3.14/4	2.500	2.500			9.813	
						Total Quantity	52.863 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	52.863 sqm	
						Say 52.863 sqm @ Rs 403.73 / sqm	**Rs 21342.38**	
14	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 WALL OUTSIDE	3.14	2.800	2.620			23.036	
	COVERING SLAB OUTSIDE	3.14/4	2.800	2.800			6.155	
						Total Quantity	29.191 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	29.191 sqm	
						Say 29.191 sqm @ Rs 224.31 / sqm	**Rs 6547.83**	
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							
	TANK WALL INSIDE	3.14	2.200		2.500		17.270	
	SUSPENDED FLOOR INSIDE	3.14/4	2.200	2.200			3.800	
						Total Quantity	21.070 sqm	

						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	21.070 sqm	
						Say 21.070 sqm @ Rs 573.87 / sqm	**Rs 12091.44**	
16	22.23.2 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 horizontal surface one coat @1.10 kg per sqm.							
	FOR FLOOR SLAB	3.14/4	2.200	2.200			3.800	
						Total Quantity	3.800 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	3.800 sqm	
						Say 3.800 sqm @ Rs 442.27 / sqm	**Rs 1680.63**	
17	100.36.1 Filling water with 5000 litre tankers fited 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 appliences and cost of water etc. complete. "(Ref. No. 000, Technical Circular)"							
	FOR TANK INSIDE	3.14/4	2.200	2.200	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 185.67 / Kilo litre	**Rs 1763.68**	
						Total	**33093324.83**	
						Centage @	**0.0%**	
						Centage Amount	**0.00**	
						Provision for GST payments (in %) @	**18.0%**	
						Amount reserved for GST payments	**5956798.47**	
						Total & Centage	**39050123.30**	
						Lumpsum for round off	**0.00**	

GRAND TOTAL Rs	**39050123.30**
Rounded Grand Total Rs 3,90,50,123	
Rupees Three Crore Ninety Lakh Fifty Thousand One Hundred and Twenty Three Only	

Detailed Estimate

SEWERAGE SYSTEM TO KOYILANDY MUNICIPALITY PHASE 2 - CONSTRUCTION OF 3MLD CAPACITY SEWAGE TREATMENT PLANT AND LAYING SEWERAGE NETWORK TO ZONE 2 OF KOYILANDY MUNICIPALITY - PART B- STP2

(Dsor year: **2018**)

Sl No	Description	No	L	B	D	CF	Quantity	Remark
	1Site Preperation (Cost Index:36.44 %)							
1	2.32 Clearing grass and removal of the rubbish up to a distance of 50 m outside the periphery of the area cleared.							
		1	90.000	70.000			6300.000	
						Total Quantity	6300.000 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	6300.000 sqm	
						Say 6300.000 sqm @ Rs 7.57 / sqm	**Rs 47691.00**	
2	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							
		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 9310.60 / No	**Rs 55863.60**	
3	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.							
		1	90.000	70.000	2.000		12600.000	
						Total Quantity	12600.000 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	12600.000 cum	
						Say 12600.000 cum @ Rs 297.37 / cum	**Rs 3746862.00**	

Sl No	Description	No	L	B	D	CF	Quantity	Remark
2Administrative/Laboratory/Chemical House / Control Room Building (Cost Index:36.44 %)								
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	0.5	3.000	0.150	1.500		0.338	
						Total Quantity	55.138 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	55.138 cum	
						Say 55.138 cum @ Rs 298.80 / cum	**Rs 16475.23**	
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)							
	FOR FOOTING BASE	16	1.500	1.500	0.100		3.600	
	FOR STEP BOTTOM	1	2.000	2.000	0.100		0.400	
	FOR RAMP BOTTOM	0.5	3.000	0.150	1.500		0.338	
						Total Quantity	4.338 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	4.338 cum	
						Say 4.338 cum @ Rs 6857.61 / cum	**Rs 29748.31**	
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)							
	FOR RAMP	0.5	3.000	0.450	1.500		1.013	
						Total Quantity	1.013 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	1.013 cum	
						Say 1.013 cum @ Rs 8040.95 / cum	**Rs 8145.48**	
4	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							
	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*0.5	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 297.37 / cum	**Rs 14541.39**	
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 wiork upto plinth level							
	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	
	PLINTH BEAMS	4	10.400	0.200	0.450		3.744	
	PLINTH BEAMS	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 9947.98 / cum	**Rs 313769.24**	
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							
	GROUND FLOOR							
	COLUMN ABOVE PLINTH UP TO ROOF SLAB	16	3.250	0.200	0.400		4.160	
	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	
	LINTELS	3	10.400	0.200	0.150		0.936	
	LINTELS	1	3.200	0.200	0.150		0.097	
	BEAMS	6	3.100	0.200	0.450		1.675	
	BEAMS	2	4.000	0.200	0.450		0.721	
	BEAMS	2	3.200	0.200	0.450		0.577	
	BEAMS	2	4.200	0.200	0.450		0.757	
	BEAMS	4	5.500	0.200	0.450		1.981	
	BEAMS	4	1.700	0.200	0.450		0.613	
	BEAMS	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*0.5	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	3.250	0.200	0.400		4.160	
	LINTELS	2	11.100	0.200	0.150		0.666	
	LINTELS	4	10.400	0.200	0.150		1.248	

	LINTELS	1	1.700	0.200	0.150		0.052	
	SUN SHADE	8	2.000	0.600	0.080		0.768	
	SUN SHADE	1	1.000	0.600	0.080		0.048	
	BEAMS	6	3.100	0.200	0.450		1.675	
	BEAMS	2	4.000	0.200	0.450		0.721	
	BEAMS	2	3.200	0.200	0.450		0.577	
	BEAMS	2	4.200	0.200	0.450		0.757	
	BEAMS	4	5.500	0.200	0.450		1.981	
	BEAMS	4	1.700	0.200	0.450		0.613	
	BEAMS	4	4.200	0.200	0.450		1.513	
	ROOF SLAB	1	11.900	11.200	0.125		16.660	
	GROUND&FIRST FLOOR							
	COLUMN	16	0.600	0.200	0.400		-0.768	
	OPENING	1	1.500	0.200	0.150		-0.045	
						Total Quantity	64.534 cum	
						Total Deducted Quantity	-0.813 cum	
						Net Total Quantity	63.721 cum	
						Say 63.721 cum @ Rs 11610.43 / cum	**Rs 739828.21**	
7	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.							
	GROUND FLOOR							
	Long Wall	3	11.100	0.200	3.200		21.313	
	Short Wall	3	10.400	0.200	3.200		19.969	
	Short Wall	1	3.200	0.200	3.200		2.049	
	Door							
	D	1	1.200	2.100	0.200		-0.504	
	D1	2	1.000	2.100	0.200		-0.840	
	D2	1	0.800	2.100	0.200		-0.336	
	W3	7	1.500	1.500	0.200		-3.150	
	V	1	0.600	0.500	0.200		-0.060	
	RS	1	2.000	2.000	2.100		-8.400	
	Column	16	0.400	0.200	3.200		-4.096	

	Opening	1	1.500	0.200	3.200		-0.960	
	FIRST FLOOR							
	Long Wall	2	11.100	0.200	3.200		14.209	
	Short Wall	4	10.400	0.200	3.200		26.625	
	Short Wall	1	7.000	0.200	3.200		4.480	
	Parappet	1	45.400	0.200	0.600		5.448	
	Door							
	D1	2	1.000	2.100	0.200		-0.840	
	D2	1	0.800	2.100	0.200		-0.336	
	W3	8	1.500	1.500	0.200		-3.600	
	V	1	0.600	0.500	0.200		-0.060	
	Column	16	0.400	0.200	3.200		-4.096	
	Opening	1	1.500	0.200	3.200		-0.960	
						Total Quantity	94.093 cum	
						Total Deducted Quantity	-28.238 cum	
						Net Total Quantity	65.855 cum	
						Say 65.855 cum @ Rs 7968.75 / cum	**Rs 524782.03**	
8	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							
	FOR FIRST FOOTING	16	1.400	1.400	0.250	90.0	705.600	
	FOR SECOND FOOTING	16	0.167	3.920	0.350	90.0	329.939	
	COLUMN UP TO PLINTH BEAM	16	0.400	0.200	0.800	90.0	92.161	
	PLINTH BEAMS	3	11.100	0.200	0.450	90.0	269.730	
	PLINTH BEAMS	4	10.400	0.200	0.450	90.0	336.961	
	PLINTH BEAMS	1	3.200	0.200	0.450	90.0	25.921	
	FLOOR SLAB	1	11.300	10.600	0.100	90.0	1078.021	
	GROUND FLOOR							
	COLUMN ABOVE PLINTH UP TO ROOF SLAB	16	3.250	0.200	0.400	95.0	395.200	
	SUN SHADE DOOR	2	2.000	1.200	0.080	85.0	32.640	

	SUN SHADE W3	7	1.900	0.600	0.080	85.0	54.264	
	SUN SHADE RS	1	3.400	1.200	0.080	85.0	27.745	
	SUN SHADE V	1	1.000	0.600	0.080	85.0	4.080	
	LINTELS	3	11.100	0.200	0.150	85.0	84.915	
	LINTELS	3	10.400	0.200	0.150	85.0	79.560	
	LINTELS	1	3.200	0.200	0.150	85.0	8.161	
	BEAMS	6	3.100	0.200	0.450	90.0	150.661	
	BEAMS	2	4.000	0.200	0.450	90.0	64.801	
	BEAMS	2	3.200	0.200	0.450	90.0	51.841	
	BEAMS	2	4.200	0.200	0.450	90.0	68.040	
	BEAMS	4	5.500	0.200	0.450	90.0	178.201	
	BEAMS	4	1.700	0.200	0.450	90.0	55.081	
	BEAMS	4	4.200	0.200	0.450	90.0	136.080	
	STAIR CASE WAIST SLAB	2	3.700	1.500	0.125	90.0	124.876	
	LANDING	1	3.000	1.500	0.125	90.0	50.625	
	STEPS	22*0.5	1.500	0.300	0.150	90.0	66.825	
	ROOF SLAB	1	11.300	10.600	0.125	90.0	1347.525	
	FIRST FLOOR							
	COLUMN UP TO ROOF SLAB	16	3.250	0.200	0.400	95.0	395.200	
	LINTELS	2	11.100	0.200	0.150	85.0	56.611	
	LINTELS	4	10.400	0.200	0.150	85.0	106.080	
	LINTELS	1	1.700	0.200	0.150	85.0	4.335	
	SUN SHADE	8	2.000	0.600	0.080	85.0	65.280	
	SUN SHADE	1	1.000	0.600	0.080	85.0	4.080	
	BEAMS	6	3.100	0.200	0.450	90.0	150.661	
	BEAMS	2	4.000	0.200	0.450	90.0	64.801	
	BEAMS	2	3.200	0.200	0.450	90.0	51.841	
	BEAMS	2	4.200	0.200	0.450	90.0	68.040	
	BEAMS	4	5.500	0.200	0.450	90.0	178.201	
	BEAMS	4	1.700	0.200	0.450	90.0	55.081	
	BEAMS	4	4.200	0.200	0.450	90.0	136.080	

	ROOF SLAB	1	11.900	11.200	0.125	90.0	1499.400	
	GROUND&FIRST FLOOR							
	COLUMN	16	0.600	0.200	0.400	95.0	-72.960	
	OPENING	1	1.500	0.200	0.150	85.0	-3.825	
						Total Quantity	8655.145 kilogram	
						Total Deducted Quantity	-76.785 kilogram	
						Net Total Quantity	8578.360 kilogram	
						Say 8578.360 kilogram @ Rs 98.92 / kilogram	**Rs 848571.37**	
9	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.							
		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 503.53 / No	**Rs 1007.06**	
10	5.9.5 Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers							
	FOR FIRST FOOTING	16*4	1.400		0.250		22.400	
	FOR SECOND FOOTING	16*4	1.600		0.175		17.920	
	COLUMN UP TO PLINTH BEAM	16	0.800		1.200		15.360	
	PLINTH BEAMS	3	11.100		1.100		36.630	
	PLINTH BEAMS	4	10.400		1.100		45.761	
	PLINTH BEAMS	1	3.200		1.100		3.521	
	GROUND FLOOR							
	COLUMN ABOVE PLINTH UP TO ROOF SLAB	16	3.250		0.400		20.800	
	SUN SHADE DOOR	2	2.200		1.300		5.721	
	SUN SHADE W3	7	2.100		0.700		10.290	
	SUN SHADE RS	1	3.600		1.300		4.681	

	SUN SHADE V	1	1.200		0.700		0.840	
	LINTELS	3	11.100		0.500		16.650	
	LINTELS	3	10.400		0.500		15.601	
	LINTELS	1	3.200		0.500		1.600	
	BEAMS	6	3.100		1.100		20.461	
	BEAMS	2	4.000		1.100		8.800	
	BEAMS	2	3.200		1.100		7.041	
	BEAMS	2	4.200		1.100		9.241	
	BEAMS	4	5.500		1.100		24.201	
	BEAMS	4	1.700		1.100		7.480	
	BEAMS	4	4.200		1.100		18.481	
	FIRST FLOOR							
	COLUMN UP TO ROOF SLAB	16	3.250		1.200		62.400	
	LINTELS	2	11.100		0.500		11.100	
	LINTELS	4	10.400		0.500		20.800	
	LINTELS	1	1.700		0.500		0.850	
	SUN SHADE	8	2.200		1.300		22.881	
	SUN SHADE	1	1.200		1.300		1.560	
	BEAMS	6	3.100		1.100		20.461	
	BEAMS	2	4.000		1.100		8.800	
	BEAMS	2	3.200		1.100		7.041	
	BEAMS	2	4.200		1.100		9.241	
	BEAMS	4	5.500		1.100		24.201	
	BEAMS	4	1.700		1.100		7.480	
	BEAMS	4	4.200		1.100		18.481	
	GROUND&FIRST FLOOR							
	COLUMN	16	0.600	0.200	0.400		-0.768	
	OPENING	1	1.500	0.200	0.150		-0.045	
						Total Quantity	528.776 sqm	
						Total Deducted Quantity	-0.813 sqm	
						Net Total Quantity	527.963 sqm	
						Say 527.963 sqm @ Rs 653.89 / sqm	**Rs 345229.73**	

11	5.9.3 Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform							
	GROUND FLOOR							
	STAIR CASE WAIST SLAB	2	3.700		1.500		11.101	
	LANDING	1	3.000		1.500		4.500	
	STEPS	22	1.600		0.150		5.280	
	ROOF SLAB	1	11.300		10.600		119.780	
	FIRST FLOOR							
	ROOF SLAB	1	11.900		11.200		133.280	
						Total Quantity	273.941 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	273.941 sqm	
						Say 273.941 sqm @ Rs 820.89 / sqm	**Rs 224875.43**	
12	13.1.1 12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)							
	GROUND FLOOR							
	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 inside	2	1.500		3.300		9.900	
	Sun shade	7	2.100		0.700		10.290	
	Sun shade	2	2.200		1.300		5.721	
	Sun shade	1	1.200		0.700		0.840	
	Step top	1	1.500		1.500		2.250	
	Step side	2	0.900		0.300		0.540	
	Ramp	2*0.5	0.300		1.500		0.450	
	Rolling shutter	1	2.000		2.100		-4.200	
	Door D2	3	1.000		2.100		-6.300	
	Window W1	7	1.500		1.500		-15.750	

	Ventilators V1	1	0.450		0.600		-0.270	
	Opening	2	1.500		3.300		-9.899	
	First Floor							
	Building Outside-Long Wall	2	11.300		3.300		74.580	
	Short Wall	2	10.600		3.300		69.960	
	Building Inside long wall	2	10.700		3.300		70.620	
	Short wall	4	10.000		3.300		132.000	
	Short wall	1	5.700		3.300		18.810	
	Short Wall	1	7.000		3.300		23.100	
	Toilet inside	2	1.500		3.300		9.900	
	Parappet	1	45.400		1.400		63.560	
		1					0.000	
	Door D2	2	1.000		2.100		-4.200	
	Door D2	1	0.800		2.100		-1.680	
	Window W1	8	1.500		1.500		-18.000	
	Ventilators V1	1	0.450		0.600		-0.270	
						Total Quantity	949.781 sqm	
						Total Deducted Quantity	-60.569 sqm	
						Net Total Quantity	889.212 sqm	
						Say 889.212 sqm @ Rs 316.06 / sqm	**Rs 281044.34**	
13	13.16.1 6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)							
	Ground Floor							
	Roof slab-Bottom	1	10.700		10.000		107.000	
	Beam Bottom	1	82.800		0.850		70.380	
	Sunshead Door	2	2.000		1.200		4.800	
	Sunshead W3	7	1.900		0.600		7.980	
	Sunshead V	1	0.900		0.600		0.540	
	Sunshead edge	1	30.200		0.100		3.020	
	Stair Waist Slab bottom	2	3.700		1.700		12.580	
	Landing	1	3.000		1.500		4.500	

	First Floor							
	Roof slab-Bottom	1	10.700		10.000		107.000	
	Beam Bottom	1	82.800		0.850		70.380	
	Sunshead W3	8	1.900		0.600		9.120	
	Sunshead V	1	0.900		0.600		0.540	
	Sunshead edge	1	30.200		0.100		3.020	
	Roof Slab Out Side	1	33.700		0.300		10.111	
						Total Quantity	410.971 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	410.971 sqm	
						Say 410.971 sqm @ Rs 269.26 / sqm	**Rs 110658.05**	
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	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 403.73 / sqm	**Rs 53809.13**	
15	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.							
	Ground Floor							
	Office room	1	7.000	7.000			49.000	
	Vistors room	1	4.000	4.000			16.000	
	Skirting-office room	1	26.500		0.100		2.651	
	Skirting-Vistors room	1	14.200		0.100		1.420	
	Chemical Room	1	6.000	4.000			24.000	
	Skirting-Chemical room	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	
	First Floor							

	Controll Room	1	7.000	5.000			35.000	
	Laboratary 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 1777.34 / sqm	**Rs 394075.38**	
16	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.							
	For floor-Toilet	1	1.500	1.500			2.250	
	For Floor Toilet	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 1097.86 / sqm	**Rs 7410.55**	
17	11.38 Providing and laying Ceramic glazed floor tiles of size 300x300 mm (thickness to be specified by the manufacturer), of Ist quality conforming to IS : 15622, of approved make, in all colours, shades, except White, Ivory, Grey, Fume Red Brown, laid on 20 mm thick 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	
	Wall Tile	1	9.000		2.100		18.901	
	Door D2	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 1180.55 / sqm	**Rs 33223.04**	
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							
	RS	1	2.000		2.100		4.200	
						Total Quantity	4.200 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	4.200 sqm	
						Say 4.200 sqm @ Rs 3487.20 / sqm	**Rs 14646.24**	
19	10.7 Providing and fixing ball bearing for rolling shutters.							
	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 497.32 / Nos	**Rs 497.32**	
20	13.43.1 Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer							
	GROUND FLOOR							
	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 inside	2	1.500		1.200		3.600	
	Sun shade	7	2.100		0.700		10.290	
	Sun shade	2	2.200		1.300		5.721	
	Sun shade	1	1.200		0.700		0.840	
	Step top	1	1.500		1.500		2.250	
	Step side	2	0.900		0.300		0.540	
	Ramp	2*0.5	0.300		1.500		0.450	
	Rolling shutter	1	2.000		2.100		-4.200	
	Door D2	3	1.000		2.100		-6.300	
	Window W1	7	1.500		1.500		-15.750	

	Ventilators V1	1	0.450		0.600		-0.270	
	Opening	2	1.500		3.300		-9.899	
	First Floor							
	Building Outside-Long Wall	2	11.300		3.300		74.580	
	Short Wall	2	10.600		3.300		69.960	
	Building Inside long wall	2	10.700		3.300		70.620	
	Short wall	4	10.000		3.300		132.000	
	Short wall	1	5.700		3.300		18.810	
	Short Wall	1	7.000		3.300		23.100	
	Toilet inside	2	1.500		1.200		3.600	
	Door D2	2	1.000		2.100		-4.200	
	Door D2	1	0.800		2.100		-1.680	
	Window W1	8	1.500		1.500		-18.000	
	Ventilators V1	1	0.450		0.600		-0.270	
						Total Quantity	873.621 sqm	
						Total Deducted Quantity	-60.569 sqm	
						Net Total Quantity	813.052 sqm	
						Say 813.052 sqm @ Rs 71.09 / sqm	**Rs 57799.87**	
21	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							
	GROUND FLOOR							
	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 inside	2	1.500		1.200		3.600	
	Sun shade	7	2.100		0.700		10.290	
	Sun shade	2	2.200		1.300		5.721	
	Sun shade	1	1.200		0.700		0.840	

	Step top	1	1.500		1.500		2.250	
	Step side	2	0.900		0.300		0.540	
	Ramp	2*0.5	0.300		1.500		0.450	
	Rolling shutter	1	2.000		2.100		-4.200	
	Door D2	3	1.000		2.100		-6.300	
	Window W1	7	1.500		1.500		-15.750	
	Ventilators V1	1	0.450		0.600		-0.270	
	Opening	2	1.500		3.300		-9.899	
	Toilet Inside	1	6.000		2.100		-12.600	
	First Floor							
	Building Outside-Long Wall	2	11.300		3.300		74.580	
	Short Wall	2	10.600		3.300		69.960	
	Building Inside long wall	2	10.700		3.300		70.620	
	Short wall	4	10.000		3.300		132.000	
	Short wall	1	5.700		3.300		18.810	
	Short Wall	1	7.000		3.300		23.100	
	Toilet inside	2	1.500		1.200		3.600	
	Door D2	2	1.000		2.100		-4.200	
	Door D2	1	0.800		2.100		-1.680	
	Window W1	8	1.500		1.500		-18.000	
	Ventilators V1	1	0.450		0.600		-0.270	
	Toilet	1	9.000		2.100		-18.900	
						Total Quantity	873.621 sqm	
						Total Deducted Quantity	-92.069 sqm	
						Net Total Quantity	781.552 sqm	
						Say 781.552 sqm @ Rs 152.34 / sqm	**Rs 119061.63**	
22	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	6	1.000	2.100			12.601	
	Window	15	1.500	1.500			33.750	
	Window Grill	15	1.500	1.500			33.750	

	Rolling Shutter	2	2.000	2.100			8.400	
	CG	2	1.500	2.100			6.301	
						Total Quantity	94.802 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	94.802 sqm	
						Say 94.802 sqm @ Rs 143.94 / sqm	**Rs 13645.80**	
23	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 .							
	CG	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 10269.91 / sqm	**Rs 32360.49**	
24	21.1.1.1 Providing and fixing aluminium work for doors, windows, ventilators and partitions with extruded built up standard tubular sections/ appropriate Z sections and other sections of approved make conforming to IS : 733 and IS: 1285, fixing with dash fasteners of required dia and size, including necessary filling up the gaps at junctions, i.e. at top, bottom and sides with required EPDM rubber/ neoprene gasket etc. Aluminium sections shall be smooth, rust free, straight, mitred and jointed mechanically wherever required including cleat angle, Aluminnium snap beading for glazing /paneling, C.P. brass/ stainless steel screws, all complete as per architectural drawings and the directions of Engineer-in-charge.(Glazing, paneling and dash fasteners to be paid for separately):For fixed portionAnodised aluminium (anodised transparent or dyed to required shade according to IS : 1868, Minimum anodic coating of grade AC 15)							
	For window frames	15	1.500	1.500	4.500		151.875	
	For ventilator frames	2	0.600	0.450	4.500		2.430	
						Total Quantity	154.305 kg	
						Total Deducted Quantity	0.000 kg	
						Net Total Quantity	154.305 kg	
						Say 154.305 kg @ Rs 502.17 / kg	**Rs 77487.34**	
25	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)							
	Ground Floor							

	For window shutter frames	7	0.500	1.440	6.500		32.760	
	For ventilator shutter frames	1	0.520	0.450	6.500		1.522	
	Door	3	0.860	1.960	6.500		32.870	
	First Floor							
	For window shutter frames	8	0.500	1.440	6.500		37.440	
	For ventilator shutter frames	1	0.520	0.450	6.500		1.522	
	For Door Shutter	2	0.860	1.960	6.500		21.913	
						Total Quantity	128.027 kg	
						Total Deducted Quantity	0.000 kg	
						Net Total Quantity	128.027 kg	
						Say 128.027 kg @ Rs 608.11 / kg	**Rs 77854.50**	
26	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							
	Ground Floor							
	For window shutter	7	0.500		1.500		5.250	
	For ventilator shutter	1	0.600		0.450		0.270	
	First Floor							
	For window shutter	8	0.500		1.500		6.000	
	For ventilator shutter	1	0.600		0.450		0.270	
						Total Quantity	11.790 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	11.790 sqm	
						Say 11.790 sqm @ Rs 1184.03 / sqm	**Rs 13959.71**	
27	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							
	Ground Floor							
	For window	7	1.500	1.500	17.000		267.750	

	For ventilator	1	0.600	0.450	17.000		4.590	
	First Floor							
	For window	8	1.500	1.500	17.000		306.000	
	For ventilator	1	0.600	0.450	17.000		4.590	
						Total Quantity	582.930 kg	
						Total Deducted Quantity	0.000 kg	
						Net Total Quantity	582.930 kg	
						Say 582.930 kg @ Rs 217.35 / kg	**Rs 126699.84**	
28	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				223.0	223.000	
	Hand Rail For Ramp	1				30.0	30.000	
						Total Quantity	253.000 kg	
						Total Deducted Quantity	0.000 kg	
						Net Total Quantity	253.000 kg	
						Say 253.000 kg @ Rs 681.59 / kg	**Rs 172442.27**	
29	9.117.1 Providing and fixing factory made uPVC door frame made of uPVC extruded sections having an overall dimension as below (tolerance ±1 mm), with wall thickness 2.0mm (±0.2 mm), corners of the door frame to be jointed with galvanized brackets and stainless steel screws, joints mitred and plastic welded. The hinge side vertical of the frames reinforced by galvanized M.S. tube of size 19 x 19 mm and 1 mm (± 0.1 mm) wall thickness and 3 nos. stainless steel hinges fixed to the frame complete as per manufacturer's specification and direction of Engineer-in-chargeExtruded section profile size 48x40 mm							
	Ground Floor							
	For doors	3	5.000				15.000	
	First Floor							
	For doors	2	5.000				10.000	
						Total Quantity	25.000 metre	
						Total Deducted Quantity	0.000 metre	
						Net Total Quantity	25.000 metre	
						Say 25.000 metre @ Rs 262.58 / metre	**Rs 6564.50**	

30	9.118.3 Providing and fixing to existing door frames25 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.							
	Ground Floor							
	For doors	1	0.800		2.100		1.681	
	First Floor							
	For doors	1	0.800		2.100		1.681	
						Total Quantity	3.362 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	3.362 sqm	
						Say 3.362 sqm @ Rs 3058.64 / sqm	**Rs 10283.15**	
31	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							
		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 6231.49 / No	**Rs 12462.98**	
32	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							
		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 3258.80 / No	**Rs 6517.60**	
33	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 300.51 / metre	**Rs 13522.95**	
34	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 386.88 / metre	**Rs 9672.00**	
35	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 490.02 / metre	**Rs 24501.00**	
36	od327849/2021_2022 :Providing and fixing uPVC pipes including fixing the pipe with clamps/clips at 1.00 m spacing. This included fittings, jointing of pipes with one step uPVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 63 mm dia 6Kgf/cm2 -							
		1	55.000				55.000	

						Total Quantity	55.000 metre	
						Total Deducted Quantity	0.000 metre	
						Net Total Quantity	55.000 metre	
						Say 55.000 metre @ Rs 255.33 / metre	**Rs 14043.15**	
37	od327851/2021_2022 :Providing and fixing uPVC pipes includings jointing of pipes with one step uPVC solvent cement, trenching,fitting refilling & testing of Joints complete as per direction of engineer in charge.110 mm dia 6Kgf/cm2							
		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 600.16 / metre	**Rs 18004.80**	
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 597.54 / No	**Rs 597.54**	
39	18.49.1 Providing and fixing C.P brass bib cock of approved quality conforming to IS: 8931.15 mm nominal bore							
		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 496.23 / No	**Rs 496.23**	
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							
		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 200.16 / No	**Rs 200.16**	
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.							
		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 1519.87 / No	**Rs 1519.87**	
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.							
		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 10.44 / Litre	**Rs 10440.00**	
Sl No	Description	No	L	B	D	CF	Quantity	Remark
	3Security Cabin (Cost Index:36.44 %)							
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	
	steps	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 298.80 / cum	**Rs 1300.98**	
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	
	steps	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 6857.61 / cum	**Rs 8105.70**	
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)							
	For Foundation	2	3.150	0.600	0.600		2.268	
	,,	2	1.950	0.600	0.600		1.404	
	Basement	2	3.000	0.450	0.450		1.215	
	,,	2	2.100	0.450	0.450		0.851	
						Total Quantity	5.738 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	5.738 cum	
						Say 5.738 cum @ Rs 7249.94 / cum	**Rs 41600.16**	
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	2.700	0.200	0.300		0.648	
	Steps	1	1.000	0.600	0.200		0.120	
		1	1.000	0.300	0.200		0.060	
	Door D1	1	1.000	0.200	2.100		-0.420	
	Window W1	2	1.500	0.200	1.500		-0.900	
						Total Quantity	6.985 cum	
						Total Deducted Quantity	-1.320 cum	
						Net Total Quantity	5.665 cum	
						Say 5.665 cum @ Rs 7968.75 / cum	**Rs 45142.97**	
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							
	Lintel	4	2.700	0.200	0.150		0.324	
	Sunshade	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 11135.00 / cum	**Rs 24463.60**	
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 wiork upto plinth level							
	Plinth Belt							
	Long wall	2	3.000	0.250	0.150		0.225	
	Short wall	2	2.500	0.250	0.150		0.188	
						Total Quantity	0.413 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	0.413 cum	
						Say 0.413 cum @ Rs 9947.98 / cum	**Rs 4108.52**	
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							
	@80Kg of Steel / 1 Cum of CC ie,	1	2.197+0.413		80.000		208.800	
						Total Quantity	208.800 kilogram	

						Total Deducted Quantity	0.000 kilogram	
						Net Total Quantity	208.800 kilogram	
						Say 208.800 kilogram @ Rs 98.92 / kilogram	**Rs 20654.50**	
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.							
		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 503.53 / No	**Rs 503.53**	
9	5.9.5 Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers							
	Belt	4	2.900		0.150		1.740	
		4	2.500		0.150		1.500	
	Lintel-	4	2.900		0.150		1.740	
	inside	4	2.500		0.150		1.500	
	Op Bott.	1	1.000		0.200		0.200	
	,,	2	1.500		0.200		0.601	
	Shade	1	3.100	0.600			1.860	
	,,	2	2.100	0.600			2.520	
						Total Quantity	11.661 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	11.661 sqm	
						Say 11.661 sqm @ Rs 653.89 / sqm	**Rs 7625.01**	
10	5.9.3 Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform							
	Roof slab bottom	1	2.500	2.500			6.250	
	Edge	4	3.500		0.120		1.680	
	Projection	4	3.200		0.300		3.840	
						Total Quantity	11.770 sqm	
						Total Deducted Quantity	0.000 sqm	

						Net Total Quantity	11.770 sqm	
						Say 11.770 sqm @ Rs 820.89 / sqm	**Rs 9661.88**	
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	1	3.500	3.500			12.250	
						Total Quantity	12.250 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	12.250 sqm	
						Say 12.250 sqm @ Rs 403.73 / sqm	**Rs 4945.69**	
12	13.1.1 12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)							
	Building outside	4	2.900		3.000		34.800	
	Building inside	4	2.500		3.000		30.000	
	Parapet including slab width	4	3.200		0.950		12.160	
	Basement	1	11.000		0.600		6.600	
	Door D1	1	1.000		2.100		-2.100	
	Window W1	2	1.500		1.500		-4.500	
						Total Quantity	83.560 sqm	
						Total Deducted Quantity	-6.600 sqm	
						Net Total Quantity	76.960 sqm	
						Say 76.960 sqm @ Rs 316.06 / sqm	**Rs 24323.98**	
13	13.16.1 6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)							
	Roof slab bottom	1	2.500	2.500			6.250	
	Projection	4	3.200		0.300		3.840	
	Sunshade bottom & top	2	3.000	0.600			3.600	
		2*2	1.900	0.600			4.560	
	Edge	6	0.600	0.100			0.360	
						Total Quantity	18.610 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	18.610 sqm	
						Say 18.610 sqm @ Rs 269.26 / sqm	**Rs 5010.93**	

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	2.500	2.500			6.250	
	Skirting	1	10.000		0.100		1.000	
	Step	1	1.000	0.600			0.600	
	,, Rise	3	1.000	0.200			0.601	
	Side	2	0.600	0.200			0.240	
	,,	2	0.300	0.200			0.120	
						Total Quantity	8.811 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	8.811 sqm	
						Say 8.811 sqm @ Rs 1777.34 / sqm	**Rs 15660.14**	
15	21.1.1.1 Providing and fixing aluminium work for doors, windows, ventilators and partitions with extruded built up standard tubular sections/ appropriate Z sections and other sections of approved make conforming to IS : 733 and IS: 1285, fixing with dash fasteners of required dia and size, including necessary filling up the gaps at junctions, i.e. at top, bottom and sides with required EPDM rubber/ neoprene gasket etc. Aluminium sections shall be smooth, rust free, straight, mitred and jointed mechanically wherever required including cleat angle, Aluminnium snap beading for glazing /paneling, C.P. brass/ stainless steel screws, all complete as per architectural drawings and the directions of Engineer-in-charge.(Glazing, paneling and dash fasteners to be paid for separately):For fixed portionAnodised aluminium (anodised transparent or dyed to required shade according to IS : 1868, Minimum anodic coating of grade AC 15)							
	Window frames W1	2	1.500	1.500		4.5	20.250	
	Doors	1	1.000	2.100		4.5	9.451	
						Total Quantity	29.701 kg	
						Total Deducted Quantity	0.000 kg	
						Net Total Quantity	29.701 kg	
						Say 29.701 kg @ Rs 502.17 / kg	**Rs 14914.95**	
16	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 shutter	2*2	0.700		1.450		4.060	
	Door	1	0.900		2.000		1.800	

						Total Quantity	5.860 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	5.860 sqm	
						Say 5.860 sqm @ Rs 1184.03 / sqm	**Rs 6938.42**	
17	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.							
	Door	1	1.000	2.100		16.0	33.600	
						Total Quantity	33.600 kg	
						Total Deducted Quantity	0.000 kg	
						Net Total Quantity	33.600 kg	
						Say 33.600 kg @ Rs 120.54 / kg	**Rs 4050.14**	
18	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	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 217.35 / kg	**Rs 19561.50**	
19	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	4	2.900		3.000		34.800	
	Building inside	4	2.500		3.000		30.000	
	Parapet including slab width	4	3.200		0.950		12.160	
	Basement	1	11.000		0.600		6.600	
	Door D1	1	1.000		2.100		-2.100	
	Window W1	2	1.500		1.500		-4.500	
	Roof slab bottom	1	2.500	2.500			6.250	
	Projection	4	3.200		0.300		3.840	
	Sunshade bottom & top	2	3.000	0.600			3.600	

		2*2	1.900	0.600			4.560	
	Edge	6	0.600	0.100			0.360	
						Total Quantity	102.170 sqm	
						Total Deducted Quantity	-6.600 sqm	
						Net Total Quantity	95.570 sqm	
						Say 95.570 sqm @ Rs 71.09 / sqm	**Rs 6794.07**	
20	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							
	Building outside	4	2.900		3.000		34.800	
	Building inside	4	2.500		3.000		30.000	
	Parapet including slab width	4	3.200		0.950		12.160	
	Basement	1	11.000		0.600		6.600	
	Door D1	1	1.000		2.100		-2.100	
	Window W1	2	1.500		1.500		-4.500	
	Roof slab bottom	1	2.500	2.500			6.250	
	Projection	4	3.200		0.300		3.840	
	Sunshade bottom & top	2	3.000	0.600			3.600	
		2*2	1.900	0.600			4.560	
	Edge	6	0.600	0.100			0.360	
						Total Quantity	102.170 sqm	
						Total Deducted Quantity	-6.600 sqm	
						Net Total Quantity	95.570 sqm	
						Say 95.570 sqm @ Rs 126.55 / sqm	**Rs 12094.38**	
21	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							
		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 3258.80 / No						**Rs 3258.80**	
22	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	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 300.51 / metre						**Rs 7512.75**	
23	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							
	LS	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 386.88 / metre						**Rs 9672.00**	
24	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							
	LS	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 490.02 / metre						**Rs 12250.50**	
25	od327849/2021_2022 :Providing and fixing uPVC pipes including fixing the pipe with clamps/clips at 1.00 m spacing. This included fittings, jointing of pipes with one step uPVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 63 mm dia 6Kgf/cm2 -							
		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 255.33 / metre	**Rs 7659.90**	
26	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.							
		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 1519.87 / No	**Rs 1519.87**	
27	13.62.1 Painting with synthetic enamel paint of approved brand and manufacture of required colour to give an even shade:Two or more coats on new work over an under coat of suitable shade with ordinary paint of approved brand and manufacture .							
	For windows	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 209.84 / sqm	**Rs 944.28**	
Sl No	Description	No	L	B	D	CF	Quantity	Remark
	4Air Blower Building (Cost Index:36.44 %)							
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							
		12	1.500	1.500	1.000		27.000	
		4	1.800	1.800	1.000		12.960	
						Total Quantity	39.960 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	39.960 cum	
						Say 39.960 cum @ Rs 298.80 / cum	**Rs 11940.05**	
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)							

		12	1.500	1.500	0.200		5.400	
		4	1.800	1.800	0.200		2.593	
						Total Quantity	7.993 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	7.993 cum	
						Say 7.993 cum @ Rs 7413.74 / cum	**Rs 59258.02**	
3	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.							
		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 297.37 / cum	**Rs 11894.80**	
4	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 wiork upto plinth level							
	FOOTING							
	CORNER COLUMN FOOTING	4	1.400	1.400	0.150		1.176	
		4	(0.2+1.4)/ 2	1.400	0.750		3.360	
	INSIDE COLUMN FOOTING	4	1.700	1.700	0.150		1.734	
		4	(0.2+1.7)/ 2	1.700	0.750		4.845	
	INTERMEDIATE COLUMN FOOTING	8	1.700	1.700	0.150		3.468	
		8	(0.2+1.7)/ 2	1.700	0.750		9.690	

	PEDESTAL COLUMN	16	0.500	0.200	0.500		0.800	
						Total Quantity	25.073 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	25.073 cum	
						Say 25.073 cum @ Rs 9947.98 / cum	**Rs 249425.70**	
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							
	PLINTH SLAB							
		1	10.400	8.400	0.200		17.473	
	PLINTH BEAM							
		1	37.800	0.250	0.500		4.725	
	RAMP							
		1	5.000	2.000	0.200		2.000	
						Total Quantity	24.198 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	24.198 cum	
						Say 24.198 cum @ Rs 11135.00 / cum	**Rs 269444.73**	
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							
	Beam (0.20 * 0.50)	2	8.200	0.200	0.500		1.640	
		2	10.200	0.200	0.500		2.040	
	Column (0.2 * 0.50)	16	0.200	0.500	5.200		8.320	
	Roof slab	1	11.000	9.000	0.120		11.880	

	Lintel	1	37.600	0.200	0.200		1.505	
	SUNSHADE	1	(11.6+9.6) *2	0.600	0.100		2.544	
						Total Quantity	27.929 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	27.929 cum	
						Say 27.929 cum @ Rs 11610.43 / cum	**Rs 324267.70**	
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							
	FOOTING							
	CORNER COLUMN FOOTING	8	1.400	1.400	0.150	100.0	235.200	
		8	(0.2+1.4)/ 2	1.400	0.750	100.0	672.000	
	INSIDE COLUMN FOOTING	4	1.700	1.700	0.150	100.0	173.400	
		4	(0.2+1.7)/ 2	1.700	0.750	100.0	484.500	
	INTERMEDIATE COLUMN FOOTING	8	1.700	1.700	0.150	100.0	346.800	
		8	(0.2+1.7)/ 2	1.700	0.750	100.0	969.000	
	PEDESTAL COLUMN	20	0.500	0.200	0.500	100.0	100.000	
	Beam (0.20 * 0.50)	2	8.200	0.200	0.500	100.0	164.000	
		2	10.200	0.200	0.500	100.0	204.000	
	Column (0.2 * 0.50)	16	0.200	0.500	5.200	100.0	832.000	
	Roof slab	1	11.000	9.000	0.120	100.0	1188.000	
	Lintel	1	37.600	0.200	0.150	75.0	84.601	
	SUNSHADE	1	(11.6+9.6) *2	0.600	0.150	75.0	286.200	
	PLINTH SLAB							
		1	10.400	8.400	0.200	100.0	1747.201	
	RAMP							
		1	5.000	2.000	0.200	75.0	150.000	
	PLINTH BEAM							

		1	37.800	0.250	0.500	100.0	472.500	
						Total Quantity	8109.402 kilogram	
						Total Deducted Quantity	0.000 kilogram	
						Net Total Quantity	8109.402 kilogram	
						Say 8109.402 kilogram @ Rs 98.92 / kilogram	**Rs 802182.05**	
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							
	C O L U M N A T C O R N E R	4	(1.4+1.4)*2		0.150		3.360	
	I N T E R M E D I A T E C O L U M N	8	(1.7+1.7)*2		0.150		8.160	
	INSIDE COLUMN	4	(1.7+1.7)*2		0.150		4.080	
						Total Quantity	15.600 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	15.600 sqm	
						Say 15.600 sqm @ Rs 337.42 / sqm	**Rs 5263.75**	
9	5.9.6 Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts							
	PEDESTAL COLUMN	16	(0.2+0.5)*2		0.500		11.200	
	COLUMN	16	(0.2+0.5)*2		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 869.05 / sqm	**Rs 110960.30**	
10	5.9.5 Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers							
	BEAM (0.2*0.5)							
	SIDE	2*2	8.200		0.500		16.400	
	BOTTOM	1*2	8.200	0.200			3.280	

	SIDE	2*2	10.200		0.500		20.400	
	BOTTOM	1*2	10.200	0.200			4.080	
	PLINTH SLAB							
		1	37.600		0.200		7.521	
	LINTEL							
	INSIDE	1	(10+8)*2		0.200		7.200	
	OUT SIDE	1	(10.4+8.4)*2		0.200		7.521	
	SUNSHADE							
		1	(11.6+9.6)*2		0.750		31.800	
	RAMP							
		1	2.000	5.000			10.000	
		2	2.000		0.200		0.800	
		1	5.000		0.200		1.000	
	PLINTH BEAM							
	INSIDE	1	35.800		0.500		17.900	
	OUT SIDE	1	37.800		0.500		18.900	
						Total Quantity	146.802 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	146.802 sqm	
						Say 146.802 sqm @ Rs 653.89 / sqm	**Rs 95992.36**	
11	5.9.3 Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform							
	ROOF SLAB							
	BOTTOM	1	11.000	9.000			99.000	
	SIDE	2	11.000		0.120		2.640	
		2	9.000		0.120		2.160	
						Total Quantity	103.800 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	103.800 sqm	
						Say 103.800 sqm @ Rs 820.89 / sqm	**Rs 85208.38**	
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.							
	LONG WALL	2	10.400	0.200	5.200		21.632	
	SHORT WALL	2	8.000	0.200	5.200		16.640	
	PARAPET WALL							
		2	11.000	0.200	0.800		3.521	
		2	9.000	0.200	0.800		2.881	
	ROLLING SHUTTER	1	2.000		3.000		-6.000	
	Window	4	1.500		1.500		-9.000	
						Total Quantity	44.674 cum	
						Total Deducted Quantity	-15.000 cum	
						Net Total Quantity	29.674 cum	
						Say 29.674 cum @ Rs 7968.75 / cum	**Rs 236464.69**	
13	13.1.1 12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)							
	Outside	1	36.000		5.200		187.201	
	Inside	1	37.600		5.200		195.520	
	ROLLING SHUTTER	1	2.000		3.000		-6.000	
	Window	4	1.500		1.500		-9.000	
	PARAPET WALL							
		2	11.000		0.800		17.600	
		2	11.000	0.150			3.300	
		2	9.000		0.800		14.400	
		2	9.000	0.150			2.700	
	SUNSHADE TOP	1	(11.6+9.6) *2		0.600		25.440	
	COLUMN							
		16	0.500	0.200	5.200		8.320	
	BEAM							
		2	0.900	8.200			14.760	
		1	0.900	10.200			9.180	
						Total Quantity	478.421 sqm	
						Total Deducted Quantity	-15.000 sqm	

						Net Total Quantity	463.421 sqm	
						Say 463.421 sqm @ Rs 316.06 / sqm	**Rs 146468.84**	
14	13.16.1 6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)							
	Roof slab	1	11.000	9.000			99.000	
		2	11.000		0.120		2.640	
		2	9.000		0.120		2.160	
	SUNSHADE BOTTOM	1	(9.6+11.6) *2		0.600		25.440	
						Total Quantity	129.240 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	129.240 sqm	
						Say 129.240 sqm @ Rs 269.26 / sqm	**Rs 34799.16**	
15	13.43.1 Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer							
	Outside	1	36.000		5.200		187.201	
	Inside	1	37.600		5.200		195.520	
	Roof slab	1	11.000	9.000			99.000	
		2	11.000		0.120		2.640	
		2	9.000		0.120		2.160	
	ROLLING SHUTTER	1	2.000		3.000		-6.000	
	Window	4	1.500		1.500		-9.000	
	SUNSHADE TOP & BOTTOM	2	(11.6+9.6) *2		0.600		50.880	
	COLUMN							
		16	0.500	0.200	5.200		8.320	
	BEAM							
		2	0.900	8.200			14.760	
		1	0.900	10.200			9.180	
						Total Quantity	569.661 sqm	
						Total Deducted Quantity	-15.000 sqm	
						Net Total Quantity	554.661 sqm	
						Say 554.661 sqm @ Rs 71.09 / sqm	**Rs 39430.85**	

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							
	Outside	1	36.000		5.200		187.201	
	Inside	1	37.600		5.200		195.520	
	Roof slab	1	11.000	9.000			99.000	
		2	11.000		0.120		2.640	
		2	9.000		0.120		2.160	
	ROLLING SHUTTER	1	2.000		3.000		-6.000	
	Window	4	1.500		1.500		-9.000	
	SUNSHADE TOP & BOTTOM	2	(11.6+9.6) *2		0.600		50.880	
	COLUMN							
		16	0.500	0.200	5.200		8.320	
	BEAM							
		2	0.900	8.200			14.760	
		1	0.900	10.200			9.180	
						Total Quantity	569.661 sqm	
						Total Deducted Quantity	-15.000 sqm	
						Net Total Quantity	554.661 sqm	
						Say 554.661 sqm @ Rs 126.55 / sqm	**Rs 70192.35**	
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.							
		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 1777.34 / sqm	**Rs 148585.62**	
18	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	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 5912.90 / sqm	**Rs 53216.10**	
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							
		1	2.000		3.000		6.000	
						Total Quantity	6.000 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	6.000 sqm	
						Say 6.000 sqm @ Rs 3487.20 / sqm	**Rs 20923.20**	
20	od327850/2021_2022 Supplying and fixing ISMB250 for Chain Pully Block							
		1					1.000	
						Total Quantity	1.000 kg	
						Total Deducted Quantity	0.000 kg	
						Net Total Quantity	1.000 kg	
						Say 1.000 kg @ Rs 58227.39 / kg	**Rs 58227.39**	
Sl No	Description	No	L	B	D	CF	Quantity	Remark
	5Chlorination Building (Cost Index:36.44 %)							
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							
		10	1.500	1.500	1.000		22.500	
	NEUTRALIZATION PIT							
		1	2.700	2.700	1.800		13.123	

						Total Quantity	35.623 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	35.623 cum	
						Say 35.623 cum @ Rs 298.80 / cum	**Rs 10644.15**	
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)							
		10	1.400	1.400	0.200		3.920	
	NEUTRALIZATION PIT							
		1	2.700	2.700	0.100		0.730	
						Total Quantity	4.650 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	4.650 cum	
						Say 4.650 cum @ Rs 7413.74 / cum	**Rs 34473.89**	
3	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.							
		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 297.37 / cum	**Rs 11894.80**	
4	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 wiork upto plinth level							
	FOOTING							
	CORNER COLUMN FOOTING	4	1.400	1.400	0.150		1.176	

	INTERMEDIATE COLUMN FOOTING	6	(0.25+1.4) /2	1.400	0.750		5.198	
	NEUTRALIZATION PIT							
		1	2.600	2.600	0.200		1.353	
		2	2.500	0.200	1.500		1.500	
	PEDESTAL COLUMN							
		10	0.500	0.250	0.500		0.625	
						Total Quantity	9.852 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	9.852 cum	
						Say 9.852 cum @ Rs 9947.98 / cum	**Rs 98007.50**	
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							
	PLINTH SLAB							
		1	10.400	8.400	0.200		17.473	
	RAMP							
		1	5.000	2.000	0.200		2.000	
	PLINTH BEAM							
		1	37.800	0.250	0.500		4.725	
						Total Quantity	24.198 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	24.198 cum	
						Say 24.198 cum @ Rs 11135.00 / cum	**Rs 269444.73**	
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							
	COLUMN (0.25*0.5)							
		10	0.500	0.250	5.000		6.250	
	BEAM (0.25*0.5)							
		2	8.200	0.200	0.500		1.640	
		1	10.200	0.200	0.500		1.020	
	LINTEL							
		1	37.600	0.200	0.200		1.505	
	SUNSHADE							
		1	(11.6+9.6) *2	0.600	0.100		2.544	
	ROOF SLAB							
		1	11.000	9.000	0.120		11.880	
	Total Quantity						24.839 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						24.839 cum	
	Say 24.839 cum @ Rs 11610.43 / cum						**Rs 288391.47**	
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							
	FOOTING							
	CORNER COLUMN FOOTING	4	1.400	1.400	0.150	100.0	117.600	
	INTERMEDIATE COLUMN FOOTING	6	(0.25+1.4) /2	1.400	0.750	100.0	519.750	
	PLINTH BEAM							
		1	37.800	0.250	0.500	100.0	472.500	
	COLUMN (0.25*0.5)							
		10	0.500	0.250	5.000	100.0	625.000	
	BEAM (0.25*0.5)							
		2	8.200	0.200	0.500	100.0	164.000	
		1	10.200	0.200	0.500	100.0	102.000	
	LINTEL							
		1	37.600	0.200	0.200	75.0	112.801	

	SUNSHADE							
		1	(11.6+9.6) *2	0.600	0.100	75.0	190.800	
	PEDESTAL COLUMN							
		10	0.500	0.250	0.500	100.0	62.500	
	PLINTH SLAB							
		1	10.400	8.400	0.200	100.0	1747.201	
	ROOF SLAB							
		1	11.000	9.000	0.120	100.0	1188.000	
	NEUTRALIZATION PIT							
		1	2.600	2.600	0.200	100.0	135.201	
		2	2.500	0.200	1.500	100.0	150.000	
	RAMP							
		1	5.000	2.000	0.200	75.0	150.000	
						Total Quantity	5737.353 kilogram	
						Total Deducted Quantity	0.000 kilogram	
						Net Total Quantity	5737.353 kilogram	
						Say 5737.353 kilogram @ Rs 98.92 / kilogram	**Rs 567538.96**	
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							
	COLUMN AT CORNER	4	(1.4+1.4)* 2		0.150		3.360	
	INTERMEDIATE COLUMN	6	(1.4+1.4)* 2		0.150		5.040	
	NEUTRALIZATION PIT							
		4	2.600		0.200		2.080	
		2*2	2.500		1.500		15.000	
						Total Quantity	25.480 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	25.480 sqm	
						Say 25.480 sqm @ Rs 337.42 / sqm	**Rs 8597.46**	
9	5.9.6 Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers,							

	Abutments, Posts and Struts							
	PEDESTAL COLUMN	10	(0.25+0.5) *2		0.500		7.500	
	COLUMN	10	(0.25+0.5) *2		5.000		75.000	
						Total Quantity	82.500 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	82.500 sqm	
						Say 82.500 sqm @ Rs 869.05 / sqm	**Rs 71696.63**	
10	5.9.5 Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers							
	PLINTH SLAB							
		1	10.450		0.200		2.090	
		1	8.450		0.200		1.690	
	BEAM (0.25*0.5)							
	SIDE	2*2	8.200		0.500		16.400	
	BOTTOM	2*1	8.200	0.250			4.100	
	SIDE	1*2	10.200		0.500		10.200	
	BOTTOM	1	10.200	0.200			2.040	
	LINTEL							
	INSIDE	1	(10+8)*2		0.200		7.200	
	OUT SIDE	1	(10.4+8.4) *2		0.200		7.521	
	SUNSHADE							
		1	(11.6+9.6) *2		0.700		29.680	
	RAMP							
		1	2.000	5.000			10.000	
		2	2.000		0.200		0.800	
		1	5.000		0.200		1.000	
	PLINTH BEAM							
	INSIDE	1	35.800		0.500		17.900	
	OUT SIDE	1	37.800		0.500		18.900	
						Total Quantity	129.521 sqm	

						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	129.521 sqm	
						Say 129.521 sqm @ Rs 653.89 / sqm	**Rs 84692.49**	
11	5.9.3 Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform							
	ROOF SLAB							
	BOTTOM	1	11.000	9.000			99.000	
	SIDE	2	11.000		0.120		2.640	
		2	9.000		0.120		2.160	
						Total Quantity	103.800 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	103.800 sqm	
						Say 103.800 sqm @ Rs 820.89 / sqm	**Rs 85208.38**	
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.							
	LONG WALL	2	10.400	0.200	5.200		21.632	
	SHORT WALL	2	8.000	0.200	5.200		16.640	
	PARAPET WALL							
		2	11.000	0.200	0.800		3.521	
		2	9.000	0.200	0.800		2.881	
	DEDUCTIONS							
	ROLLING SHUTTER	1	3.000	0.200	3.000		-1.800	
	WINDOW	4	1.500	0.200	1.500		-1.800	
	DOOR	1	1.500	0.200	2.100		-0.630	
	STEP							
		2	1.500	0.150	0.300		0.135	
						Total Quantity	44.809 cum	
						Total Deducted Quantity	-4.230 cum	
						Net Total Quantity	40.579 cum	
						Say 40.579 cum @ Rs 7968.75 / cum	**Rs 323363.91**	
13	13.1.1 12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)							

	Wall Outside	1	36.000		5.000		180.000	
	Wall Inside	1	37.600		5.000		188.000	
	DEDUCTIONS							
	ROLLING SHUTTER	1	3.000		3.000		-9.000	
	WINDOW	4	1.500		1.500		-9.000	
	DOOR	1	1.500		2.100		-3.150	
	PARAPET WALL							
	SIDE	2	11.000		0.800		17.600	
	TOP	2	11.000	0.150			3.300	
	SIDE	2	9.000		0.800		14.400	
	TOP	2	9.000	0.150			2.700	
	SUNSHADE TOP							
		1	(11.6+9.6) *2		0.600		25.440	
	COLUMN							
		10	0.500	0.250	5.000		6.250	
	BEAM							
		2	1.000	8.200			16.400	
		1	1.000	10.200			10.200	
	NEUTRALIZATION PIT							
		2	2.500		1.500		7.500	
		1	2.500	2.500			6.250	
						Total Quantity	478.040 sqm	
						Total Deducted Quantity	-21.150 sqm	
						Net Total Quantity	456.890 sqm	
						Say 456.890 sqm @ Rs 316.06 / sqm	**Rs 144404.65**	
14	13.16.1 6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)							
	Roof slab	1	11.000	9.000			99.000	
		2	11.000		0.120		2.640	
		2	9.000		0.120		2.160	
	SUNSHADE BOTTOM	1	(9.6+11.6) *2		0.600		25.440	
						Total Quantity	129.240 sqm	

						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	129.240 sqm	
						Say 129.240 sqm @ Rs 269.26 / sqm	**Rs 34799.16**	
15	13.43.1 Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer							
	Wall Outside	1	36.000		5.000		180.000	
	Wall Inside	1	37.600		5.000		188.000	
	DEDUCTIONS							
	ROLLING SHUTTER	1	3.000		3.000		-9.000	
	WINDOW	4	1.500		1.500		-9.000	
	DOOR	1	1.500		2.100		-3.150	
	PARAPET WALL							
	SIDE	2	11.000		0.800		17.600	
	TOP	2	11.000	0.150			3.300	
	SIDE	2	9.000		0.800		14.400	
	TOP	2	9.000	0.150			2.700	
	SUNSHADE TOP							
		1	(11.6+9.6) *2		0.600		25.440	
	COLUMN							
		10	0.500	0.250	5.000		6.250	
	BEAM							
		2	1.000	8.200			16.400	
		1	1.000	10.200			10.200	
	Roof slab	1	11.000	9.000			99.000	
		2	11.000		0.120		2.640	
		2	9.000		0.120		2.160	
	SUNSHADE BOTTOM	1	(9.6+11.6) *2		0.600		25.440	
						Total Quantity	593.530 sqm	
						Total Deducted Quantity	-21.150 sqm	
						Net Total Quantity	572.380 sqm	
						Say 572.380 sqm @ Rs 71.09 / sqm	**Rs 40690.49**	

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							
	Wall Outside	1	36.000		5.000		180.000	
	Wall Inside	1	37.600		5.000		188.000	
	DEDUCTIONS							
	ROLLING SHUTTER	1	3.000		3.000		-9.000	
	WINDOW	4	1.500		1.500		-9.000	
	DOOR	1	1.500		2.100		-3.150	
	PARAPET WALL							
	SIDE	2	11.000		0.800		17.600	
	TOP	2	11.000	0.150			3.300	
	SIDE	2	9.000		0.800		14.400	
	TOP	2	9.000	0.150			2.700	
	SUNSHADE TOP							
		1	(11.6+9.6) *2		0.600		25.440	
	COLUMN							
		10	0.500	0.250	5.000		6.250	
	BEAM							
		2	1.000	8.200			16.400	
		1	1.000	10.200			10.200	
	Roof slab	1	11.000	9.000			99.000	
		2	11.000		0.120		2.640	
		2	9.000		0.120		2.160	
	S U N S H A D E B O T T O M	1	(9.6+11.6) *2		0.600		25.440	
						Total Quantity	593.530 sqm	
						Total Deducted Quantity	-21.150 sqm	
						Net Total Quantity	572.380 sqm	
						Say 572.380 sqm @ Rs 126.55 / sqm	**Rs 72434.69**	
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	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 5912.90 / sqm	**Rs 53216.10**	
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	1.500		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 5244.96 / sqm	**Rs 16526.87**	
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							
		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 3487.20 / sqm	**Rs 31384.80**	
20	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.							
		1	10.000	8.000			80.000	
	SKIRTING	1	36.000		0.100		3.600	

	STEP	2	1.500	0.300			0.900	
		2	1.500	0.150			0.450	
						Total Quantity	84.950 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	84.950 sqm	
						Say 84.950 sqm @ Rs 1777.34 / sqm	**Rs 150985.03**	
21	od327848/2021_2022 Supplying and fixing ISMB250							
		1					1.000	
						Total Quantity	1.000 kg	
						Total Deducted Quantity	0.000 kg	
						Net Total Quantity	1.000 kg	
						Say 1.000 kg @ Rs 58227.39 / kg	**Rs 58227.39**	
Sl No	Description	No	L	B	D	CF	Quantity	Remark
6Compound Wall (Cost Index:36.44 %)								
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							
	Wall	1	320.000	0.800	0.700		179.200	
						Total Quantity	179.200 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	179.200 cum	
						Say 179.200 cum @ Rs 298.80 / cum	**Rs 53544.96**	
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)							
	Wall	1	320.000	0.800	0.100		25.600	
						Total Quantity	25.600 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	25.600 cum	
						Say 25.600 cum @ Rs 6857.61 / cum	**Rs 175554.82**	
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)							
	Wall	1	320.000	0.450	0.450		64.800	
						Total Quantity	64.800 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	64.800 cum	
						Say 64.800 cum @ Rs 7249.94 / cum	**Rs 469796.11**	
4	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 wiork upto plinth level							
	For column footing	2	1.000	1.000	0.400		0.800	
	For column	2	0.300	0.300	1.000		0.180	
						Total Quantity	0.980 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	0.980 cum	
						Say 0.980 cum @ Rs 9947.98 / cum	**Rs 9749.02**	
5	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	2	0.300	0.300	3.000		0.540	
						Total Quantity	0.540 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	0.540 cum	
						Say 0.540 cum @ Rs 11610.43 / cum	**Rs 6269.63**	

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	1.600		100.000		160.000	
	Total Quantity						160.000 kilogram	
	Total Deducted Quantity						0.000 kilogram	
	Net Total Quantity						160.000 kilogram	
	Say 160.000 kilogram @ Rs 98.92 / kilogram						**Rs 15827.20**	
7	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	2	4.000		0.400		3.200	
	Total Quantity						3.200 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						3.200 sqm	
	Say 3.200 sqm @ Rs 337.42 / sqm						**Rs 1079.74**	
8	5.9.6 Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts							
	For column	2	1.200		4.000		9.600	
	Total Quantity						9.600 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						9.600 sqm	
	Say 9.600 sqm @ Rs 869.05 / sqm						**Rs 8342.88**	
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.							
	Wall	1	280.000	0.200	1.800		100.800	
	Wall column	92	0.100	0.100	1.800		1.657	
	Gate	1	5.000	0.200	1.800		-1.800	
	Total Quantity						102.457 cum	
	Total Deducted Quantity						-1.800 cum	
	Net Total Quantity						100.657 cum	
	Say 100.657 cum @ Rs 7968.75 / cum						**Rs 802110.47**	
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							
	Gate	1	5.000	2.400	40.000		480.000	
						Total Quantity	480.000 kg	
						Total Deducted Quantity	0.000 kg	
						Net Total Quantity	480.000 kg	
						Say 480.000 kg @ Rs 155.13 / kg	**Rs 74462.40**	
11	13.83.2 Wall painting with premium acrylic emulsion paint of interior grade, having VOC (Volatile including applying additional coats wherever required to achieve even shade and colour.Two coats							
	Gate	1	5.000	2.400			12.000	
						Total Quantity	12.000 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	12.000 sqm	
						Say 12.000 sqm @ Rs 134.94 / sqm	**Rs 1619.28**	
12	13.1.1 12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)							
	Wall	2	280.000		1.800		1008.000	
	Wall top	1	280.000	0.200			56.000	
	Projection	92*2	0.100		1.800		33.121	
	Gate	1	5.000		1.800		-9.000	
						Total Quantity	1097.121 sqm	
						Total Deducted Quantity	-9.000 sqm	
						Net Total Quantity	1088.121 sqm	
						Say 1088.121 sqm @ Rs 316.06 / sqm	**Rs 343911.52**	
13	13.48.1 Finishing with Deluxe Multi surface paint system for interiors and exteriors using primer as per manufacturers specifications:Two or more coats applied on walls @ 1.25 ltr/10 sqm over and including one coat of special primer applied @ 0.75 ltr /10 sqm							
	Wall	2	280.000		1.800		1008.000	
	Wall top	1	280.000	0.200			56.000	
	Projection	92*2	0.100		1.800		33.121	
	Gate	1	5.000		1.800		-9.000	
						Total Quantity	1097.121 sqm	

						Total Deducted Quantity	-9.000 sqm	
						Net Total Quantity	1088.121 sqm	
						Say 1088.121 sqm @ Rs 168.44 / sqm	**Rs 183283.10**	
Sl No	Description	No	L	B	D	CF	Quantity	Remark
	7Internal Roads (Cost Index:36.44 %)							
1	16.91.2 Providing and laying factory made chamfered edge Cement Concrete paver blocksin footpath, parks, lawns, drive ways or light traffic parking etc, of required strength,thickness & size/ shape, made by table vibratory method using PU mould, laid inrequired colour & pattern over 50mm thick compacted bed of sand, compacting andproper embedding/laying of inter locking paver blocks into the sand bedding layerthrough vibratory compaction by using plate vibrator, filling the joints with sand andcutting of paver blocks as per required size and pattern, finishing and sweepingextra sand. complete all as per direction of Engineer-in-Charge.80 mm thick C.C. paver block of M-30 grade with approved color design and pattern.							
	5m wide road	1	280.000	5.000			1400.000	
						Total Quantity	1400.000 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	1400.000 sqm	
						Say 1400.000 sqm @ Rs 1128.84 / sqm	**Rs 1580376.00**	
2	16.59.2 Manufacturing, supplying and fixing retro reflective sign boards made up of 2 mmthick aluminium sheet, face to be fully covered with high intensity encapsulatedtype heat activated retro reflective sheeting conforming to type - IV of ASTM-D4956-01 in blue and silver white or other colour combination including subjectmatter, message (bi-lingual), symbols and borders etc. as per IRC: 67- 2001, pastedon substrate by an adhesive backing which shall be activated by applying heatand pressure conforming to class-2 of ASTM-D-4956-01 and fixing the same withsuitable sized aluminium alloy rivets @ 20 cm c/c to back support frame of M.S.angle iron of size 25x25x3 mm along with theft resistant measures, mounted andfixed with 2 Nos M.S. angles of size 35x35x5 mm to a vertical post made up to M.S.Tee section ISMT 50x50x6 mm welded with base plate of size 100x100x 5 mm at thebottom end and including making holes in pipes, angles flats, providing & fixingM.S. message plate of required size, steel work to be painted with two or morecoats of synthetic enamel paint of required shade and of approved brand &manufacture over priming coat of zinc chromate yellow primer (vertical MS-Teesupport to be painted in black and white colours). Backside of aluminium sheet tobe painted with two or more coats of epoxy paint over and including appropriatepriming coat including all leads and lifts etc. complete as per drawing , specification and direction of Engineer-in-Charge.Cautionary / warning sign boards of equilateral triangular shape having each side of 900 mm with support length of 3650 mm							
		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 5370.69 / No						**Rs 10741.38**	
3	16.59.1 Manufacturing, supplying and fixing retro reflective sign boards made up of 2 mmthick aluminium sheet, face to be fully covered with high intensity encapsulatedtype heat activated retro reflective sheeting conforming to type - IV of ASTM-D4956-01 in blue and silver white or other colour combination including subjectmatter, message (bi-lingual), symbols and borders etc. as per IRC: 67- 2001, pastedon substrate by an adhesive backing which shall be activated by applying heatand pressure conforming to class-2 of ASTM-D-4956-01 and fixing the same withsuitable sized aluminium alloy rivets @ 20 cm c/c to back support frame of M.S.angle iron of size 25x25x3 mm along with theft resistant measures, mounted andfixed with 2 Nos M.S. angles of size 35x35x5 mm to a vertical post made up to M.S.Tee section ISMT 50x50x6 mm welded with base plate of size 100x100x 5 mm at thebottom end and including making holes in pipes, angles flats, providing & fixingM.S. message plate of required size, steel work to be painted with two or morecoats of synthetic enamel paint of required shade and of approved brand &manufacture over priming coat of zinc chromate yellow primer (vertical MS-Teesupport to be painted in black and white colours). Backside of aluminium sheet tobe painted with two or more coats of epoxy paint over and including appropriatepriming coat including all leads and lifts etc. complete as per drawing , specification and direction of Engineer-in-Charge.Mandatory / Regulatory sign boards of 900 mm diametre with support length of 3750 mm							
		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 7103.70 / No						**Rs 14207.40**	
4	16.63 Providing, laying and making kerb channel 30 cm wide and 50 mm thick with cement concrete 1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size) over 75 mm bed of dry brick ballast 40 mm nominal size, well rammed and consolidated and grouted with fine sand, including finishing the top smooth etc. complete and as per direction Engineer - in-Charge.							
		1	642.000	0.300			192.600	
	Total Quantity						192.600 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						192.600 sqm	
	Say 192.600 sqm @ Rs 572.09 / sqm						**Rs 110184.53**	
5	16.69 Providing and laying at or near ground level factory made kerb stone of M-25 grade cement concrete in position to the required line, level and curvature jointed with cement mortar 1:3 (1 cement : 3 coarse sand) , including making joints with or without grooves (thickness of joints except at sharp curve shall not to more than 5 mm), including making drainage opening wherever required complete etc. as per direction of Engineer-in-charge (length of finished kerb edging shall be measured for payment). (Precast C.C. kerb stone shall be approved by Engineer-in-Charge)							

		1	560.000	0.200	0.300		33.600	
						Total Quantity	33.600 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	33.600 cum	
						Say 33.600 cum @ Rs 9921.30 / cum	**Rs 333355.68**	
Sl No	Description	No	L	B	D	CF	Quantity	Remark
	8Storm Water Drains (Cost Index:36.44 %)							
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							
		1	280.000	0.700	0.600		117.600	
						Total Quantity	117.600 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	117.600 cum	
						Say 117.600 cum @ Rs 298.80 / cum	**Rs 35138.88**	
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)							
		1	280.000	0.700	0.100		19.600	
						Total Quantity	19.600 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	19.600 cum	
						Say 19.600 cum @ Rs 6857.61 / cum	**Rs 134409.16**	
3	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)							
	Side wall	1	280.000	0.100	0.500		14.000	
						Total Quantity	14.000 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	14.000 cum	
						Say 14.000 cum @ Rs 7413.74 / cum	**Rs 103792.36**	
4	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)							
	Wearing coat	1	280.000	0.500	0.050		7.000	
						Total Quantity	7.000 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	7.000 cum	
						Say 7.000 cum @ Rs 8040.95 / cum	**Rs 56286.65**	
5	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.							
	Wall-outside	1	280.000		0.600		168.000	
	Inside	1	280.000		0.500		140.000	
						Total Quantity	308.000 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	308.000 sqm	
						Say 308.000 sqm @ Rs 721.70 / sqm	**Rs 222283.60**	
Sl No	Description	No	L	B	D	CF	Quantity	Remark
9Transformer Building (Cost Index:36.44 %)								
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							
		1	24.000	0.800	0.900		17.281	
	For ramp	1	4.000	1.500	0.100		0.601	
	Step	1	1.000	0.500	0.100		0.050	
	Wire duct	1	10.700	1.100	0.800		9.416	
						Total Quantity	27.348 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	27.348 cum	
						Say 27.348 cum @ Rs 298.80 / cum	**Rs 8171.58**	
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	21.400	0.100	1.000		2.140	
		1	10.700	0.900	0.100		0.963	
		1	24.800	0.800	0.100		1.985	
	Ramp	1	4.000	0.700	0.075		0.210	
	Floor	1	6.500	5.500	0.075		2.682	
	Step	1	1.000	0.500	0.100		0.050	
	Wire duct	1	10.700	1.100	0.075		-0.882	
						Total Quantity	8.030 cum	
						Total Deducted Quantity	-0.882 cum	
						Net Total Quantity	7.148 cum	
						Say 7.148 cum @ Rs 7256.36 / cum	**Rs 51868.46**	
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	24.800	0.450	0.450		5.022	
	Ramp	2*5	1.500	0.400	0.450		2.701	
						Total Quantity	7.723 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	7.723 cum	
						Say 7.723 cum @ Rs 7249.94 / cum	**Rs 55991.29**	
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	24.800	0.200	3.050		15.129	
	Parapet	1	27.200	0.100	0.600		1.633	
	step	1	1.000	0.250	0.150		0.038	
		1	1.000	0.500	0.150		0.075	
	Shutter	1	4.000	0.200	2.100		-1.680	
	Door	1	1.000	0.200	2.100		-0.420	
	Window	1	1.500	0.200	1.500		-0.450	
						Total Quantity	16.875 cum	
						Total Deducted Quantity	-2.550 cum	
						Net Total Quantity	14.325 cum	

					Say 14.325 cum @ Rs 7968.75 / cum		**Rs 114152.34**	
5	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)							
	Ramp	1	4.000	1.500	0.050		0.301	
					Total Quantity		0.301 cum	
					Total Deducted Quantity		0.000 cum	
					Net Total Quantity		0.301 cum	
					Say 0.301 cum @ Rs 8040.95 / cum		**Rs 2420.33**	
6	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							
	Roof slab	1	7.500	6.500	0.100		4.875	
	Lintel	1	24.800	0.200	0.150		0.745	
	Sunshade	1	1.700	0.600	0.075		0.077	
					Total Quantity		5.697 cum	
					Total Deducted Quantity		0.000 cum	
					Net Total Quantity		5.697 cum	
					Say 5.697 cum @ Rs 11135.00 / cum		**Rs 63436.10**	
7	5.1.2 Providing and laying in position specified grade of reinforced cement concrete, excluding the cost of centering, shuttering, finishing and reinforcement - All work up to plinth level:1:1:5:3 (1 cement 1.5 coarse sand :3 graded stone aggregate 20 mm nominal size							
	For transformer	1	5.000	2.000	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 9142.09 / cum		**Rs 9142.09**	
8	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	6.697		80.000		535.760	
						Total Quantity	535.760 kilogram	
						Total Deducted Quantity	0.000 kilogram	
						Net Total Quantity	535.760 kilogram	
						Say 535.760 kilogram @ Rs 98.92 / kilogram	**Rs 52997.38**	
9	5.9.5 Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers							
	Lintel outside	1	25.600		0.150		3.840	
	Inside	1	24.000		0.150		3.600	
						Total Quantity	7.440 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	7.440 sqm	
						Say 7.440 sqm @ Rs 653.89 / sqm	**Rs 4864.94**	
10	5.9.3 Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform							
	Roof slab	1	6.500	5.500			35.750	
	Slab edge	1	25.600		0.100		2.561	
	Sunshade	1	1.700	0.600			1.020	
	Sunshade edge	1	2.900	0.100			0.290	
						Total Quantity	39.621 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	39.621 sqm	
						Say 39.621 sqm @ Rs 820.89 / sqm	**Rs 32524.48**	
11	13.1.1 12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)							
	Outside	1	25.600		3.200		81.921	
	Inside	1	24.000		3.200		76.801	
	Parapet outside	1	28.000		0.600		16.800	
	Parapet inside	1	27.200		0.600		16.320	
	Parapet top	1	27.600	0.100			2.761	
	Steps	2	1.000	0.250			0.500	
		3	1.000		0.150		0.450	

	Side	2	0.250		0.150		0.075	
		2	0.250		0.300		0.150	
	Shutter	1*2	4.000		2.100		-16.800	
	Door	1	1.000		2.100		-2.100	
	Window	1	1.500		1.500		-2.250	
						Total Quantity	195.778 sqm	
						Total Deducted Quantity	-21.150 sqm	
						Net Total Quantity	174.628 sqm	
						Say 174.628 sqm @ Rs 316.06 / sqm	**Rs 55192.93**	
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	7.300	6.300			45.990	
						Total Quantity	45.990 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	45.990 sqm	
						Say 45.990 sqm @ Rs 403.73 / sqm	**Rs 18567.54**	
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.							
	Transformer room	1	6.500	5.500			35.750	
	Skirting	1	24.000		0.100		2.401	
						Total Quantity	38.151 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	38.151 sqm	
						Say 38.151 sqm @ Rs 1097.86 / sqm	**Rs 41884.46**	
14	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							
		1	4.000		2.100		8.400	

						Total Quantity	8.400 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	8.400 sqm	
						Say 8.400 sqm @ Rs 3487.20 / sqm	**Rs 29292.48**	
15	10.7 Providing and fixing ball bearing for rolling shutters.							
		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 497.32 / Nos	**Rs 497.32**	
16	21.1.1.1 Providing and fixing aluminium work for doors, windows, ventilators and partitions with extruded built up standard tubular sections/ appropriate Z sections and other sections of approved make conforming to IS : 733 and IS: 1285, fixing with dash fasteners of required dia and size, including necessary filling up the gaps at junctions, i.e. at top, bottom and sides with required EPDM rubber/ neoprene gasket etc. Aluminium sections shall be smooth, rust free, straight, mitred and jointed mechanically wherever required including cleat angle, Aluminnium snap beading for glazing /paneling, C.P. brass/ stainless steel screws, all complete as per architectural drawings and the directions of Engineer-in-charge.(Glazing, paneling and dash fasteners to be paid for separately):For fixed portionAnodised aluminium (anodised transparent or dyed to required shade according to IS : 1868, Minimum anodic coating of grade AC 15)							
	For window frame	1	1.500	1.500	4.500		10.125	
						Total Quantity	10.125 kg	
						Total Deducted Quantity	0.000 kg	
						Net Total Quantity	10.125 kg	
						Say 10.125 kg @ Rs 502.17 / kg	**Rs 5084.47**	
17	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 frame	1	1.500	1.500	4.500		10.125	
						Total Quantity	10.125 kg	
						Total Deducted Quantity	0.000 kg	
						Net Total Quantity	10.125 kg	
						Say 10.125 kg @ Rs 608.11 / kg	**Rs 6157.11**	
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							
	For window shutter	3	0.500		1.500		2.250	
						Total Quantity	2.250 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	2.250 sqm	
						Say 2.250 sqm @ Rs 1184.03 / sqm	**Rs 2664.07**	
19	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 frame	1	1.500	1.500	4.500		10.125	
						Total Quantity	10.125 kg	
						Total Deducted Quantity	0.000 kg	
						Net Total Quantity	10.125 kg	
						Say 10.125 kg @ Rs 217.35 / kg	**Rs 2200.67**	
20	13.43.1 Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer							
	Outside	1	25.600		3.200		81.921	
	Inside	1	24.000		3.200		76.801	
	Parapet outside	1	28.000		0.600		16.800	
	Parapet inside	1	27.200		0.600		16.320	
	Parapet top	1	27.600	0.100			2.761	
	Roof slab bottom	1	6.500	5.500			35.750	
	Projection	2	7.500	0.400			6.000	
		2	5.900	0.400			4.721	
	Sunshade top and bottom	2	1.700	0.600			2.040	
	Edge	1	2.900		0.100		0.290	
	Shutter	1*2	4.000		2.100		-16.800	
	Door	1	1.000		2.100		-2.100	
	Window	1	1.500		1.500		-2.250	
						Total Quantity	243.404 sqm	

						Total Deducted Quantity	-21.150 sqm	
						Net Total Quantity	222.254 sqm	
						Say 222.254 sqm @ Rs 71.09 / sqm	**Rs 15800.04**	
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							
	Outside	1	25.600		3.200		81.921	
	Inside	1	24.000		3.200		76.801	
	Parapet outside	1	28.000		0.600		16.800	
	Parapet inside	1	27.200		0.600		16.320	
	Parapet top	1	27.600	0.100			2.761	
	Roof slab bottom	1	6.500	5.500			35.750	
	Projection	2	7.500	0.400			6.000	
		2	5.900	0.400			4.721	
	Sunshade top and bottom	2	1.700	0.600			2.040	
	Edge	1	2.900		0.100		0.290	
	Shutter	1*2	4.000		2.100		-16.800	
	Door	1	1.000		2.100		-2.100	
	Window	1	1.500		1.500		-2.250	
						Total Quantity	243.404 sqm	
						Total Deducted Quantity	-21.150 sqm	
						Net Total Quantity	222.254 sqm	
						Say 222.254 sqm @ Rs 126.55 / sqm	**Rs 28126.24**	
22	13.16.1 6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)							
	Roof slab bottom	1	6.500	5.500			35.750	
	Projection	2	7.500	0.400			6.000	
		2	5.900	0.400			4.721	
	Sonshade top and bottom	2	1.700	0.600			2.040	
	Edge	1	2.900		0.100		0.290	
						Total Quantity	48.801 sqm	

						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	48.801 sqm	
						Say 48.801 sqm @ Rs 269.26 / sqm	**Rs 13140.16**	
23	10.2 Structural steel work riveted, bolted or welded in built up sections, trusses and framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer all complete.							
	Grill	1	10.700	1.100	10.000		117.700	
						Total Quantity	117.700 kg	
						Total Deducted Quantity	0.000 kg	
						Net Total Quantity	117.700 kg	
						Say 117.700 kg @ Rs 120.54 / kg	**Rs 14187.56**	
Sl No	Description	No	L	B	D	CF	Quantity	Remark
	10DG Room (Cost Index:36.44 %)							
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	1	4.6*4	0.600	0.700		7.728	
						Total Quantity	7.728 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	7.728 cum	
						Say 7.728 cum @ Rs 298.80 / cum	**Rs 2309.13**	
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	1	4.6*4	0.600	0.100		1.104	
						Total Quantity	1.104 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	1.104 cum	
						Say 1.104 cum @ Rs 6857.61 / cum	**Rs 7570.80**	
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	1	4.6*4	0.600	0.600		6.624	

	Basement	1	4.45*4	0.450	0.300		2.403	
						Total Quantity	9.027 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	9.027 cum	
						Say 9.027 cum @ Rs 7249.94 / cum	**Rs 65445.21**	
4	5.9.5 Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers							
	Plinth Belt	4*4	4.200		0.200		13.441	
	Lintel	4*4	4.200		0.150		10.080	
	Shade	3	1.700		0.600		3.060	
	,,	1	2.400		0.600		1.440	
						Total Quantity	28.021 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	28.021 sqm	
						Say 28.021 sqm @ Rs 653.89 / sqm	**Rs 18322.65**	
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 wiork upto plinth level							
	Plinth beam	4	4.200	0.250	0.150		0.630	
	Lintel	4	4.200	0.200	0.150		0.504	
	Shade	3	1.500	0.600	0.100		0.270	
	,,	1	2.200	0.600	0.100		0.132	
						Total Quantity	1.536 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	1.536 cum	
						Say 1.536 cum @ Rs 9947.98 / cum	**Rs 15280.10**	
6	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							

	Slab	1	4.000	4.000			16.000	
	Proj.	4	5.000	0.600			12.000	
	Slab Edge	4	5.600	0.120			2.688	
						Total Quantity	30.688 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	30.688 sqm	
						Say 30.688 sqm @ Rs 923.02 / sqm	**Rs 28325.64**	
7	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							
	Roof	1	5.600	5.600	0.120		3.764	
						Total Quantity	3.764 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	3.764 cum	
						Say 3.764 cum @ Rs 11135.00 / cum	**Rs 41912.14**	
8	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	4.200	0.200	5.000		16.800	
	Door	1	2.000	0.200	2.400		-0.960	
	Window	3	1.200	0.200	1.500		-1.080	
						Total Quantity	16.800 cum	
						Total Deducted Quantity	-2.040 cum	
						Net Total Quantity	14.760 cum	
						Say 14.760 cum @ Rs 7968.75 / cum	**Rs 117618.75**	
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							
	@ 80 Kg/ Cum of CC	1	1.536+3.765		80.000		424.081	

						Total Quantity	424.081 kilogram	
						Total Deducted Quantity	0.000 kilogram	
						Net Total Quantity	424.081 kilogram	
						Say 424.081 kilogram @ Rs 98.92 / kilogram	**Rs 41950.09**	
10	13.1.1 12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)							
	Outside-wall	4	4.400		5.000		88.000	
	Inside	4	4.000		5.000		80.000	
	Door	1*2	2.000		2.400		-9.600	
	Window	3	1.200		1.500		-5.399	
						Total Quantity	168.000 sqm	
						Total Deducted Quantity	-14.999 sqm	
						Net Total Quantity	153.001 sqm	
						Say 153.001 sqm @ Rs 316.06 / sqm	**Rs 48357.50**	
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	1	5.600	5.600			31.360	
						Total Quantity	31.360 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	31.360 sqm	
						Say 31.360 sqm @ Rs 403.73 / sqm	**Rs 12660.97**	
12	13.16.1 6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)							
	Roof slab	1	4.000	4.000			16.000	
	Proj.	4	5.000	0.600			12.000	
	Roof edge	4	5.600		0.120		2.688	
						Total Quantity	30.688 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	30.688 sqm	
						Say 30.688 sqm @ Rs 269.26 / sqm	**Rs 8263.05**	
13	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	4.000	4.000			16.000	
	Skirting	1	16.000		0.100		1.600	
						Total Quantity	17.600 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	17.600 sqm	
						Say 17.600 sqm @ Rs 1777.34 / sqm	**Rs 31281.18**	
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-wall	4	4.400		5.000		88.000	
	Inside	4	4.000		5.000		80.000	
	Door	1*2	2.000		2.400		-9.600	
	Window	3	1.200		1.500		-5.399	
	Roof slab	1	4.000	4.000			16.000	
	Proj.	4	5.000	0.600			12.000	
	Roof edge	4	5.600		0.120		2.688	
						Total Quantity	198.688 sqm	
						Total Deducted Quantity	-14.999 sqm	
						Net Total Quantity	183.689 sqm	
						Say 183.689 sqm @ Rs 71.09 / sqm	**Rs 13058.45**	
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-wall	4	4.400		5.000		88.000	
	Inside	4	4.000		5.000		80.000	
	Door	1*2	2.000		2.400		-9.600	
	Window	3	1.200		1.500		-5.399	
	Roof slab	1	4.000	4.000			16.000	
	Proj.	4	5.000	0.600			12.000	
	Roof edge	4	5.600		0.120		2.688	
						Total Quantity	198.688 sqm	
						Total Deducted Quantity	-14.999 sqm	
						Net Total Quantity	183.689 sqm	

						Say 183.689 sqm @ Rs 126.55 / sqm	**Rs 23245.84**	
16	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	1.200		1.500		5.400	
						Total Quantity	5.400 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	5.400 sqm	
						Say 5.400 sqm @ Rs 5912.90 / sqm	**Rs 31929.66**	
17	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	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 5244.96 / sqm	**Rs 25175.81**	
18	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							
	For window	3	1.200	1.500			5.400	
	Door	1	2.000	2.400		2.0	9.600	
						Total Quantity	15.000 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	15.000 sqm	
						Say 15.000 sqm @ Rs 143.94 / sqm	**Rs 2159.10**	
Sl No	Description	No	L	B	D	CF	Quantity	Remark
11Centrifuge Building (Cost Index:36.44 %)								
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	2.000	2.000	1.600		64.000	

						Total Quantity	64.000 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	64.000 cum	
						Say 64.000 cum @ Rs 298.80 / cum	**Rs 19123.20**	
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)							
	Column Footing	10	2.000	2.000	0.100		4.000	
	Plinth Beam bottm	3*3	3.130	0.350	0.100		0.986	
	,,	2*2	2.800	0.350	0.100		0.392	
	,,	2*2	2.980	0.350	0.100		0.418	
	Floor PCC	6	3.130	3.330	0.100		6.254	
						Total Quantity	12.050 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	12.050 cum	
						Say 12.050 cum @ Rs 7256.36 / cum	**Rs 87439.14**	
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.							
	inside plinth	6	3.130	3.330	0.350		21.889	
						Total Quantity	21.889 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	21.889 cum	
						Say 21.889 cum @ Rs 260.19 / cum	**Rs 5695.30**	
4	5.9.5 Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers							
	Plinth beam							
	PB1	3*6	3.130		0.450		25.353	
	PB2	2*4	2.800		0.450		10.080	
	PB3	2*2	6.200		0.450		11.160	
	GF beam							
	B1	3*3	3.130		0.950		26.762	

	B2	2*2	2.800		0.950		10.640	
	B3	2*2	2.980		1.350		16.093	
	Rs Beam	1	3.330		0.850		2.831	
	Shade	1	3.500		0.600		2.100	
	shade edge	2	0.600		0.100		0.120	
	FF beam							
	B1	3*3	3.130		0.900		25.353	
	B2	2*2	2.800		0.900		10.080	
	B3	2*2	2.980		1.350		16.093	
						Total Quantity	156.665 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	156.665 sqm	
						Say 156.665 sqm @ Rs 653.89 / sqm	**Rs 102441.68**	
5	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	10*4	1.800		0.150		10.800	
						Total Quantity	10.800 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	10.800 sqm	
						Say 10.800 sqm @ Rs 337.42 / sqm	**Rs 3644.14**	
6	5.9.6 Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts							
	Column-GF Column	10	1.700		4.000		68.000	
	Column-FF Column	10	1.700		4.000		68.000	
						Total Quantity	136.000 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	136.000 sqm	
						Say 136.000 sqm @ Rs 869.05 / sqm	**Rs 118190.80**	
7	5.9.3 Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform							
	Slab							
	GF Slab	6	3.130	3.330			62.538	

	FF Slab	6	3.130	3.330			62.538	
	Ope. Side	1	8.660	0.150			1.299	
	Stair op	1	2.000	3.330			-6.660	
						Total Quantity	126.375 sqm	
						Total Deducted Quantity	-6.660 sqm	
						Net Total Quantity	119.715 sqm	
						Say 119.715 sqm @ Rs 820.89 / sqm	**Rs 98272.85**	
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 wiork upto plinth level							
	Column footing-raft							
	Column Footing	10	1.800	1.800	0.150		4.860	
	Isolated Portion	10/3	1.800	1.800	0.750		8.101	
	Grad Slab	6	3.330	3.130	0.150		9.381	
	Column footing-Column							
	Column Pedestal	10	0.250	0.600	0.400		0.600	
	Plinth beam							
	PB1	3*3	3.130	0.250	0.450		3.170	
	PB2	2*2	2.800	0.250	0.450		1.260	
	PB3	2*2	3.980	0.250	0.450		1.791	
						Total Quantity	29.163 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	29.163 cum	
						Say 29.163 cum @ Rs 9947.98 / cum	**Rs 290112.94**	
9	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							
	Slab							
	GF	4	4.700	5.800	0.150		16.357	
	FF (Roof)	4	4.700	5.800	0.120		13.085	
	Slab Proj.	1	38.000	0.600	0.100		2.281	
	RS beam	1	3.330	0.200	0.300		0.200	
	Shade	1	3.500	0.600	0.100		0.211	
	Stair case Portion	1	2.000	3.330	0.150		-0.999	
						Total Quantity	32.134 cum	
						Total Deducted Quantity	-0.999 cum	
						Net Total Quantity	31.135 cum	
						Say 31.135 cum @ Rs 11135.00 / cum	**Rs 346688.23**	
10	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-GF							
	GF Column	10	0.250	0.600	4.000		6.000	
	Beam-GF							
	B1	3*3	3.130	0.250	0.350		2.465	
	B2	2*2	2.800	0.250	0.350		0.980	
	B3	2*2	2.980	0.250	0.550		1.639	
	Column-FF							
	FF Column	10	0.250	0.600	4.000		6.000	
	Beam-FF							
	B1	3*3	3.130	0.250	0.350		2.465	
	B2	2*2	2.800	0.250	0.350		0.980	
	B3	2*2	2.980	0.250	0.550		1.639	

						Total Quantity	22.168 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	22.168 cum	
						Say 22.168 cum @ Rs 11610.43 / cum	**Rs 257380.01**	
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							
	@120 Kg / Cum of Concrete Qty , ie	1	22.168+31.14+29.163		120.000		9896.520	
						Total Quantity	9896.520 kilogram	
						Total Deducted Quantity	0.000 kilogram	
						Net Total Quantity	9896.520 kilogram	
						Say 9896.520 kilogram @ Rs 98.92 / kilogram	**Rs 978963.76**	
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- GF & FF							
	GF 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 7968.75 / cum	**Rs 332352.66**	
13	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	7.000			70.000	
						Total Quantity	70.000 sqm	
						Total Deducted Quantity	0.000 sqm	

						Net Total Quantity	70.000 sqm	
						Say 70.000 sqm @ Rs 1777.34 / sqm	**Rs 124413.80**	
14	13.1.1 12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)							
	GF Plastering							
	inside wall	2	10.000		4.000		80.000	
	,,	2	7.000		4.000		56.000	
	Column Portion	2*4	0.350		4.000		11.200	
	FF Inside	2	10.000		4.000		80.000	
	,,	2	7.000		4.000		56.000	
	Column Portion	2*4	0.350		4.000		11.200	
	Out Side wall	2	10.400		8.750		182.000	
		2	7.400		8.750		129.500	
	Rolling Shutter	2	3.130		3.000		-18.780	
						Total Quantity	605.900 sqm	
						Total Deducted Quantity	-18.780 sqm	
						Net Total Quantity	587.120 sqm	
						Say 587.120 sqm @ Rs 316.06 / sqm	**Rs 185565.15**	
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)							
	Roof Top	1	11.600	8.600			99.760	
						Total Quantity	99.760 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	99.760 sqm	
						Say 99.760 sqm @ Rs 403.73 / sqm	**Rs 40276.10**	
16	13.16.1 6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)							
	slab-							
	GF	1	10.000	7.000			70.000	
	Beam Side	3*2	3.130	0.350			6.573	
	,,	4*2	2.980	0.550			13.112	
	FF	1	10.000	7.000			70.000	
	,,Beam Side	3*2	3.130	0.350			6.573	
	,,	4*2	2.980	0.550			13.112	

	Slab Prj.	1	38.000	0.600			22.800	
	Edge	1	40.400	0.120			4.848	
						Total Quantity	207.018 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	207.018 sqm	
						Say 207.018 sqm @ Rs 269.26 / sqm	**Rs 55741.67**	
17	13.43.1 Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer							
	GF Plastering							
	inside wall	2	10.000		4.000		80.000	
	,,	2	7.000		4.000		56.000	
	Column Portion	2*4	0.350		4.000		11.200	
	FF Inside	2	10.000		4.000		80.000	
	,,	2	7.000		4.000		56.000	
	Column Portion	2*4	0.350		4.000		11.200	
	Out Side wall	2	10.400		8.750		182.000	
		2	7.400		8.750		129.500	
	Rolling Shutter	2	3.130		3.000		-18.780	
	slab-							
	GF	1	10.000	7.000			70.000	
	Beam Side	3*2	3.130	0.350			6.573	
	,,	4*2	2.980	0.550			13.112	
	FF	1	10.000	7.000			70.000	
	,,Beam Side	3*2	3.130	0.350			6.573	
	,,	4*2	2.980	0.550			13.112	
	Slab Prj.	1	38.000	0.600			22.800	
	Edge	1	40.400	0.120			4.848	
						Total Quantity	812.918 sqm	
						Total Deducted Quantity	-18.780 sqm	
						Net Total Quantity	794.138 sqm	
						Say 794.138 sqm @ Rs 71.09 / sqm	**Rs 56455.27**	
18	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							
	GF Plastering							
	inside wall	2	10.000		4.000		80.000	
	,,	2	7.000		4.000		56.000	
	Column Portion	2*4	0.350		4.000		11.200	
	FF Inside	2	10.000		4.000		80.000	
	,,	2	7.000		4.000		56.000	
	Column Portion	2*4	0.350		4.000		11.200	
	Out Side wall	2	10.400		8.750		182.000	
		2	7.400		8.750		129.500	
	Rolling Shutter	2	3.130		3.000		-18.780	
	slab-							
	GF	1	10.000	7.000			70.000	
	Beam Side	3*2	3.130	0.350			6.573	
	,,	4*2	2.980	0.550			13.112	
	FF	1	10.000	7.000			70.000	
	,,Beam Side	3*2	3.130	0.350			6.573	
	,,	4*2	2.980	0.550			13.112	
	Slab Prj.	1	38.000	0.600			22.800	
	Edge	1	40.400	0.120			4.848	
						Total Quantity	812.918 sqm	
						Total Deducted Quantity	-18.780 sqm	
						Net Total Quantity	794.138 sqm	
						Say 794.138 sqm @ Rs 126.55 / sqm	**Rs 100498.16**	
19	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							
	Stair - using MS Channel, MS Angle and MS Flat							
	Stair - Flight	2	2.500	0.900		30.0	135.000	
	Stair landing	1	2.000	1.000		30.0	60.000	
	Hand rails	1	9.000		0.900	15.0	121.500	

	Hand rail - Floor op side	1	5.500		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 110.93 / kg	**Rs 43345.90**	
20	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							
	GF Rolling shutter	1	3.130	3.000			9.390	
						Total Quantity	9.390 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	9.390 sqm	
						Say 9.390 sqm @ Rs 3320.81 / sqm	**Rs 31182.41**	
21	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							
	Stair - using MS Channel, MS Angle and MS Flat							
	Stair - Flight	2	2.500	0.900		2.0	9.000	
	Stair landing	1	2.000	1.000		2.0	4.000	
	Hand rails	1	9.000		0.900		8.100	
	Hand rail - Floor op side	1	5.500		0.900		4.950	
	Rolling shutter	1	3.130		3.000	2.5	23.475	
						Total Quantity	49.525 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	49.525 sqm	
						Say 49.525 sqm @ Rs 149.06 / sqm	**Rs 7382.20**	
Sl No	Description	No	L	B	D	CF	Quantity	Remark
12PSF/ACF Foundation (Cost Index:36.44 %)								

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	12.200	8.200	0.300		30.012	
	Total Quantity						30.012 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						30.012 cum	
	Say 30.012 cum @ Rs 215.37 / cum						**Rs 6463.68**	
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	12.200	8.200	0.150		15.006	
	Total Quantity						15.006 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						15.006 cum	
	Say 15.006 cum @ Rs 7256.36 / cum						**Rs 108888.94**	
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 wiork upto plinth level							
		1	12.000	8.000	0.300		28.800	
	Total Quantity						28.800 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						28.800 cum	
	Say 28.800 cum @ Rs 9947.98 / cum						**Rs 286501.82**	
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	40.000		0.300		12.000	

						Total Quantity	12.000 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	12.000 sqm	
						Say 12.000 sqm @ Rs 337.42 / sqm	**Rs 4049.04**	
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	28.800		30.000		864.000	
						Total Quantity	864.000 kilogram	
						Total Deducted Quantity	0.000 kilogram	
						Net Total Quantity	864.000 kilogram	
						Say 864.000 kilogram @ Rs 98.92 / kilogram	**Rs 85466.88**	
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	12.000	8.000			96.000	
		1	40.000	0.300			12.000	
						Total Quantity	108.000 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	108.000 sqm	
						Say 108.000 sqm @ Rs 403.73 / sqm	**Rs 43602.84**	
Sl No	Description	No	L	B	D	CF	Quantity	Remark
13Sludge Shed (Cost Index:36.44 %)								
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	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 298.80 / cum	**Rs 5526.60**	
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 6857.61 / cum	**Rs 29686.59**	
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 260.19 / cum	**Rs 2276.66**	
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 7216.83 / cum	**Rs 108772.06**	
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	
	Tile 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 11135.00 / cum	**Rs 37881.27**	
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 wiork 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 9947.98 / cum	**Rs 43940.23**	
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 Concrete Qty , ie	1	3.402+4.417			100.0	781.900	
						Total Quantity	781.900 kilogram	
						Total Deducted Quantity	0.000 kilogram	
						Net Total Quantity	781.900 kilogram	
						Say 781.900 kilogram @ Rs 98.92 / kilogram	**Rs 77345.55**	
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 337.42 / sqm	**Rs 1214.71**	
9	5.9.6 Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts							
	Column	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 869.05 / sqm	**Rs 18771.48**	
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	
	Tile 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 653.89 / sqm	**Rs 24507.80**	
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 1461.95 / sqm	**Rs 77190.96**	
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	4.500			97.200	
	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	197.840 sqm	
						Total Deducted Quantity	-14.399 sqm	
						Net Total Quantity	183.441 sqm	
						Say 183.441 sqm @ Rs 316.06 / sqm	**Rs 57978.36**	
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							
	Floor finishing	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 545.69 / sqm	**Rs 13642.25**	
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 120.54 / kg	**Rs 113826.89**	
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	4.500			97.200	
	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	197.840 sqm	
						Total Deducted Quantity	-14.399 sqm	
						Net Total Quantity	183.441 sqm	
						Say 183.441 sqm @ Rs 71.09 / sqm	**Rs 13040.82**	
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	4.500			97.200	
	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	197.840 sqm	
						Total Deducted Quantity	-14.399 sqm	
						Net Total Quantity	183.441 sqm	
						Say 183.441 sqm @ Rs 126.55 / sqm	**Rs 23214.46**	
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 149.06 / sqm	**Rs 6022.02**	
Sl No	Description	No	L	B	D	CF	Quantity	Remark
14Landscaping, green belt formation and re-use of treated water								
						Lump-Sum Total	**Rs 400000.00**	
Sl No	Description	No	L	B	D	CF	Quantity	Remark
15Odour Control system								
						Lump-Sum Total	**Rs 8800000.00**	
Sl No	Description	No	L	B	D	CF	Quantity	Remark
16Providing Solar energy system								
						Lump-Sum Total	**Rs 2500000.00**	
						Total	**36328474.40**	
						Centage @	**0.0%**	
						Centage Amount	**0.00**	
						Provision for GST payments (in %) @	**18.0%**	
						Amount reserved for GST payments	**6539125.39**	
						Total & Centage	**42867599.79**	
						Lumpsum for round off	**0.00**	
						GRAND TOTAL Rs	**42867599.79**	

Rounded Grand Total Rs 4,28,67,600
Rupees Four Crore Twenty Eight Lakh Sixty Seven Thousand Six Hundred Only

Detailed Estimate

SEWERAGE SYSTEM TO KOYILANDY MUNICIPALITY -PHASE 2- CONSTRUCTION OF 3 MLD CAPACITY SEWAGE TREATMENT PLANT AND LAYING SEWERAGE NET WORK TO ZONE 2 OF KOYILANDY MUNICIPALITY- PART- C- ELECTRO-MECHANICAL-2

(Dsor year: **2018**)

Sl No	Description	No	L	B	D	CF	Quantity	Remark
	1MECHANICAL WORKS (Cost Index:36.44 %)							
1	od336560/2021_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 (1W 1S)"- Raw Sewage Transfer Pump-25hp,79lps							
		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 929200.00 / No						**Rs 1858400.00**	
2	od336564/2021_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							
		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 139380.00 / No						**Rs 278760.00**	

3	od336565/2021_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 & Clarifier to sludge sump							
	Sludge Thickener Feed Pump	2					2.000	
	Clarifier to sludge sump	2					2.000	
						Total Quantity	4.000 No	
						Total Deducted Quantity	0.000 No	
						Net Total Quantity	4.000 No	
						Say 4.000 No @ Rs 87112.50 / No	**Rs 348450.00**	
4	od336568/2021_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							
		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 37168.00 / No	**Rs 74336.00**	
5	od336569/2021_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							
		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 74336.00 / No	**Rs 148672.00**	
6	od336571/2021_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 BOQMotor : three phase motor with IP 68 Protection"- Pump for clarifier to PSF							
		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 511060.00 / No	**Rs 1533180.00**	
7	od336575/2021_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 (2W 1 S)" 46HP							
		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 801435.00 / No	**Rs 3205740.00**	
8	od336578/2021_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"							
		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 209070.00 / No	**Rs 418140.00**	
9	od336579/2021_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"							
		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 80724.25 / No	**Rs 161448.50**	
10	od336581/2021_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**	
11	od336584/2021_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 450m/m, length 16-20 mm, dia 22 mm complete as per technical specification or as directed by Engineer in Charge"							
		1				200.0	200.000	
	Total Quantity						200.000 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						200.000 cum	
	Say 200.000 cum @ Rs 10453.50 / cum						**Rs 2090700.00**	
12	od336586/2021_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, suctions 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**	
13	od336588/2021_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	
	Net Total Quantity						2.000 No	
	Say 2.000 No @ Rs 87112.50 / No						**Rs 174225.00**	
14	od336589/2021_2022 "Lifting Mechanism for Air Grid Supply , installation & commissioning of the manually operating chain pulley mechanism to lift the equipments from a height not less than 5m including all equipments , foundation etc"							
		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 11615.00 / No						**Rs 58075.00**	
15	od336590/2021_2022 "SS Gates Supplying at site, installation testing and commissioning of all materials, fabricating, fixing and commissioning of spindle operated open channel sluice gates/shutter of DI make with a peak flow of 145LPS and velocity less than 1m/s at the inleta and outlet of the screen channel to suit the channel sizes as per drawings, tender specifications and as directed by Engineer in Charge"							
		8					8.000	
	Total Quantity						8.000 set	
	Total Deducted Quantity						0.000 set	
	Net Total Quantity						8.000 set	
	Say 8.000 set @ Rs 17422.50 / set						**Rs 139380.00**	
16	od336591/2021_2022 "Mechanical Coarse Screen Supplying all materials, fabricating, fixing and commissioning of mechanical 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 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 69690.00 / set						**Rs 69690.00**	
17	od336592/2021_2022 "Mechanical Fine Screen Supplying all materials, fabricating, fixing and commissioning of mechanical SS Screen Bar of following 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**	
18	od336593/2021_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**	
19	od336594/2021_2022 "Griting Mechanism Supplying at site all electro-mechanical equipments, fabricating, fixing and commissioning of the griting 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**	
20	od336595/2021_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"							
		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 813050.00 / No	**Rs 813050.00**	
21	od336596/2021_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**	
22	od336597/2021_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**	
23	od336598/2021_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**	
24	od336599/2021_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 patform 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**	
25	od336600/2021_2022 "Wheel Barrow Supply of three wheel type wheel barrow of capcity 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**	
26	od336601/2021_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**	
27	od336602/2021_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**	
28	od336603/2021_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**

29	od336604/2021_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, butteryfly 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"							
		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 522675.00 / No						**Rs 1568025.00**	
30	od336605/2021_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, butteryfly 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"							
		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 551712.50 / No						**Rs 1655137.50**	
31	od336606/2021_2022 "Centrifuge System Supply at site, installation and commissioning of filter press /centrifuge system. Filter Press shall be automated, recessed type press with SS fabricated structure pipe button surface and SS flat parallel bar, with PP cloth. Filter operations to be mechanical. Outlet cake consistency should not be more than 35%							

	moisture. The capacity of the filter press shall be 1cum/hr. The Filter Press Unit shall be mounted on a platform and all around drain system to be provided to prevent the filtrate water from contaminating the entire surroundings as per the specifications or as directed by the 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 348450.00 / No						**Rs 696900.00**	
32	od336607/2021_2022 SLUDGE DEWATERING and Packing UNIT -Volute is a dewatering unit for convenient sludge dewatering.Machine is available for dry sludge (DS) output of 1.0kg/hr to 750kg/hr the Sludge to be dried from 70% moisture content to 10%.The similar type can be suggested.The Packing of the dried sludge to be packed in the packing machine.The necessary electrification civil works,cost of packing machine,cost of gunny bags for 6months.The machines suggested should be cost effective							
		2					2.000	
	Total Quantity						2.000 L.S	
	Total Deducted Quantity						0.000 L.S	
	Net Total Quantity						2.000 L.S	
	Say 2.000 L.S @ Rs 1200000.00 / L.S						**Rs 2400000.00**	
33	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.)							
		1				8.0	8.000	
	Total Quantity						8.000 kg	
	Total Deducted Quantity						0.000 kg	
	Net Total Quantity						8.000 kg	
	Say 8.000 kg @ Rs 681.59 / kg						**Rs 5452.72**	
34	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 1815.06 / metre	**Rs 90753.00**	
35	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	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 2722.86 / metre	**Rs 54457.20**	
36	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 3436.45 / metre	**Rs 68729.00**	
37	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 6262.46 / metre	**Rs 250498.40**	
Sl No	Description	No	L	B	D	CF	Quantity	Remark
2ELECTRICAL WORKS (Cost Index:36.44 %)								
1	od336561/2021_2022 "250kVA Indoor Transformer and 11 kv indoor free standing cubcle type vcb switch gear panel of suitable capacity Supplying, installation, testing and commissioning of 250KVA, 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 suuply 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	
	Net Total Quantity						1.000 No	
	Say 1.000 No @ Rs 1000000.00 / No						**Rs 1000000.00**	
2	od336563/2021_2022 "CT - PT Unit and TOD meter Supplying, installation, testing and commissioning of Indoor type 11KV CT-PT Unit 3Phase Dry type confirming to IS 2026 (Part 1 to Part 5) & as per KSEB specification complete in all respects as required at site or as directed by the 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 200000.00 / No						**Rs 200000.00**	
3	od336566/2021_2022 "10kA Surge (Lightining Arrester) Supply & Installation of Heavy Duty hot dipped galvanized 10kA lightining arrester suitable for the 11kV incoming line complying IS: 3070 (Part - III) &IEC 60099 - 4 (2009) 50Hz, rated voltage of 12kV with a operating load of 10kV with terminals made of MS/Aluminium with Zinc plating full set or as directed by the 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 4646.00 / No						**Rs 9292.00**	
4	od336567/2021_2022 Main LT panel Supplying, installation, testing and commissioning of S3phase 415V, 50Hz, floor mounted MS Cubicle type panel board suitable for connecting 250 kva transformer and all motors including all inter connections, wiring in all etc using 14 gauge CRCA sheet painted with 2coats of superior quality enamel paint of approved color over a coat of superior quality iron primer of approved quality as per specification complete in all respects as required at site conforming to relevant BIS standards and KSEB standards or as directed by the 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 350000.00 / No						**Rs 350000.00**	

5	od336570/2021_2022 "Earthing Equipments for Transformer 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 250000.00 / L.S	**Rs 250000.00**	
6	od336572/2021_2022 "250KVA Diesel Generator Providing, Installing, Testing and Commissioning of ?Silent Type? Diesel Generating set alongwith having Prime Power Rating of 250 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 1509950.00 / No	**Rs 1509950.00**	
7	od336574/2021_2022 "Auto Mains Failure Unit (AMF Panel) Fabricating, Installing, Testing & Commissioning of automatic mains failure control including auto by-pass panel, suitable for 250 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	od336576/2021_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	od336577/2021_2022 "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 compartmenatised 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."							
		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	od336580/2021_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.							
		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 1889258.73 / L.S	**Rs 1889258.73**	
11	od336582/2021_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.							
		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	od336583/2021_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 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	od336585/2021_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	od336587/2021_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/MB/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 1626100.00 / L.S	**Rs 1626100.00**

Sl No	Description	No	L	B	D	CF	Quantity	Remark
3Charges for Power allocation to KSEB and power extension by cable								
						Lump-Sum Total	**Rs 9000000.00**	
Sl No	Description	No	L	B	D	CF	Quantity	Remark
4Tools and Plants								
						Lump-Sum Total	**Rs 200000.00**	
Sl No	Description	No	L	B	D	CF	Quantity	Remark
5Providing SCADA system								
						Lump-Sum Total	**Rs 2500000.00**	
						Total	**43720111.80**	
						Centage @	**0.0%**	
						Centage Amount	**0.00**	
						Provision for GST payments (in %) @	**18.0%**	
						Amount reserved for GST payments	**7869620.12**	
						Total & Centage	**51589731.92**	
						Lumpsum for round off	**0.00**	
						GRAND TOTAL Rs	**51589731.92**	
Rounded Grand Total Rs 5,15,89,732								
Rupees Five Crore Fifteen Lakh Eighty Nine Thousand Seven Hundred and Thirty Two Only								

Detailed Estimate

SEWERAGE SYSTEM TO KOYILANDY MUNICIPALITY PHASE 2 - CONSTRUCTION OF 3MLD CAPACITY SEWAGE TREATMENT PLANT AND LAYING SEWERAGE NETWORK TO ZONE 2 OF KOYILANDY MUNICIPALITY - PART D- NETWORK

(Dsor year: **2018**)

Sl No	Description	No	L	B	D	CF	Quantity	Remark
1Laying of sewer network (Cost Index:36.44 %)								
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	1	34117.000				34117.000	
	Inspection Chamber to Manhole	1	40000.000				40000.000	
						Total Quantity	74117.000 metre	
						Total Deducted Quantity	0.000 metre	
						Net Total Quantity	74117.000 metre	
						Say 74117.000 metre @ Rs 30.63 / metre	**Rs 2270203.71**	
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	1	34117.000	1.000			34117.000	
	Inspection Chamber to Manhole	1	40000.000	0.600			24000.000	
						Total Quantity	58117.000 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	58117.000 sqm	
						Say 58117.000 sqm @ Rs 363.20 / sqm	**Rs 21108094.40**	
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)							

	Demolishing of cement concrete (Municipality roads)	1	2000.000	1.000	0.100		200.000	
	Inspection Chamber to Manhole	1	2500.000	0.600	0.100		150.000	
						Total Quantity	350.000 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	350.000 cum	
						Say 350.000 cum @ Rs 2057.94 / cum	**Rs 720279.00**	
4	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 : 11/2 coarse sand : 3 graded stone aggregate 20 mm nominal size)							
	Reconcreting demolished roads (Municipality roads)	1	2000.000	1.000	0.100		200.000	
	Inspection Chamber to Manhole	1	2500.000	0.600	0.100		150.000	
						Total Quantity	350.000 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	350.000 cum	
						Say 350.000 cum @ Rs 8540.67 / cum	**Rs 2989234.50**	
5	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							
	Sewer	1	34117.000	0.600			20470.200	
	Inspection Chamber to Manhole	1	40000.000	0.600			24000.000	
						Total Quantity	44470.200 metre	
						Total Deducted Quantity	0.000 metre	
						Net Total Quantity	44470.200 metre	
						Say 44470.200 metre @ Rs 96.77 / metre	**Rs 4303381.25**	
6	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)							

	Sewer	1	34117.000	0.200			6823.401	
	Inspection Chamber to Manhole	1	40000.000	0.200			8000.000	
						Total Quantity	14823.401 metre	
						Total Deducted Quantity	0.000 metre	
						Net Total Quantity	14823.401 metre	
						Say 14823.401 metre @ Rs 28.12 / metre	**Rs 416834.04**	
7	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)							
	Quantity from calculation sheet	1	46529.000			0.8	37223.201	
	Inspection Chamber to Manhole	1	40000.000	0.600	1.100	0.8	21120.001	
						Total Quantity	58343.202 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	58343.202 cum	
						Say 58343.202 cum @ Rs 558.99 / cum	**Rs 32613266.49**	
8	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 consolidatingeach deposited layer by ramming, watering, etc. and disposing of surplus excavated soil as directed, within a lead of 50 m :" Ordinary Rock. (Ref. Item No. 2.13.1 of DSR)							
	Quantity from calculation sheet	1	46529.000			0.2	9305.801	
	Inspection Chamber to Manhole	1	40000.000	0.600	1.100	0.2	5280.001	
						Total Quantity	14585.802 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	14585.802 cum	

						Say 14585.802 cum @ Rs 811.82 / cum	**Rs 11841045.78**	
9	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)							
	Quantity from calculation sheet	1	13198.656			0.8	10558.925	
						Total Quantity	10558.925 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	10558.925 cum	
						Say 10558.925 cum @ Rs 666.03 / cum	**Rs 7032560.82**	
10	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)							
	Quantity from calculation sheet	1	13198.656			0.2	2639.732	
						Total Quantity	2639.732 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	2639.732 cum	
						Say 2639.732 cum @ Rs 1003.79 / cum	**Rs 2649736.58**	
11	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)							
	Quantity from Calculation Sheet	1	69.750				69.750	
						Total Quantity	69.750 cum	

						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	69.750 cum	
						Say 69.750 cum @ Rs 1195.76 / cum	**Rs 83404.26**	
12	100.1.8 Excavating trenches of required width for pipes, cables, etc including excavation for sockets, and dressing of sides, ramming of bottoms, depth exceeding 4.5 m in depth but not exceeding 6.0 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 : 4.5m to 6.0m. Ordinary Rock. (Ref. Item No. 2.15 of DSR)							
	Quantity from Calculation Sheet	1	38.925				38.925	
						Total Quantity	38.925 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	38.925 cum	
						Say 38.925 cum @ Rs 1387.73 / cum	**Rs 54017.39**	
13	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							
		2	15912.000	2.250			71604.000	
						Total Quantity	71604.000 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	71604.000 sqm	
						Say 71604.000 sqm @ Rs 192.52 / sqm	**Rs 13785202.08**	
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).							
		1	1500.000	2.800			4200.000	
						Total Quantity	4200.000 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	4200.000 sqm	
						Say 4200.000 sqm @ Rs 971.93 / sqm	**Rs 4082106.00**	
15	od328805/2021_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	12000.000	0.800	0.100		960.000	
						Total Quantity	960.000 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	960.000 cum	
						Say 960.000 cum @ Rs 2303.86 / cum	**Rs 2211705.60**	
16	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)							
	R C C bedding concrete where ever necessary	1	12000.000	0.600	0.100		720.000	
						Total Quantity	720.000 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	720.000 cum	
						Say 720.000 cum @ Rs 8642.31 / cum	**Rs 6222463.20**	
17	100.98.226 Supply of uPVC Pipe, IS 4985: 2000 , 8kg/cm2, 160mm Dia.							
	MH to IC	1	40000.000				40000.000	
						Total Quantity	40000.000 metre	
						Total Deducted Quantity	0.000 metre	
						Net Total Quantity	40000.000 metre	
						Say 40000.000 metre @ Rs 905.95 / metre	**Rs 36238000.00**	
18	100.98.214 Supply of uPVC Pipe, IS 4985: 2000 , 6kg/cm2, 110mm Dia.							
	For House connection	3000	8.000				24000.000	
						Total Quantity	24000.000 metre	
						Total Deducted Quantity	0.000 metre	
						Net Total Quantity	24000.000 metre	
						Say 24000.000 metre @ Rs 291.80 / metre	**Rs 7003200.00**	
19	od328806/2021_2022 Conveying to site, lowering into trenches, laying to correct line and grade using CC holding clamps, 160mm PVC SN 8 (8 Kg/Cm2) 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 , de watering 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							
	MH to IC	1	40000.000				40000.000	
						Total Quantity	40000.000 metre	
						Total Deducted Quantity	0.000 metre	
						Net Total Quantity	40000.000 metre	
						Say 40000.000 metre @ Rs 214.42 / metre	**Rs 8576800.00**	
20	100.9.9 Laying UPVC pipes of class 2 to class 6 and specials, lowering to the trenches already made, placing in position aligning the pipe line to the lines and levels and jointing the pipes and specials with solvent cement and testing the pipe line with water to the required test pressure (excluding cost of pipes and specials). 110 mm nominal outer dia pipes.							
	For house connection	3000	8.000				24000.000	
						Total Quantity	24000.000 metre	
						Total Deducted Quantity	0.000 metre	
						Net Total Quantity	24000.000 metre	
						Say 24000.000 metre @ Rs 129.07 / metre	**Rs 3097680.00**	
21	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							
		150	8.000	5.000*.746			4476.000	
						Total Quantity	4476.000 hour	
						Total Deducted Quantity	0.000 hour	
						Net Total Quantity	4476.000 hour	
						Say 4476.000 hour @ Rs 435.24 / hour	**Rs 1948134.24**	
22	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							
		30	15.000*.746	5.000			1678.500	
						Total Quantity	1678.500 hour	
						Total Deducted Quantity	0.000 hour	
						Net Total Quantity	1678.500 hour	

	Say 1678.500 hour @ Rs 540.40 / hour						**Rs 907061.40**	
23	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 errection,cost of fuel, lubrication oil and other stores, pay of staff etc complete							
		60	25.000*.746	5.000			5595.000	
	Total Quantity						5595.000 hour	
	Total Deducted Quantity						0.000 hour	
	Net Total Quantity						5595.000 hour	
	Say 5595.000 hour @ Rs 978.66 / hour						**Rs 5475602.70**	
24	od328807/2021_2022 Supply of PE Pipe PE 100 (IS 14333/ sewerage pipe with latest IS), 8kg, 200mm Outer Dia.							
		1	42720.000				42720.000	
	Total Quantity						42720.000 metre	
	Total Deducted Quantity						0.000 metre	
	Net Total Quantity						42720.000 metre	
	Say 42720.000 metre @ Rs 1268.79 / metre						**Rs 54202708.80**	
25	od328808/2021_2022 Supply of PE Pipe PE 100 (IS 14333), 8kg, 250mm Outer Dia							
		1	1573.000				1573.000	
	Total Quantity						1573.000 metre	
	Total Deducted Quantity						0.000 metre	
	Net Total Quantity						1573.000 metre	
	Say 1573.000 metre @ Rs 2079.09 / metre						**Rs 3270408.57**	
26	100.98.144 Supply of PE Pipe, PE100, PN8, 315mm dia, conforming to IS 4984/2016.							
		1	1518.000				1518.000	
	Total Quantity						1518.000 metre	
	Total Deducted Quantity						0.000 metre	
	Net Total Quantity						1518.000 metre	
	Say 1518.000 metre @ Rs 2625.00 / metre						**Rs 3984750.00**	
27	100.98.146 Supply of PE Pipe, PE100, PN8, 400mm dia, conforming to IS 4984/2016.							
		1	523.000				523.000	

						Total Quantity	523.000 metre	
						Total Deducted Quantity	0.000 metre	
						Net Total Quantity	523.000 metre	
						Say 523.000 metre @ Rs 4215.85 / metre	**Rs 2204889.55**	
28	100.10.7 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 hydrulic 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. 200 mm OD HDPE pipe NEW DATA							
	Open cut	1	31109.000				31109.000	
						Total Quantity	31109.000 metre	
						Total Deducted Quantity	0.000 metre	
						Net Total Quantity	31109.000 metre	
						Say 31109.000 metre @ Rs 321.86 / metre	**Rs 10012742.74**	
29	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 hydrulic 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							
	Qty	1	997.000				997.000	
						Total Quantity	997.000 metre	
						Total Deducted Quantity	0.000 metre	
						Net Total Quantity	997.000 metre	
						Say 997.000 metre @ Rs 444.59 / metre	**Rs 443256.23**	
30	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 hydrulic 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							
	open cut	1	1488.000				1488.000	
						Total Quantity	1488.000 metre	
						Total Deducted Quantity	0.000 metre	
						Net Total Quantity	1488.000 metre	
						Say 1488.000 metre @ Rs 584.65 / metre	**Rs 869959.20**	
31	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 hydrulic 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							
		1	523.000				523.000	
						Total Quantity	523.000 metre	
						Total Deducted Quantity	0.000 metre	
						Net Total Quantity	523.000 metre	
						Say 523.000 metre @ Rs 734.87 / metre	**Rs 384337.01**	
32	7.6.1 Coursed rubble masonry (first sort) with hard stone in foundation and plinth with:Cement mortar 1:6 (1 cement : 6 coarse sand)							
	Culvert regions / RR portions	1	8.000	0.400	0.450		1.441	
		8	6.000	0.450	0.450		9.720	
						Total Quantity	11.161 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	11.161 cum	
						Say 11.161 cum @ Rs 8661.01 / cum	**Rs 96665.53**	
33	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							
	Anchor required	50	0.700	(.5+.8)/2	0.700		15.925	
						Total Quantity	15.925 cum	
						Total Deducted Quantity	0.000 cum	

						Net Total Quantity	15.925 cum	
						Say 15.925 cum @ Rs 9142.09 / cum	**Rs 145587.78**	
34	5.22.6 Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth levelThermo - Mechanically Treated bars of grade Fe-500D or more							
	steel	1	15.900			60.0	954.000	
						Total Quantity	954.000 kilogram	
						Total Deducted Quantity	0.000 kilogram	
						Net Total Quantity	954.000 kilogram	
						Say 954.000 kilogram @ Rs 98.92 / kilogram	**Rs 94369.68**	
35	od328809/2021_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							
		1	600.000				600.000	
						Total Quantity	600.000 No	
						Total Deducted Quantity	0.000 No	
						Net Total Quantity	600.000 No	
						Say 600.000 No @ Rs 7276.70 / No	**Rs 4366020.00**	
36	od328810/2021_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							
		1	1500.000				1500.000	
						Total Quantity	1500.000 No	
						Total Deducted Quantity	0.000 No	
						Net Total Quantity	1500.000 No	

	Say 1500.000 No @ Rs 3673.89 / No						**Rs 5510835.00**	
37	od328811/2021_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							
		1	450.000				450.000	
	Total Quantity						450.000 No	
	Total Deducted Quantity						0.000 No	
	Net Total Quantity						450.000 No	
	Say 450.000 No @ Rs 7929.36 / No						**Rs 3568212.00**	
38	od328812/2021_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							
		1	600.000				600.000	
	Total Quantity						600.000 No	
	Total Deducted Quantity						0.000 No	
	Net Total Quantity						600.000 No	
	Say 600.000 No @ Rs 7472.74 / No						**Rs 4483644.00**	
39	od328813/2021_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							

	Qty	1	250.000				250.000	
						Total Quantity	250.000 No	
						Total Deducted Quantity	0.000 No	
						Net Total Quantity	250.000 No	
						Say 250.000 No @ Rs 7687.45 / No	**Rs 1921862.50**	
Sl No	Description	No	L	B	D	CF	Quantity	Remark
	2Road Restoration work of laying of sewers and pumping main. (Cost Index:36.44 %)							
1	od335236/2021_2022 Excavation for roadwork in soil with hydraulic excavator of 0.9Cum 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 1000m							
	Sewer- Municipality Roads	1	21534.000	1.200	0.300		7752.240	
	pumping mains (1900)	1	1900.000	1.000	0.300		570.000	
	Lifting stations	1	1970.000	1.000	0.300		591.000	
	Manhole to Inspection Chamber	1	25500.000	1.000	0.300		7650.000	
						Total Quantity	16563.240 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	16563.240 cum	
						Say 16563.240 cum @ Rs 58.08 / cum	**Rs 961992.98**	
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- Municipality Roads	1	21534.000	1.200	0.150		3876.120	
	pumping mains (1900)	1	1900.000	1.000	0.150		285.000	
	Lifting stations	1	1970.000	1.000	0.150		295.500	
	Manhole to Inspection Chamber	1	25500.000	1.000	0.150		3825.000	
						Total Quantity	8281.620 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	8281.620 cum	
						Say 8281.620 cum @ Rs 549.44 / cum	**Rs 4550253.29**	
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- Municipality Roads	1	21534.000	1.200	0.150		3876.120	
	pumping mains (1900)	1	1900.000	1.000	0.150		285.000	
	Lifting stations	1	1970.000	1.000	0.150		295.500	
	Manhole to Inspection Chamber	1	25500.000	1.000	0.150		3825.000	
						Total Quantity	8281.620 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	8281.620 cum	
						Say 8281.620 cum @ Rs 3128.64 / cum	**Rs 25910207.60**	
4	od328773/2021_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- Municipality Roads	1	21534.000	1.200			25840.800	
	pumping mains (1900)	1	1900.000	1.000			1900.000	
	Lifting stations	1	1970.000	1.000			1970.000	
	Manhole to Inspection Chamber	1	25500.000	1.000			25500.000	
						Total Quantity	55210.800 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	55210.800 sqm	
						Say 55210.800 sqm @ Rs 59.03 / sqm	**Rs 3259093.52**	
5	od328776/2021_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- Municipality Roads	1	21534.000	1.200			25840.800	
	pumping mains (1900)	1	1900.000	1.000			1900.000	
	Lifting stations	1	1970.000	1.000			1970.000	

	Manhole to Inspection Chamber	1	25500.000	1.000			25500.000	
						Total Quantity	55210.800 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	55210.800 sqm	
						Say 55210.800 sqm @ Rs 10.41 / sqm	**Rs 574744.43**	
6	od328781/2021_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- Municipality Roads	1	21534.000	1.200			25840.800	
	pumping mains (1900)	1	1900.000	1.000			1900.000	
	Lifting stations	1	1970.000	1.000			1970.000	
	Manhole to Inspection Chamber	1	25500.000	1.000			25500.000	
						Total Quantity	55210.800 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	55210.800 sqm	
						Say 55210.800 sqm @ Rs 176.52 / sqm	**Rs 9745810.42**	
7	od328783/2021_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- Municipality Roads	1	21534.000	1.200			25840.800	
	pumping mains (1900)	1	1900.000	1.000			1900.000	
	Lifting stations	1	1970.000	1.000			1970.000	
	Manhole to Inspection Chamber	1	25500.000	1.000			25500.000	
						Total Quantity	55210.800 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	55210.800 sqm	

	Say 55210.800 sqm @ Rs 78.00 / sqm						**Rs 4306442.40**	
Sl No	Description	No	L	B	D	CF	Quantity	Remark
3Construction of Pumping stations (Cost Index:36.44 %)								
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 14.87 / sqm						**Rs 5948.00**	
2	od328761/2021_2022 Sinking wells above up to 3.50 m dia. and up to 6.00 m inside and depth up to 3.00 m below spring level in in 50% all kind of soil and 50% ordinary rocksoil (specify type of soil) to lines and levels and plumb by scooping out earth from inside and below the steining using necessary appliances including hire and labour for the same including dumping the spoil beyond the initial lead of 50 m etc. complete.Initial depth upto 1.5m							
	PH1	1	1.500				1.500	
	Total Quantity						1.500 metre	
	Total Deducted Quantity						0.000 metre	
	Net Total Quantity						1.500 metre	
	Say 1.500 metre @ Rs 42720.83 / metre						**Rs 64081.25**	
3	od328765/2021_2022 Sinking wells above up to 3.50 m dia. and up to 6.00 m inside and depth up to 3.00 m below spring level in in 50% all kind of soil and 50% ordinary rocksoil (specify type of soil) to lines and levels and plumb by scooping out earth from inside and below the steining using necessary appliances including hire and labour for the same including dumping the spoil beyond the initial lead of 50 m etc. complete.First depth upto 1.5m to 3.0m							
	PH1	1	1.500				1.500	
	Total Quantity						1.500 metre	
	Total Deducted Quantity						0.000 metre	
	Net Total Quantity						1.500 metre	
	Say 1.500 metre @ Rs 46357.39 / metre						**Rs 69536.08**	
4	od328768/2021_2022 Sinking wells above up to 3.50 m dia. and up to 6.00 m inside and depth up to 3.00 m below spring level in in 50% all kind of soil and 50% ordinary rocksoil (specify type of soil) to lines and levels and plumb by							

	scooping out earth from inside and below the steining using necessary appliances including hire and labour for the same including dumping the spoil beyond the initial lead of 50 m etc. complete.First depth upto 3.0m to 4.5m							
	PH1	1	1.500				1.500	
						Total Quantity	1.500 metre	
						Total Deducted Quantity	0.000 metre	
						Net Total Quantity	1.500 metre	
						Say 1.500 metre @ Rs 49992.72 / metre	**Rs 74989.08**	
5	od328772/2021_2022 Sinking wells above up to 3.50 m dia. and up to 6.00 m inside and depth up to 3.00 m below spring level in in 50% all kind of soil and 50% ordinary rocksoil (specify type of soil) to lines and levels and plumb by scooping out earth from inside and below the steining using necessary appliances including hire and labour for the same including dumping the spoil beyond the initial lead of 50 m etc. complete.First depth upto 4.5m to 6.0m							
	PH1	1	1.500				1.500	
						Total Quantity	1.500 metre	
						Total Deducted Quantity	0.000 metre	
						Net Total Quantity	1.500 metre	
						Say 1.500 metre @ Rs 53630.54 / metre	**Rs 80445.81**	
6	od328777/2021_2022 Sinking wells above up to 3.50 m dia. and up to 6.00 m inside and depth up to 3.00 m below spring level in in 50% all kind of soil and 50% ordinary rocksoil (specify type of soil) to lines and levels and plumb by scooping out earth from inside and below the steining using necessary appliances including hire and labour for the same including dumping the spoil beyond the initial lead of 50 m etc. complete.First depth upto 6.0m to 7.5m							
	PH1	1	0.650				0.650	
						Total Quantity	0.650 metre	
						Total Deducted Quantity	0.000 metre	
						Net Total Quantity	0.650 metre	
						Say 0.650 metre @ Rs 57265.88 / metre	**Rs 37222.82**	
7	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	5000.000				5000.000	
						Total Quantity	5000.000 Kwh	

						Total Deducted Quantity	0.000 Kwh	
						Net Total Quantity	5000.000 Kwh	
						Say 5000.000 Kwh @ Rs 37.18 / Kwh	**Rs 185900.00**	
8	od328759/2021_2022 Reinforcement cement concrete M-30using 20mm&down size (nominal size) broken stone using SRC for raft slab ,well kerb and steining excluding formwork,curing etc complete.as per the specifications and drawings with alllead and lift							
	PH1	1	3.14/4	(5.2*5.2)-(4.2*4.2)	7.150		52.760	
	Bottom Plug	1	3.14/4	5.2*5.2	0.500		10.614	
	curb top rectangular	1	3.140	4.7*0.50	0.200		1.476	
	Curb triangular	1	3.14/2	4.7*.50	0.500		1.845	
	Cover slab	1	3.14/4	5.2*5.2	0.200		4.246	
						Total Quantity	70.941 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	70.941 cum	
						Say 70.941 cum @ Rs 9555.17 / cum	**Rs 677853.31**	
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							
		1	70.941			80.0	5675.281	
						Total Quantity	5675.281 kilogram	
						Total Deducted Quantity	0.000 kilogram	
						Net Total Quantity	5675.281 kilogram	
						Say 5675.281 kilogram @ Rs 98.92 / kilogram	**Rs 561398.80**	
10	5.9.1 Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete							
	Curb- PH1	1	3.140	4.700	1.200		17.710	
						Total Quantity	17.710 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	17.710 sqm	
						Say 17.710 sqm @ Rs 337.42 / sqm	**Rs 5975.71**	
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- PH1	1	3.140/4	5.2*5.2			21.227	
						Total Quantity	21.227 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	21.227 sqm	
						Say 21.227 sqm @ Rs 820.89 / sqm	**Rs 17425.03**	
12	5.9.12 Centering and shuttering including strutting, etc. and removal of form for:Well steining							
	PH1	2	3.140	4.700	7.150		211.040	
						Total Quantity	211.040 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	211.040 sqm	
						Say 211.040 sqm @ Rs 251.25 / sqm	**Rs 53023.80**	
13	od328782/2021_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.							
		1	41.000				41.000	
						Total Quantity	41.000 No	
						Total Deducted Quantity	0.000 No	
						Net Total Quantity	41.000 No	
						Say 41.000 No @ Rs 424.89 / No	**Rs 17420.49**	
Sl No	Description	No	L	B	D	CF	Quantity	Remark
4Compound wall with gate for Pumping stations (Cost Index:36.44 %)								
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	320.000	0.600	0.800		153.601	
						Total Quantity	153.601 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	153.601 cum	
						Say 153.601 cum @ Rs 884.54 / cum	**Rs 135866.23**	
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	320.000	0.600	0.800		153.601	
	Total Quantity						153.601 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						153.601 cum	
	Say 153.601 cum @ Rs 7256.36 / cum						**Rs 1114584.15**	
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)							
		1	320.000	0.450	0.450		64.800	
	Total Quantity						64.800 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						64.800 cum	
	Say 64.800 cum @ Rs 7249.94 / cum						**Rs 469796.11**	
4	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	320.000	0.220	1.800		126.721	
	Total Quantity						126.721 cum	
	Total Deducted Quantity						0.000 cum	
	Net Total Quantity						126.721 cum	
	Say 126.721 cum @ Rs 7293.33 / cum						**Rs 924218.07**	
5	13.1.1 12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)							
		2	320.000		1.800		1152.000	
	Total Quantity						1152.000 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						1152.000 sqm	
	Say 1152.000 sqm @ Rs 316.06 / sqm						**Rs 364101.12**	
6	13.43.1 Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer							
		2	320.000		1.800		1152.000	
	Total Quantity						1152.000 sqm	

						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	1152.000 sqm	
						Say 1152.000 sqm @ Rs 71.09 / sqm	**Rs 81895.68**	
7	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	320.000		1.800		1152.000	
						Total Quantity	1152.000 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	1152.000 sqm	
						Say 1152.000 sqm @ Rs 108.06 / sqm	**Rs 124485.12**	
8	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 155.13 / kg	**Rs 124104.00**	
Sl No	Description	No	L	B	D	CF	Quantity	Remark
5Construction of screen chamber and Valve chamber (Cost Index:36.44 %)								
1	od328759/2021_2022 Reinforcement cement concrete M-30using 20mm&down size (nominal size) broken stone using SRC for raft slab ,well kerb and steining excluding formwork,curing etc complete.as per the specifications and drawings with alllead and lift							
	Side wall	1	2*(3+2)	0.500	(6.24+5.46)		58.500	
	working platform	1	2.500	0.750	0.150		0.282	
	bottom plug	1	2.500	1.500	0.450		1.688	
						Total Quantity	60.470 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	60.470 cum	
						Say 60.470 cum @ Rs 9555.17 / cum	**Rs 577801.13**	
2	5.9.1							

	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete							
	Side	2*1	2*(3+2)		(6.24+5.46)		234.000	
	working platform	1	2.500		0.150		0.375	
						Total Quantity	234.375 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	234.375 sqm	
						Say 234.375 sqm @ Rs 337.42 / sqm	**Rs 79082.81**	
3	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	60.470			100.0	6047.000	
						Total Quantity	6047.000 kilogram	
						Total Deducted Quantity	0.000 kilogram	
						Net Total Quantity	6047.000 kilogram	
						Say 6047.000 kilogram @ Rs 98.92 / kilogram	**Rs 598169.24**	
4	od328778/2021_2022 Sinking section for screen chamber of internal dimmension of 2.5 m x 1.5 m as per approved design , drawing specification to the given alignment and to any depth in all kinds of strata including soft rock, including excavation, dewatering until completion of works application of knetledge for alround seating of well , removal of bouldars, burried timbers, trunks,fossils, including depositingthe excavated stuff and stacking of useful materials and disposal of the surplus earth/unsuitable material as directed by the engineer with necessarry shoring and strutting, barricading etcincluding cost of ringbunds/cofferdams/approved suitable arrangementys for diversion of water cours etc. The rate include providing the required equipments, oil lubricants,labour and any other mechanical operationthat may be required in all respects for succesfull completion of work, including cost of materials , tools and plants, machinaries, powersupply at site etc, including all necessarry safety arrangements like danger lighting, fencing etc including cost of all materials and labour charges with all lead and lift etc as per the direction of Engineer for upto 6.00m beyond initial 4.50m depth.							
	PH1	1	1.150				1.150	
						Total Quantity	1.150 metre	
						Total Deducted Quantity	0.000 metre	
						Net Total Quantity	1.150 metre	
						Say 1.150 metre @ Rs 24201.55 / metre	**Rs 27831.78**	
5	od328780/2021_2022 Sinking section for screen chamber of internal dimmension of 2.5 m x 1.5 m as per approved design , drawing specification to the given alignment and to any depth in all kinds of strata including soft rock,							

	including excavation, dewatering until completion of works application of knetledge for alround seating of well , removal of bouldars, burried timbers, trunks,fossils, including depositingthe excavated stuff and stacking of useful materials and disposal of the surplus earth/unsuitable material as directed by the engineer with necessarry shoring and strutting, barricading etcincluding cost of ringbunds/cofferdams/approved suitable arrangementys for diversion of water cours etc. The rate include providing the required equipments, oil lubricants,labour and any other mechanical operationthat may be required in all respects for succesfull completion of work, including cost of materials , tools and plants, machinaries, powersupply at site etc, including all necessarry safety arrangements like danger lighting, fencing etc including cost of all materials and labour charges with all lead and lift etc as per the direction of Engineer for upto 4.50m beyond initial 3.00m depth.							
	PH1	1	1.500				1.500	
						Total Quantity	1.500 metre	
						Total Deducted Quantity	0.000 metre	
						Net Total Quantity	1.500 metre	
						Say 1.500 metre @ Rs 15751.66 / metre	**Rs 23627.49**	
6	od328784/2021_2022 Sinking section for screen chamber of internal dimmension of 2.5 m x 1.5 m as per approved design , drawing specification to the given alignment and to any depth in all kinds of strata including soft rock, including excavation, dewatering until completion of works application of knetledge for alround seating of well , removal of bouldars, burried timbers, trunks,fossils, including depositingthe excavated stuff and stacking of useful materials and disposal of the surplus earth/unsuitable material as directed by the engineer with necessarry shoring and strutting, barricading etcincluding cost of ringbunds/cofferdams/approved suitable arrangementys for diversion of water cours etc. The rate include providing the required equipments, oil lubricants,labour and any other mechanical operationthat may be required in all respects for succesfull completion of work, including cost of materials , tools and plants, machinaries, powersupply at site etc, including all necessarry safety arrangements like danger lighting, fencing etc including cost of all materials and labour charges with all lead and lift etc as per the direction of Engineer for upto 3.00m below ground level							
	PH1	1	3.000				3.000	
						Total Quantity	3.000 metre	
						Total Deducted Quantity	0.000 metre	
						Net Total Quantity	3.000 metre	
						Say 3.000 metre @ Rs 14834.78 / metre	**Rs 44504.34**	
7	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	5000.000				5000.000	
						Total Quantity	5000.000 Kwh	

						Total Deducted Quantity	0.000 Kwh	
						Net Total Quantity	5000.000 Kwh	
						Say 5000.000 Kwh @ Rs 37.18 / Kwh	**Rs 185900.00**	
8	od328787/2021_2022 Providing and laying in position cement concrete of specified grade. using sulphate resistant cement , 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).							
		1	3.500	2.500	0.500		4.375	
						Total Quantity	4.375 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	4.375 cum	
						Say 4.375 cum @ Rs 7951.69 / cum	**Rs 34788.64**	
9	13.7.2 12 mm cement plaster finished with a floating coat of neat cement of mix:1:4 (1 cement : 4 fine sand)							
	Side wall	1	2*(3+2)		6.24+5.46		117.000	
	Working Platform	1	2.500		0.150		0.375	
						Total Quantity	117.375 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	117.375 sqm	
						Say 117.375 sqm @ Rs 388.79 / sqm	**Rs 45634.23**	
10	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	1	2*(3+2)		6.24+5.46		117.000	
	Working Platform	1	2.500		0.150		0.375	
						Total Quantity	117.375 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	117.375 sqm	
						Say 117.375 sqm @ Rs 108.06 / sqm	**Rs 12683.54**	
11	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	1	2*(3+2)		6.24+5.46		117.000	
	Working Platform	1	2.500		0.150		0.375	
						Total Quantity	117.375 sqm	

						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	117.375 sqm	
						Say 117.375 sqm @ Rs 125.59 / sqm	**Rs 14741.13**	
12	od328782/2021_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.							
		38					38.000	
						Total Quantity	38.000 No	
						Total Deducted Quantity	0.000 No	
						Net Total Quantity	38.000 No	
						Say 38.000 No @ Rs 424.89 / No	**Rs 16145.82**	
Sl No	Description	No	L	B	D	CF	Quantity	Remark
	6Construction of Valve chamber (Cost Index:36.44 %)							
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 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)							
	Qty- valve chamber 1	1	4.600	2.600	1.800		21.528	chamber 1- 7*2*1.5
	qty - valve chamber 2	1	2.600	1.600	1.800		7.488	chamber - 2* 1 *1.5
						Total Quantity	29.016 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	29.016 cum	
						Say 29.016 cum @ Rs 558.99 / cum	**Rs 16219.65**	
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)							
	Qty- valve chamber 1	1	4.600	2.600	0.300		3.588	chamber 1- 7*2*1.5

	qty - valve chamber 2	1	2.600	1.600	0.300		1.248	chamber - 2* 1 *1.5
						Total Quantity	4.836 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	4.836 cum	
						Say 4.836 cum @ Rs 666.03 / cum	**Rs 3220.92**	
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-sidewall	1	2*(4.4+2)	0.200	1.500		3.841	chamber 1- 7*2*1.5
	bottom plug	1	4.400	2.400	0.300		3.168	
	cover slab	1	4.400	2.400	0.200		2.112	
	qty - valve chamber 2-side wall	1	2*(2.2+1.2)	0.200	1.500		2.041	chamber - 2* 1 *1.5
	bottom plug	1	2.400	1.400	0.300		1.008	
	cover slab	1	2.400	1.400	0.200		0.672	
						Total Quantity	12.842 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	12.842 cum	
						Say 12.842 cum @ Rs 9142.09 / cum	**Rs 117402.72**	
4	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	12.842			80.0	1027.361	
						Total Quantity	1027.361 kilogram	
						Total Deducted Quantity	0.000 kilogram	
						Net Total Quantity	1027.361 kilogram	
						Say 1027.361 kilogram @ Rs 98.92 / kilogram	**Rs 101626.55**	
5	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-sidewall	1	2*(4.4+2)		1.500		19.201	chamber 1- 7*2*1.5
	bottom plug	1	4.400		0.300		1.320	

	cover slab	1	4.400		0.200		0.881	
	qty - valve chamber 2-side wall	1	2*(2.4+1)		1.500		10.200	chamber - 2* 1 *1.5
	bottom plug	1	2.400		0.300		0.720	
	cover slab	1	2.400		0.200		0.480	
						Total Quantity	32.802 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	32.802 sqm	
						Say 32.802 sqm @ Rs 414.71 / sqm	**Rs 13603.32**	
6	od328782/2021_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	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 424.89 / No	**Rs 3399.12**	
Sl No	Description	No	L	B	D	CF	Quantity	Remark
	7Construction of Control room and Generator Room (Cost Index:36.44 %)							
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 884.54 / cum	**Rs 32720.90**	
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	0.100		2.312	
	Floor	1	5.000	4.000	0.150		3.000	

	,,	1	5.000	4.000	0.080		1.600	
						Total Quantity	6.912 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	6.912 cum	
						Say 6.912 cum @ Rs 7256.36 / cum	**Rs 50155.96**	
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	
	Isolated Portion	8/3	1.500	1.500	0.450		2.700	
	Column Pedestal	8	0.200	0.400	1.200		0.769	
	Grade slab	1	5.000	4.000	0.150		3.000	
	Plinth beam	2*3	3.270	0.200	0.450		1.766	
	,,	2	3.600	0.200	0.450		0.649	
	,,	1	4.000	0.200	0.450		0.361	
	Ramp	2	3.000	1.500	0.100		0.900	
						Total Quantity	13.745 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	13.745 cum	
						Say 13.745 cum @ Rs 9142.09 / cum	**Rs 125658.03**	
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	4.900		3.137	
	Lintel	2	3.270	0.200	0.300		0.393	
	,,	4	3.270	0.200	0.150		0.393	
	,,	2	3.600	0.200	0.150		0.217	
	,,	1	4.000	0.200	0.150		0.120	
	Shade	1	11.800	0.750	0.100		0.886	
	,,	1	11.8+2*4.4	0.600	0.100		1.237	
	Vertical	2	0.600	0.100	0.900		0.108	

	Beam	4	3.600	0.200	0.330		0.951	
	,,	2*3	3.270	0.200	0.230		0.903	
	Slab	1	11.200	5.000	0.120		6.720	
						Total Quantity	15.065 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	15.065 cum	
						Say 15.065 cum @ Rs 11022.71 / cum	**Rs 166057.13**	
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	0.100		9.248	
	Footing RCC	8*4	1.500	1.500	0.200		14.400	
						Total Quantity	23.648 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	23.648 sqm	
						Say 23.648 sqm @ Rs 337.42 / sqm	**Rs 7979.31**	
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	1	30.000		0.450		13.500	
	,,	4	4.000		0.450		7.200	
	,,	3*2	3.270		0.450		8.829	
	Lintel	2*2	3.270		0.300		3.924	
	Bottom	2	3.270	0.200			1.308	
	Lintel	4*2	3.270		0.150		3.924	
	Lintel	2*2	3.600		0.150		2.160	
	,,	1*2	4.000		0.150		1.200	
	Bottom	5	1.500	0.200			1.501	
	Beam	4*2	3.600		0.330		9.505	
	Bottom	4	3.600	0.200			2.881	
	Beam	6*2	3.270		0.230		9.026	
	Bottom	6	3.270	0.200			3.925	
						Total Quantity	68.883 sqm	
						Total Deducted Quantity	0.000 sqm	

						Net Total Quantity	68.883 sqm	
						Say 68.883 sqm @ Rs 653.89 / sqm	**Rs 45041.90**	
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	1.200		0.750		7.200	
	Column above Plinth	8	1.200	4.900			47.040	
						Total Quantity	54.240 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	54.240 sqm	
						Say 54.240 sqm @ Rs 869.05 / sqm	**Rs 47137.27**	
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	11.800	0.750			8.851	
	,,	1	11.8+2*4.4	0.600			12.361	
	Vertical	2*2	0.600		0.900		2.160	
	Shade Edge	6	0.600		0.100		0.360	
	,,	2	0.750		0.100		0.151	
	Slab	3	4.000	3.270			39.240	
	,, Projection	2	11.200	0.120			2.688	
	,,	2	5.000	0.120			1.200	
						Total Quantity	67.011 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	67.011 sqm	
						Say 67.011 sqm @ Rs 923.02 / sqm	**Rs 61852.49**	
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 7968.75 / cum	**Rs 165805.78**	
10	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 of Steel of 1 Cum of CC	1	13.745+15.065			100.0	2881.000	
						Total Quantity	2881.000 kilogram	
						Total Deducted Quantity	0.000 kilogram	
						Net Total Quantity	2881.000 kilogram	
						Say 2881.000 kilogram @ Rs 98.92 / kilogram	**Rs 284988.52**	
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 316.06 / sqm	**Rs 98727.66**	
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 293.14 / sqm	**Rs 42496.80**	
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 3487.20 / sqm	**Rs 68418.86**	
14	od328795/2021_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 3852.42 / sqm	**Rs 34671.78**	
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 8040.95 / cum	**Rs 6432.76**	
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 414.71 / sqm	**Rs 20320.79**	
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 71.09 / sqm	**Rs 29611.90**	
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 108.06 / sqm	**Rs 45011.42**	
19	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							
	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 155.13 / kg	**Rs 22338.72**	
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	
						Net Total Quantity	58.051 sqm	
						Say 58.051 sqm @ Rs 143.94 / sqm	**Rs 8355.86**	
Sl No	Description	No	L	B	D	CF	Quantity	Remark
8Providing Cable Trenches (Cost Index:36.44 %)								
1	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)							
		1	6.000	1.050	0.100		0.631	
						Total Quantity	0.631 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	0.631 cum	
						Say 0.631 cum @ Rs 6857.61 / cum	**Rs 4327.15**	
2	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	6.000	1.050	0.100		0.631	

						Total Quantity	0.631 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	0.631 cum	
						Say 0.631 cum @ Rs 9142.09 / cum	**Rs 5768.66**	
3	13.9.1 Cement plaster 1:3 (1 cement : 3 coarse sand) finished with a floating coat of neat cement.12 mm cement plaster							
		1	6.000	1.050	1.050		6.616	
						Total Quantity	6.616 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	6.616 sqm	
						Say 6.616 sqm @ Rs 414.71 / sqm	**Rs 2743.72**	
4	od328764/2021_2022 supplying and providing checkered plate 6mm thick over the cable trench including painting with a coat of iron primer							
		1	30.000	0.800			24.000	
						Total Quantity	24.000 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	24.000 sqm	
						Say 24.000 sqm @ Rs 6997.51 / sqm	**Rs 167940.24**	
Sl No	Description	No	L	B	D	CF	Quantity	Remark
	9Bath cum Toilets (Cost Index:36.44 %)							
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 884.54 / cum	**Rs 5628.33**	
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 7256.36 / cum	**Rs 7031.41**	
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 7249.94 / cum	**Rs 80916.58**	
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 9249.88 / cum	**Rs 108778.59**	
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 11564.93 / cum	**Rs 40673.86**	
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 98.92 / kilogram	**Rs 27697.60**	
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 6857.61 / cum	**Rs 6857.61**	
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 316.06 / sqm	**Rs 33065.25**	
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 293.14 / sqm	**Rs 11826.15**	
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 338.10 / sqm	**Rs 7043.30**	
11	od328785/2021_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 4816.51 / No	**Rs 9633.02**	
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 1746.02 / sqm	**Rs 5238.06**	
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 1097.86 / sqm	**Rs 9880.74**	
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 33.84 / sqm	**Rs 670.03**	
15	13.40 Distempering 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 139.44 / sqm	**Rs 2760.91**	
Sl No	Description	No	L	B	D	CF	Quantity	Remark

10Mechanical, Electrical - Pumpsets, grit chamber screen, generator, transformer & allied works complete (Cost Index:36.44 %)

1	od328753/2021_2022 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 assemby as per form 4 of IS 8623 using 2mm CRCA sheet as per approved design and requirement, with front and rear accessembly ,bus bar chembers,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 chember 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 apropriate 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)IH&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 armourd aluminum conductor cable length as per site condition.connection from suction up to header line.(three year additional replacement warranty additional to 2 years = total 5 year -Including replacement of parts or pump,motors,panel board fully.)							
	PH1	2	27.000				54.000	
						Total Quantity	54.000 Hp	
						Total Deducted Quantity	0.000 Hp	
						Net Total Quantity	54.000 Hp	
						Say 54.000 Hp @ Rs 25395.04 / Hp	**Rs 1371332.16**	
2	od328762/2021_2022 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							

		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 10350.00 / No						**Rs 31050.00**	
3	od328766/2021_2022 Supply and delivery of 250 mm suitable flexible joint coupling for easy dismantling of delivery pipes and valves with Tie bolts with angular deflection 5 Degree							
		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 12650.00 / No						**Rs 37950.00**	
4	od328769/2021_2022 Supply and delivery of 200 mm CI Sluice Valves suitable for the sewage pump sets one no. for each pump sets .							
		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 80500.00 / No						**Rs 80500.00**	
5	od328786/2021_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 .							
		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**	
6	od328788/2021_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**	
7	od328789/2021_2022 Supply and delivery of Diaphragm type pressure gauge with necessary S.S tubes and isolating valves							
		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**	
8	od328791/2021_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**	
9	od328793/2021_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 							
		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	100.98.460 Supply of CI Double Flanged Sluice Valve Conforming to IS 14846 - 2000, Sluice Valve with Cap PN 1.6, Size 150mm.							
		2					2.000	3 + 1
					Total Quantity		2.000 No	
					Total Deducted Quantity		0.000 No	
					Net Total Quantity		2.000 No	
					Say 2.000 No @ Rs 6770.65 / No		**Rs 13541.30**	
11	100.31.1.5 "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) :							

	200 mm diameter. Class I" Data derived from item no.18.31.4.1 of DAR							
		2					2.000	3 + 1
						Total Quantity	2.000 Nos	
						Total Deducted Quantity	0.000 Nos	
						Net Total Quantity	2.000 Nos	
						Say 2.000 Nos @ Rs 1567.42 / Nos	**Rs 3134.84**	
12	100.98.461 Supply of CI Double Flanged Sluice Valve Conforming to IS 14846 - 2000, Sluice Valve with Cap PN 1.6, Size 200mm.							
		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 11794.00 / No	**Rs 23588.00**	
13	od328794/2021_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.							
		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 25875.00 / No	**Rs 51750.00**	
14	od328796/2021_2022 Supply, delivery and erection of 200 mm CIDF 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**	
15	od328797/2021_2022 Supply, delivery and erection of 200 mm CIDF 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 kg	

	Total Deducted Quantity						0.000 kg	
	Net Total Quantity						1.000 kg	
	Say 1.000 kg @ Rs 174.22 / kg						**Rs 174.22**	
16	od328798/2021_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**	
17	od328799/2021_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**	
18	od346199/2021_2022 Estimate for Mechanical and Allied Electrical works - ELECTRICAL PANELS AND CABLES Supply, Delivery of M.V control panel of wall mounting type made up of 14 SWG M.S Sheet of size to suit the L.T metering arrangements by KSEB. The board is to be supplied with 3 Nos of fuse carriers, MCCB with neutral and earthing arrangements as per I.E rules. Supply and delivery of floor mounting type MV control panel of vermin proof, dust proof, modular type consisting of the following accessories and controls. The control panel shall be of enclosed type and built with compartmentalized modular type cubical. All cubical shall be constructed from 14 SWG, M.S sheet at the bottom and rear and 12 SWG M.S Sheet at front. . The interior and exterior of the panels and compartment shall be treated with one coat of primer and two coats of stove enameled light gray shade suitable for electric applications. The panel should be supplied with 4 nos of copper bus bars of ample carrying capacity properly sleeved with respective colour codes.Set1 Incoming 1. 150 A MCCB / 35KA with over load, short circuit protection 2. (0-500 v) Voltmeter (w) selector switch -1set3. Ammeter 0-300A with phase selector switch – 1 set4. 3 phase / 4 wire KWH meter – 1 no5. Earth fault relay – 1 set6. Slide locking type fuses – 1set Supply and installation of suitable starters in the above pump houseses(7). 63 A TPN MCCB for lighting control and spare – 2noN.B (a) Necessary CTs should be provided for safe guarding the instruments wherever necessary(b)							

	The supply should be terminated through A.M.F panel of Genset offered for Auto start operation during EB power failure with in 15 secsTwin earthing the plant and equipment as per IE roles including cost of GI flats (continuous earthing) etc complete.set1Cabling 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 excluding cost of flat submersible cable connecting main panel board and submersible pump sets thro starter control board and isolator 3 ½ core 35 sq mm armourd aluminum conductor cable of suitable length as per site condition connecting EB pole and EB meter and control panel boardm30 SupplyLighting LoadSupply and completion of required house wiring for accommodating the following including DB panels, cost of wire, cost of PVC conduits, earthing etc.1. SV lamp to be fixed on the top of control room -1no (250w)2. Industrial type tube lights inside the control room.-8 nos (40w)3. 4 Nos CFL (not exceeding 25 W) at suitable locations with fittings.4. 15 A plug and socket with control switch – 2 nos5. 5 A plug and socket with control switch – 2 nos6. Portable lamp with 25W CFL bulb and 15 M cable-1 no7. Pedestal fan -1 no The above electrical items as per IE rules includes cost of materials such as bulbs and fittings etc. Supply and delivery of silent diesel generator set of 82.5 Kva with AMF panel with suitable engine capacity conforming to relevent IS specifications, water cooled, six cylinders comprising of suitable altemator 3 phase, 0.8PF, 4 pole with panel board, digital type voltmeter, anneter, Hertz meter, kwh meter, MCCB with acoustic enclosure as per CPCP norms including cost of battery charger, cost of battery etc. complete, including cost of cabling, earthing, etc. suitable for outdoor application as per IE rules including cost of platform etc. complete.set1 Air valves Supply and delivery of following safety items ,including cost of same.L SI. Fire extinguisher of required capacity (powder type 2 no’s) II. Fire buckets with stand 5no’s III. Rubber mat to be laid in front of all the panel boards including starter panelsSupply and delivery of tools required for maintenance works including double end spanners, ring spanners, screw drivers,etc and Supply and erection of 1 number 50KVA Diesel Generator							
		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 2000000.00 / L.S	**Rs 2000000.00**	
Sl No	Description	No	L	B	D	CF	Quantity	Remark
	11Pumping mains (Cost Index:36.44 %)							
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 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)							
	PH1 to STP- 200DI	1	3850.000	0.800	1.150	0.8	2833.600	
						Total Quantity	2833.600 cum	
						Total Deducted Quantity	0.000 cum	

						Net Total Quantity	2833.600 cum	
						Say 2833.600 cum @ Rs 558.99 / cum	**Rs 1583954.06**	
2	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 consolidatingeach deposited layer by ramming, watering, etc. and disposing of surplus excavated soil as directed, within a lead of 50 m :" Ordinary Rock. (Ref. Item No. 2.13.1 of DSR)							
	PH1 to STP- 200DI	1	3850.000	0.800	1.150	0.18	637.560	
						Total Quantity	637.560 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	637.560 cum	
						Say 637.560 cum @ Rs 811.82 / cum	**Rs 517583.96**	
3	100.1.9 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 Hard Rock(Requiring Blasting). (Ref. Item No. 2.13.2 of DSR)							
	PH1 to STP- 200DI	1	3850.000	0.800	1.150	0.02	70.840	
						Total Quantity	70.840 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	70.840 cum	
						Say 70.840 cum @ Rs 1149.71 / cum	**Rs 81445.46**	
4	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)							
	Concrete Roads	1	200.000	1.000	0.150		30.000	
						Total Quantity	30.000 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	30.000 cum	
						Say 30.000 cum @ Rs 2057.94 / cum	**Rs 61738.20**	
5	100.98.117							

	Supply of DI K9 Pipe Conforming to IS 8329/2000, 200mm Dia.							
		1	3850.000				3850.000	
						Total Quantity	3850.000 metre	
						Total Deducted Quantity	0.000 metre	
						Net Total Quantity	3850.000 metre	
						Say 3850.000 metre @ Rs 2100.55 / metre	**Rs 8087117.50**	
6	100.14.3 Conveying and laying S&S Centrifugally Cast (Spun) / Ductile Iron Pipes conforming to IS: 8329 excluding cost of pipes and specials : 200 mm dia Ductile Iron Class K-9 Pipes Data derived from 18.72.17 in DAR							
		1	3850.000				3850.000	
						Total Quantity	3850.000 metre	
						Total Deducted Quantity	0.000 metre	
						Net Total Quantity	3850.000 metre	
						Say 3850.000 metre @ Rs 122.86 / metre	**Rs 473011.00**	
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	2000.000				2000.000	
						Total Quantity	2000.000 metre	
						Total Deducted Quantity	0.000 metre	
						Net Total Quantity	2000.000 metre	
						Say 2000.000 metre @ Rs 28.12 / metre	**Rs 56240.00**	
8	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							
		650					650.000	
						Total Quantity	650.000 joint	
						Total Deducted Quantity	0.000 joint	
						Net Total Quantity	650.000 joint	
						Say 650.000 joint @ Rs 260.40 / joint	**Rs 169260.00**	
9	18.83.5 Labour for cutting C.I. pipe with steel saw.200 mm diameter C.I. pipe							
		40					40.000	

						Total Quantity	40.000 Each Cut	
						Total Deducted Quantity	0.000 Each Cut	
						Net Total Quantity	40.000 Each Cut	
						Say 40.000 Each Cut @ Rs 433.40 / Each Cut	**Rs 17336.00**	
10	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	25.000				25.000	
						Total Quantity	25.000 quintal	
						Total Deducted Quantity	0.000 quintal	
						Net Total Quantity	25.000 quintal	
						Say 25.000 quintal @ Rs 20247.70 / quintal	**Rs 506192.50**	
11	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							
		1	3850.000				3850.000	
						Total Quantity	3850.000 metre	
						Total Deducted Quantity	0.000 metre	
						Net Total Quantity	3850.000 metre	
						Say 3850.000 metre @ Rs 40.14 / metre	**Rs 154539.00**	
12	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	10	1.000	1.000	1.000		10.000	
						Total Quantity	10.000 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	10.000 cum	
						Say 10.000 cum @ Rs 8642.31 / cum	**Rs 86423.10**	
13	5.9.1 Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete							
		10	4.000				40.000	
						Total Quantity	40.000 sqm	

						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	40.000 sqm	
						Say 40.000 sqm @ Rs 337.42 / sqm	**Rs 13496.80**	
14	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	10.000			80.0	800.000	
						Total Quantity	800.000 kilogram	
						Total Deducted Quantity	0.000 kilogram	
						Net Total Quantity	800.000 kilogram	
						Say 800.000 kilogram @ Rs 98.92 / kilogram	**Rs 79136.00**	
Sl No	Description	No	L	B	D	CF	Quantity	Remark
12Laying PE pipes via HDD Method above 3m depth (Cost Index:36.44 %)								
1	od328756/2021_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 including 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							
	250MM HDPE	1	576.000				576.000	
	315MM HDPE	1	30.000				30.000	
						Total Quantity	606.000 metre	
						Total Deducted Quantity	0.000 metre	
						Net Total Quantity	606.000 metre	
						Say 606.000 metre @ Rs 6445.97 / metre	**Rs 3906257.82**	
2	od328760/2021_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 HDPE 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							
	200MM HDPE	1	11611.000				11611.000	
						Total Quantity	11611.000 metre	
						Total Deducted Quantity	0.000 metre	
						Net Total Quantity	11611.000 metre	
						Say 11611.000 metre @ Rs 5100.12 / metre	**Rs 59217493.32**	
Sl No	Description	No	L	B	D	CF	Quantity	Remark
	13Construction of Man holes (Cost Index:36.44 %)							
1	od328755/2021_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, embeded 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 anticorrossive 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)							
		754					754.000	275-(123-already done, 50-precast MH)
						Total Quantity	754.000 No	
						Total Deducted Quantity	0.000 No	
						Net Total Quantity	754.000 No	
						Say 754.000 No @ Rs 58049.94 / No	**Rs 43769654.76**	
2	od328758/2021_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, embeded 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 anticorrossive 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)							
		420					420.000	
						Total Quantity	420.000 No	
						Total Deducted Quantity	0.000 No	
						Net Total Quantity	420.000 No	
						Say 420.000 No @ Rs 76668.65 / No	**Rs 32200833.00**	
3	od328763/2021_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, embeded 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 anticorrossive 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)							
		302					302.000	
						Total Quantity	302.000 No	
						Total Deducted Quantity	0.000 No	
						Net Total Quantity	302.000 No	
						Say 302.000 No @ Rs 153988.35 / No	**Rs 46504481.70**	
4	od328770/2021_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, embeded 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 anticorrossive 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)							
		159					159.000	
						Total Quantity	159.000 No	

							Total Deducted Quantity	0.000 No	
							Net Total Quantity	159.000 No	
							Say 159.000 No @ Rs 196474.41 / No	**Rs 31239431.19**	
5	od328774/2021_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, embeded 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 anticorrossive 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)								
		136					136.000	asramom-4, h&C2-18, H&C1-3	
							Total Quantity	136.000 No	
							Total Deducted Quantity	0.000 No	
							Net Total Quantity	136.000 No	
							Say 136.000 No @ Rs 236432.82 / No	**Rs 32154863.52**	
6	od328775/2021_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, embeded 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 anticorrossive 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 6.50m (internal diameter-1500mm)								
		20					20.000		
							Total Quantity	20.000 No	
							Total Deducted Quantity	0.000 No	
							Net Total Quantity	20.000 No	
							Say 20.000 No @ Rs 248508.47 / No	**Rs 4970169.40**	

Sl No	Description	No	L	B	D	CF	Quantity	Remark
14Road Restoration - to PWD/NH (Cost Index:36.44 %)								
1	od328752/2021_2022 PWD Berm Cutting							
	For Inspection Chamber	3050	1.000	1.000			3050.000	
						Total Quantity	3050.000 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	3050.000 sqm	
						Say 3050.000 sqm @ Rs 321.29 / sqm	**Rs 979934.50**	
2	od328754/2021_2022 PWD Road reformation Charges- BT Cutting							
		1	13063.000	1.000		1.5	19594.500	
						Total Quantity	19594.500 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	19594.500 sqm	
						Say 19594.500 sqm @ Rs 2759.43 / sqm	**Rs 54069651.14**	
3	od328757/2021_2022 Road restoration charges for BM & BC Tar Cutting							
		1	11900.000	1.000	1.500		17850.000	
						Total Quantity	17850.000 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	17850.000 sqm	
						Say 17850.000 sqm @ Rs 3633.49 / sqm	**Rs 64857796.50**	
Sl No	Description	No	L	B	D	CF	Quantity	Remark
15Lifting Stations and Allied work (Cost Index:36.44 %)								
1	100.3.1.1 Earthwork open well excavation (above water) for wells of dia. upto 2.50 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.1071 & 1074							
	LS1	3.14	1.100	1.100	1.500		5.700	
	LS5	3.14	1.200	1.200	1.500		6.783	
	LS6	3.14	1.100	1.100	1.500		5.700	
	LS7	3.14	1.200	1.200	1.500		6.783	
	LS8	3.14	1.200	1.200	1.500		6.783	

	LS13	3.14	1.200	1.200	1.500		6.783	
						Total Quantity	38.532 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	38.532 cum	
						Say 38.532 cum @ Rs 535.87 / cum	**Rs 20648.14**	
2	100.3.1.2 Earthwork open well excavation (above water) for wells of dia. upto 2.50 m in all kinds of soil and conveying and depositing the spoil within initial lead of 50m and lift from 1.5m to 3.0m including neat banking. NEW DATA (Prepared based on PHED SDB - Item No.1073 & 1076							
	LS1	3.14	1.100	1.100	1.500		5.700	
	LS5	3.14	1.200	1.200	1.500		6.783	
	LS6	3.14	1.100	1.100	1.500		5.700	
	LS7	3.14	1.200	1.200	1.500		6.783	
	LS8	3.14	1.200	1.200	1.500		6.783	
	LS13	3.14	1.200	1.200	1.500		6.783	
						Total Quantity	38.532 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	38.532 cum	
						Say 38.532 cum @ Rs 589.49 / cum	**Rs 22714.23**	
3	100.3.1.3 Earthwork open well excavation (above water) for wells of dia. upto 2.50 m in all kinds of soil and conveying and depositing the spoil within initial lead of 50m and lift from 3.0m to 4.5m including neat banking. NEW DATA (Prepared based on PHED SDB - Item No.1073 & 1076							
	LS1	3.14	1.100	1.100	1.500		5.700	
	LS5	3.14	1.200	1.200	1.500		6.783	
	LS6	3.14	1.100	1.100	1.500		5.700	
	LS7	3.14	1.200	1.200	1.500		6.783	
	LS8	3.14	1.200	1.200	1.500		6.783	
	LS13	3.14	1.200	1.200	1.500		6.783	
						Total Quantity	38.532 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	38.532 cum	
						Say 38.532 cum @ Rs 643.04 / cum	**Rs 24777.62**	

4	100.3.1.4 Earth work open well excavation (above water for wells of dia. upto 2.50 m in all kinds of soil and conveying and depositing the spoil within intial lead of 50m and lift from 4.5 m to 6.0m including neat banking. NEW DATA(Prepared based on PHED SDB- Item No. 1073&1076							
	LS1	3.14	1.100	1.100	1.500		5.700	
	LS5	3.14	1.200	1.200	1.500		6.783	
	LS6	3.14	1.100	1.100	1.500		5.700	
	LS7	3.14	1.200	1.200	1.230		5.562	
	LS8	3.14	1.200	1.200	1.500		6.783	
	LS13	3.14	1.200	1.200	1.290		5.833	
						Total Quantity	36.361 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	36.361 cum	
						Say 36.361 cum @ Rs 696.66 / cum	**Rs 25331.25**	
5	100.3.1.5 Earthwork open well excavation (above water) for wells of dia. upto 2.50 m in all kinds of soil and conveying and depositing the spoil within initial lead of 50m and lift from 6.0m to 7.5m including neat banking. NEW DATA (Prepared based on PHED SDB - Item No.1073 & 1076							
	LS1	3.14	1.100	1.100	0.090		0.342	
	LS5	3.14	1.200	1.200	0.490		2.216	
	LS6	3.14	1.100	1.100	0.210		0.798	
	LS8	3.14	1.200	1.200	0.310		1.402	
						Total Quantity	4.758 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	4.758 cum	
						Say 4.758 cum @ Rs 750.22 / cum	**Rs 3569.55**	
6	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							
	LS2	3.14	1.350	1.350	1.500		8.584	
	LS3	3.14	1.600	1.600	1.500		12.058	
	LS9	3.14	1.450	1.450	1.500		9.903	

	LS10	3.14	1.600	1.600	1.500		12.058	
	LS11	3.14	1.450	1.450	1.500		9.903	
	LS12	3.14	1.350	1.350	1.500		8.584	
	LS14	3.14	1.400	1.400	1.500		9.232	
						Total Quantity	70.322 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	70.322 cum	
						Say 70.322 cum @ Rs 513.76 / cum	**Rs 36128.63**	
7	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							
	LS2	3.14	1.350	1.350	1.500		8.584	
	LS3	3.14	1.600	1.600	1.500		12.058	
	LS9	3.14	1.450	1.450	1.500		9.903	
	LS10	3.14	1.600	1.600	1.500		12.058	
	LS11	3.14	1.450	1.450	1.500		9.903	
	LS12	3.14	1.350	1.350	1.500		8.584	
	LS14	3.14	1.400	1.400	1.500		9.232	
						Total Quantity	70.322 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	70.322 cum	
						Say 70.322 cum @ Rs 565.13 / cum	**Rs 39741.07**	
8	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							
	LS2	3.14	1.350	1.350	1.500		8.584	
	LS3	3.14	1.600	1.600	1.500		12.058	
	LS9	3.14	1.450	1.450	1.500		9.903	
	LS10	3.14	1.600	1.600	1.500		12.058	
	LS11	3.14	1.450	1.450	1.500		9.903	
	LS12	3.14	1.350	1.350	1.500		8.584	

	LS14	3.14	1.400	1.400	1.220		7.509	
						Total Quantity	68.599 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	68.599 cum	
						Say 68.599 cum @ Rs 739.78 / cum	**Rs 50748.17**	
9	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							
	LS2	3.14	1.350	1.350	1.500		8.584	
	LS3	3.14	1.600	1.600	1.500		12.058	
	LS9	3.14	1.450	1.450	1.500		9.903	
	LS10	3.14	1.600	1.600	1.500		12.058	
	LS11	3.14	1.450	1.450	1.500		9.903	
	LS12	3.14	1.350	1.350	1.500		8.584	
						Total Quantity	61.090 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	61.090 cum	
						Say 61.090 cum @ Rs 2077.50 / cum	**Rs 126914.48**	
10	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							
	LS2	3.14	1.350	1.350	0.900		5.151	
	LS3	3.14	1.600	1.600	0.330		2.653	
	LS9	3.14	1.450	1.450	0.530		3.499	
	LS10	3.14	1.600	1.600	0.620		4.984	
	LS11	3.14	1.450	1.450	0.390		2.575	
	LS12	3.14	1.350	1.350	0.640		3.663	
						Total Quantity	22.525 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	22.525 cum	
						Say 22.525 cum @ Rs 2237.27 / cum	**Rs 50394.51**	

11	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							
	LS4	3.14	2.150	2.150	1.500		21.772	
						Total Quantity	21.772 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	21.772 cum	
						Say 21.772 cum @ Rs 473.11 / cum	**Rs 10300.55**	
12	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							
	LS4	3.14	2.150	2.150	1.500		21.772	
						Total Quantity	21.772 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	21.772 cum	
						Say 21.772 cum @ Rs 520.45 / cum	**Rs 11331.24**	
13	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							
	LS4	3.14	2.150	2.150	1.500		21.772	
						Total Quantity	21.772 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	21.772 cum	
						Say 21.772 cum @ Rs 681.24 / cum	**Rs 14831.96**	
14	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							
	LS4	3.14	2.150	2.150	1.500		21.772	
						Total Quantity	21.772 cum	

						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	21.772 cum	
						Say 21.772 cum @ Rs 1555.35 / cum	**Rs 33863.08**	
15	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							
	LS4	3.14	2.150	2.150	0.700		10.161	
						Total Quantity	10.161 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	10.161 cum	
						Say 10.161 cum @ Rs 1675.01 / cum	**Rs 17019.78**	
16	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							
		14	200.000				2800.000	
						Total Quantity	2800.000 Kwh	
						Total Deducted Quantity	0.000 Kwh	
						Net Total Quantity	2800.000 Kwh	
						Say 2800.000 Kwh @ Rs 37.18 / Kwh	**Rs 104104.00**	
17	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 wiork upto plinth level							
	Lifting station -1 Bottom Plugging	3.14	1.100	1.100	0.300		1.140	
	,, Well Steaning	3.14	1.900	0.300	6.090		10.900	
	Cover Slab	3.14	1.100	1.100	0.200		0.760	

	Lifting station -2 Bottom Plugging	3.14	1.350	1.350	0.300		1.717	
	,, Well Steaning	3.14	2.400	0.300	6.900		15.600	
	Cover Slab	3.14	1.350	1.350	0.200		1.145	
	Lifting station -3 Bottom Plugging	3.14	1.600	1.600	0.300		2.412	
	,, Well Steaning	3.14	3.000	0.300	6.330		17.889	
	Cover Slab	3.14	1.600	1.600	0.200		1.608	
	Lifting station -4 Bottom Plugging	3.14	2.150	2.150	0.300		4.355	
	,, Well Steaning	3.14	4.000	0.300	6.700		25.246	
	Cover Slab	3.14	2.150	2.150	0.200		2.903	
	Lifting station -5 Bottom Plugging	3.14	1.200	1.200	0.300		1.357	
	,, Well Steaning	3.14	2.100	0.300	6.490		12.839	
	Cover Slab	3.14	1.200	1.200	0.200		0.905	
	Lifting station -6 Bottom Plugging	3.14	1.100	1.100	0.300		1.140	
	,, Well Steaning	3.14	1.900	0.300	6.210		11.115	
	Cover Slab	3.14	1.100	1.100	0.200		0.760	
	Lifting station -7 Bottom Plugging	3.14	1.200	1.200	0.300		1.357	
	,, Well Steaning	3.14	2.100	0.300	5.730		11.336	
	Cover Slab	3.14	1.200	1.200	0.200		0.905	
	Lifting station -8 Bottom Plugging	3.14	1.200	1.200	0.300		1.357	
	,, Well Steaning	3.14	2.100	0.300	6.310		12.483	
	Cover Slab	3.14	1.200	1.200	0.200		0.905	
	Lifting station -9 Bottom Plugging	3.14	1.450	1.450	0.300		1.981	
	,, Well Steaning	3.14	2.600	0.300	6.530		15.994	
	Cover Slab	3.14	1.450	1.450	0.200		1.321	
	Lifting station -10 Bottom Plugging	3.14	1.600	1.600	0.300		2.412	
	,, Well Steaning	3.14	2.900	0.300	6.620		18.085	

	Cover Slab	3.14	1.600	1.600	0.200		1.608	
	Lifting station -11 Bottom Plugging	3.14	1.450	1.450	0.300		1.981	
	,, Well Steaning	3.14	2.600	0.300	6.390		15.651	
	Cover Slab	3.14	1.450	1.450	0.200		1.321	
	Lifting station -12 Bottom Plugging	3.14	1.350	1.350	0.300		1.717	
	,, Well Steaning	3.14	2.400	0.300	6.640		15.012	
	Cover Slab	3.14	1.350	1.350	0.200		1.145	
	Lifting station -13 Bottom Plugging	3.14	1.200	1.200	0.300		1.357	
	,, Well Steaning	3.14	2.100	0.300	5.790		11.454	
	Cover Slab	3.14	1.200	1.200	0.200		0.905	
	Lifting station -14 Bottom Plugging	3.14	1.400	1.400	0.300		1.847	
	,, Well Steaning	3.14	2.500	0.300	4.220		9.939	
	Cover Slab	3.14	1.400	1.400	0.200		1.231	
	Manhole	14	0.450	0.600	0.300		-1.134	
						Total Quantity	247.095 cum	
						Total Deducted Quantity	-1.134 cum	
						Net Total Quantity	245.961 cum	
						Say 245.961 cum @ Rs 9947.98 / cum	**Rs 2446815.11**	
18	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).							
	Richer mix	1	247.095				247.095	
						Total Quantity	247.095 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	247.095 cum	
						Say 247.095 cum @ Rs 82.61 / cum	**Rs 20412.52**	
19	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 of cement @340Kg x 247.095	1	247.095			340.0	84012.300	

						Total Quantity	84012.300 kg	
						Total Deducted Quantity	0.000 kg	
						Net Total Quantity	84012.300 kg	
						Say 84012.300 kg @ Rs 1.36 / kg	**Rs 114256.73**	
20	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.							
	Stening inside - LS -1	3.14	1.600	6.090			30.597	
	Stening Outside - LS -1	3.14	2.200	6.390			44.143	
	Stening inside - LS -2	3.14	2.100	6.900			45.499	
	Stening Outside - LS -2	3.14	2.700	7.200			61.042	
	Stening inside - LS -3	3.14	2.600	6.330			51.679	
	Stening Outside - LS -3	3.14	3.200	6.630			66.619	
	Stening inside - LS -4	3.14	3.700	6.700			77.841	
	Stening Outside - LS -4	3.14	4.300	7.000			94.514	
	Stening inside - LS -5	3.14	1.800	6.490			36.682	
	Stening Outside - LS -5	3.14	2.400	6.790			51.170	
	Stening inside - LS -6	3.14	1.600	6.210			31.200	
	Stening Outside - LS -6	3.14	2.200	6.510			44.972	
	Stening inside - LS -7	3.14	1.800	5.730			32.386	
	Stening Outside - LS -7	3.14	2.400	6.030			45.443	
	Stening inside - LS -8	3.14	1.800	6.310			35.665	
	Stening Outside - LS -8	3.14	2.400	6.610			49.813	
	Stening inside - LS -9	3.14	2.300	6.530			47.160	
	Stening Outside - LS -9	3.14	2.900	6.830			62.194	
	Stening inside - LS -10	3.14	2.600	6.620			54.046	

	Stening Outside - LS - 10	3.14	3.200	6.920			69.533	
	Stening inside - LS - 11	3.14	2.300	6.390			46.149	
	Stening Outside - LS - 11	3.14	2.900	6.690			60.920	
	Stening inside - LS - 12	3.14	2.100	6.640			43.785	
	Stening Outside - LS - 12	3.14	2.700	6.940			58.838	
	Stening inside - LS - 13	3.14	1.800	5.790			32.726	
	Stening Outside - LS - 13	3.14	2.400	6.090			45.895	
	Stening inside - LS - 14	3.14	2.200	4.220			29.152	
	Stening Outside - LS - 14	3.14	2.800	4.520			39.740	
						Total Quantity	1389.403 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	1389.403 sqm	
						Say 1389.403 sqm @ Rs 721.70 / sqm	**Rs 1002732.15**	
21	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							
	LS- 1 &LS 6, Cover slab	2*3.14	0.800	0.800			4.020	
	,, Side	2*3.14	2.200		0.200		2.764	
	LS- 2 &LS 12, Cover slab	2*3.14	1.050	1.050			6.924	
	,, Side	2*3.14	2.700		0.200		3.392	
	LS- 3 & 10 , Cover slab	2*3.14	1.300	1.300			10.614	
	,, Side	2*3.14	3.200		0.200		4.020	
	LS- 4, Cover slab	3.14	1.850	1.850			10.747	
	,, Side	3.14	4.300		0.200		2.701	
	LS- 5, Cover slab	3.14	0.900	0.900			2.544	

	,, Side	3.14	2.400		0.200		1.508	
	LS- 7, Cover slab	3.14	0.900	0.900			2.544	
	,, Side	3.14	2.400		0.200		1.508	
	LS- 8&13, Cover slab	2*3.14	0.900	0.900			5.087	
	,, Side	2*3.14	2.400		0.200		3.015	
	LS- 9&11, Cover slab	2*3.14	1.150	1.150			8.306	
	,, Side	2*3.14	2.900		0.200		3.643	
	LS- 14, Cover slab	3.14	1.100	1.100			3.800	
	,, Side	3.14	2.800		0.200		1.759	
						Total Quantity	78.896 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	78.896 sqm	
						Say 78.896 sqm @ Rs 923.02 / sqm	**Rs 72822.59**	
22	5.22.1 Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth levelMild steel and Medium Tensile steel bars							
	Steel reinforcement @ 100Kg/ 1Cum of CC	1	247.095			100.0	24709.500	
						Total Quantity	24709.500 kg	
						Total Deducted Quantity	0.000 kg	
						Net Total Quantity	24709.500 kg	
						Say 24709.500 kg @ Rs 97.28 / kg	**Rs 2403740.16**	
23	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	14					14.000	
						Total Quantity	14.000 No	
						Total Deducted Quantity	0.000 No	
						Net Total Quantity	14.000 No	
						Say 14.000 No @ Rs 2815.71 / No	**Rs 39419.94**	
24	100.98.115 Supply of DI K9 Pipe Conforming to IS 8329/2000, 100mm Dia.							
	LS1,LS2,LS3,LS4,LS6 ,LS8,LS10,LS13	8	40.000				320.000	
	LS5,LS7,LS9	3	50.000				150.000	

	LS11	1	500.000				500.000	
	LS12	1	380.000				380.000	
	LS14	1	1050.000				1050.000	
						Total Quantity	2400.000 metre	
						Total Deducted Quantity	0.000 metre	
						Net Total Quantity	2400.000 metre	
						Say 2400.000 metre @ Rs 1143.05 / metre	**Rs 2743320.00**	
25	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)							
	LS1,LS2,LS3,LS4,LS6 ,LS8,LS10,LS13	8	40.000	0.500	1.100		176.000	
	LS5,LS7,LS9	3	50.000	0.500	1.100		82.501	
	LS11	1	500.000	0.500	1.100		275.000	
	LS12	1	380.000	0.500	1.100		209.001	
	LS14	1	1050.000	0.500	1.100		577.500	
						Total Quantity	1320.002 cum	
						Total Deducted Quantity	0.000 cum	
						Net Total Quantity	1320.002 cum	
						Say 1320.002 cum @ Rs 558.99 / cum	**Rs 737867.92**	
26	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	1000.000				1000.000	
						Total Quantity	1000.000 metre	
						Total Deducted Quantity	0.000 metre	
						Net Total Quantity	1000.000 metre	
						Say 1000.000 metre @ Rs 28.12 / metre	**Rs 28120.00**	
27	100.14.1 Conveying and laying S&S Centrifugally Cast (Spun) / Ductile Iron Pipes conforming to IS: 8329 excluding cost of pipes and specials :							

	100 mm dia Ductile Iron Class K-9 Pipes Data derived from 18.72.15 in DAR							
		1	2400.000				2400.000	
						Total Quantity	2400.000 metre	
						Total Deducted Quantity	0.000 metre	
						Net Total Quantity	2400.000 metre	
						Say 2400.000 metre @ Rs 59.21 / metre	**Rs 142104.00**	
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	7.000				7.000	
						Total Quantity	7.000 quintal	
						Total Deducted Quantity	0.000 quintal	
						Net Total Quantity	7.000 quintal	
						Say 7.000 quintal @ Rs 20247.70 / quintal	**Rs 141733.90**	
29	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							
		1	400.000				400.000	
						Total Quantity	400.000 joint	
						Total Deducted Quantity	0.000 joint	
						Net Total Quantity	400.000 joint	
						Say 400.000 joint @ Rs 108.54 / joint	**Rs 43416.00**	
30	18.83.2 Labour for cutting C.I. pipe with steel saw.100 mm diameter C.I. pipe							
		30					30.000	
						Total Quantity	30.000 Each Cut	
						Total Deducted Quantity	0.000 Each Cut	
						Net Total Quantity	30.000 Each Cut	
						Say 30.000 Each Cut @ Rs 172.94 / Each Cut	**Rs 5188.20**	
31	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							
		1	2400.000				2400.000	
						Total Quantity	2400.000 metre	

						Total Deducted Quantity	0.000 metre	
						Net Total Quantity	2400.000 metre	
						Say 2400.000 metre @ Rs 23.49 / metre	**Rs 56376.00**	
32	od328801/2021_2022 Pumpset- Supply, Installation, Commissioning, testing and trial run of SUBMERSIBLE SLURRY HANDLING TYPE PUMP various capacities for lifting stations							
	LS1	2	1.000				2.000	
	LS2	2	1.000				2.000	
	LS3	2	1.500				3.000	
	LS4	2	3.500				7.000	
	LS5	2	0.500				1.000	
	LS6	2	1.000				2.000	
	LS7	2	0.500				1.000	
	LS8	2	1.000				2.000	
	LS9	2	2.000				4.000	
	LS10	2	2.000				4.000	
	LS11	2	3.000				6.000	
	LS12	2	3.000				6.000	
	LS13	2	3.000				6.000	
	LS14	2	3.000				6.000	
						Total Quantity	52.000 L.S	
						Total Deducted Quantity	0.000 L.S	
						Net Total Quantity	52.000 L.S	
						Say 52.000 L.S @ Rs 290375.00 / L.S	**Rs 15099500.00**	
33	od328802/2021_2022 Supple and erection of Indoor Type Generator (Suitable Capacity)							
	LS1	1	2.400				2.400	
	LS2	1	2.400				2.400	
	LS3	1	3.600				3.600	
	LS4	1	8.400				8.400	
	LS5	1	1.200				1.200	
	LS6	1	2.400				2.400	
	LS7	1	1.200				1.200	

	LS8	1	2.400				2.400	
	LS9	1	4.800				4.800	
	LS10	1	4.800				4.800	
	LS11	1	7.200				7.200	
	LS12	1	7.200				7.200	
	LS13	1	7.200				7.200	
	LS14	1	7.200				7.200	
						Total Quantity	62.400 L.S	
						Total Deducted Quantity	0.000 L.S	
						Net Total Quantity	62.400 L.S	
						Say 62.400 L.S @ Rs 29037.50 / L.S	**Rs 1811940.00**	
34	od328803/2021_2022 Automatic Control system							
		14					14.000	
						Total Quantity	14.000 No	
						Total Deducted Quantity	0.000 No	
						Net Total Quantity	14.000 No	
						Say 14.000 No @ Rs 100000.00 / No	**Rs 1400000.00**	
35	od328804/2021_2022 Control Room and Generator Room							
		14					14.000	
						Total Quantity	14.000 No	
						Total Deducted Quantity	0.000 No	
						Net Total Quantity	14.000 No	
						Say 14.000 No @ Rs 320279.00 / No	**Rs 4483906.00**	
Sl No	Description	No	L	B	D	CF	Quantity	Remark
16Water Supply and Sanatory arrangements, Electrical wiring in pumping stations								
						Lump-Sum Total	**Rs 800000.00**	
Sl No	Description	No	L	B	D	CF	Quantity	Remark
17Line extension , Deposit to KSEB, etc								
						Lump-Sum Total	**Rs 1400000.00**	
						Total	**755530350.23**	
						Centage @	**0.0%**	
						Centage Amount	**0.00**	

Provision for GST payments (in %) @	**18.0%**
Amount reserved for GST payments	**135995463.04**
Total & Centage	**891525813.27**
Lumpsum for round off	**0.00**
GRAND TOTAL Rs	**891525813.27**
Rounded Grand Total Rs 89,15,25,813	
Rupees Eighty Nine Crore Fifteen Lakh Twenty Five Thousand Eight Hundred and Thirteen Only	

Detailed Estimate

SEWERAGE SYSTEM TO KOYILANDY MUNICIPALITY PHASE 2 - CONSTRUCTION OF 3MLD CAPACITY SEWAGE TREATMENT PLANT AND LAYING SEWERAGE NETWORK TO ZONE 2 OF KOYILANDY MUNICIPALITY - PART E- O&M

(Dsor year: **2018**)

Sl No	Description	No	L	B	D	CF	Quantity	Remark
1STP-Providing skilled and experienced personnals for the monitoring of the day to day operation and maintenance of the all systems for STP (Cost Index:36.44 %)								
1	od328821/2021_2022 Plant Manager (Call on duty)							
		1	365.000				365.000	
						Total Quantity	365.000 Day	
						Total Deducted Quantity	0.000 Day	
						Net Total Quantity	365.000 Day	
						Say 365.000 Day @ Rs 1563.28 / Day	**Rs 570597.20**	
2	100.98.1030 Engaging Operator (pile/ Special Machine)							
		3	365.000				1095.000	
						Total Quantity	1095.000 Day	
						Total Deducted Quantity	0.000 Day	
						Net Total Quantity	1095.000 Day	
						Say 1095.000 Day @ Rs 1169.56 / Day	**Rs 1280668.20**	
3	100.98.1032 Engaging Technician							
	Process Chemist(Call on duty)							
	Single shift	1	365.000				365.000	
						Total Quantity	365.000 Day	
						Total Deducted Quantity	0.000 Day	
						Net Total Quantity	365.000 Day	
						Say 365.000 Day @ Rs 1228.16 / Day	**Rs 448278.40**	
4	100.98.1009 Engaging Fitter (grade 1)							

	Mechanic(General shift)	1	365.000				365.000	
						Total Quantity	365.000 Day	
						Total Deducted Quantity	0.000 Day	
						Net Total Quantity	365.000 Day	
						Say 365.000 Day @ Rs 1169.56 / Day	**Rs 426889.40**	
5	100.98.1008 Engaging Coolie							
	Sweeper/Cleaner(General shift)	3	365.000				1095.000	
						Total Quantity	1095.000 Day	
						Total Deducted Quantity	0.000 Day	
						Net Total Quantity	1095.000 Day	
						Say 1095.000 Day @ Rs 884.27 / Day	**Rs 968275.65**	
6	100.98.1036 Supply of Security Guard without gun.							
	Security guards							
		1*3	365.000				1095.000	
						Total Quantity	1095.000 No	
						Total Deducted Quantity	0.000 No	
						Net Total Quantity	1095.000 No	
						Say 1095.000 No @ Rs 977.80 / No	**Rs 1070691.00**	
Sl No	Description	No	L	B	D	CF	Quantity	Remark
2STP-Periodical cleaning STP units (Cost Index:36.44 %)								
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							
		2	250.000				500.000	
						Total Quantity	500.000 sqm	
						Total Deducted Quantity	0.000 sqm	
						Net Total Quantity	500.000 sqm	
						Say 500.000 sqm @ Rs 14.87 / sqm	**Rs 7435.00**	
Sl No	Description	No	L	B	D	CF	Quantity	Remark
3STP-Upkeep of Civil structures, maintaining Landscaping etc. (Cost Index:36.44 %)								

1	od328814/2021_2022 Maintaining the garden as per the direction of department officers							
	For each month for a year							
		1	12.000				12.000	
	Total Quantity						12.000 Month	
	Total Deducted Quantity						0.000 Month	
	Net Total Quantity						12.000 Month	
	Say 12.000 Month @ Rs 5264.39 / Month						**Rs 63172.68**	
2	13.99.1 Painting with synthetic enamel paint of approved brand and manufacture ofrequired colour to give an even shade :One or more coats on old work							
		1	100.000				100.000	
	Total Quantity						100.000 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						100.000 sqm	
	Say 100.000 sqm @ Rs 94.69 / sqm						**Rs 9469.00**	
3	13.51.2 Painting with silicon & acrylic emulsion based water thinnable sealer of approved brand and manufacture on wet or patchy portion of plastered surfaces:Two coats							
	Painting Area:2000m2. Two painting within O& M Period. Area= 2x2000/10=400m2 / year	1	400.000				400.000	
	Total Quantity						400.000 sqm	
	Total Deducted Quantity						0.000 sqm	
	Net Total Quantity						400.000 sqm	
	Say 400.000 sqm @ Rs 152.81 / sqm						**Rs 61124.00**	
Sl No	Description	No	L	B	D	CF	Quantity	Remark
4STP-Annual Chemicals charges (Cost Index:36.44 %)								
1	od328816/2021_2022 Supply of liquid chlorine in Tonne Cylinders (3.5 PPM dosage) 							
		3	5.000	365.000			5475.000	
	Total Quantity						5475.000 kg	
	Total Deducted Quantity						0.000 kg	

	Net Total Quantity						5475.000 kg	
	Say 5475.000 kg @ Rs 26.45 / kg						**Rs 144813.75**	
2	od328817/2021_2022 Supply and delivery of Hydrated lime as per specification (7 PPM dosage) 							
		3	7.000	365.000			7665.000	
	Total Quantity						7665.000 kg	
	Total Deducted Quantity						0.000 kg	
	Net Total Quantity						7665.000 kg	
	Say 7665.000 kg @ Rs 14.05 / kg						**Rs 107693.25**	
3	od328822/2021_2022 Supply and delivery of Alum at (7 PPM dosage) as per specification 							
		3	7.000	365.000			7665.000	
	Total Quantity						7665.000 kg	
	Total Deducted Quantity						0.000 kg	
	Net Total Quantity						7665.000 kg	
	Say 7665.000 kg @ Rs 13.75 / kg						**Rs 105393.75**	
4	od328826/2021_2022 Other Chemicals							
		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 58075.00 / L.S						**Rs 58075.00**	
Sl No	Description	No	L	B	D	CF	Quantity	Remark
5STP-Major repairs and maintenance of Electro Mechanical work (Break down maintanence). (Cost Index:36.44 %)								
1	od328830/2021_2022 Repair and Rewinding of motors and its assembly and putting into use for the break down maintenance for the pumps.							
		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 60000.00 / set						**Rs 60000.00**	
Sl No	Description	No	L	B	D	CF	Quantity	Remark

6STP-Others (Cost Index:36.44 %)								
1	od328820/2021_2022 Testing and calibration of electrical meters and relays,ammeter and voltmeters,cranes and hoists,testing of ELCB,testing of earth pit,testing and cathodic protection of MS line,environmental monitoring,sludge testing,transformer testing and other inspection charges payable to inspecting agencies excluding the Govt.agencies.							
		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 5000.00 / No						**Rs 5000.00**	
2	od328828/2021_2022 Attending the repairs in the valves,actuators,electro magnetic flow meters and connected works							
		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 5000.00 / No						**Rs 5000.00**	
3	od328829/2021_2022 Attending repairs in the E.O.T crane including changing of spare if any during servicing							
		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 4000.00 / No						**Rs 4000.00**	
4	od328831/2021_2022 Transformer air filtration and topup oil in transformer,replacement of tap changing mechanism,replacement of dial thermometer,replacement of terminal bushes(HT),painting of the transformer 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 4000.00 / No						**Rs 4000.00**	
5	od328832/2021_2022 Attending emergency repair works in starter like replacement of fixed contacts,moving contacts,auxilary							

	contacts,replacement of over load relays,replacement of timer,no volt coil,repair work in switches like replacement of fixed contacts,moving contacts,fuse carrier sets.HRC fuse base and carriers,replacement of isolator,isolator bridges,repair of oil circuit breaker and air circuit breaker like replacement of fixed contacts,moving contacts,replacement of operating mechanism sets,tripping mechanism sets,no volt coils control circuit 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 5000.00 / No						**Rs 5000.00**	
6	od328833/2021_2022 Hire charges of Tools and Plants required for the day to day operation of the Plant and equipment s							
		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 5000.00 / No						**Rs 5000.00**	
7	od328834/2021_2022 Supply and maintenance of emergency personal and fire fighting equipment s including periodical check up,refilling and getting sanction from concerned departments,license renewal etc except renewal of Factories and Boilers and Electrical Inspectorate							
		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 5000.00 / No						**Rs 5000.00**	
8	od328835/2021_2022 Repair and maintenance of control/instrumentation cabling,communication cabling,instrumentation cabling etc for the proper upkeep of SCADA and telemetry system including repair of all faulty components whenever necessary							
		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 6000.00 / No						**Rs 6000.00**	
9	od328836/2021_2022							

	Maintenance of SCADA system like Hardware including servers,printers,monitors etc for control room Scada,office stationary items.software for , etc including replacing of all faulty components whenever necessary							
		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 25000.00 / No	**Rs 25000.00**	
10	od328837/2021_2022 Replacement of Catridge one time between 5 to 10 years							
		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 40000.00 / L.S	**Rs 40000.00**	
11	od328838/2021_2022 Generator Fuel charges							
		1	100.000				100.000	
						Total Quantity	100.000 hour	
						Total Deducted Quantity	0.000 hour	
						Net Total Quantity	100.000 hour	
						Say 100.000 hour @ Rs 6608.93 / hour	**Rs 660893.00**	
Sl No	Description	No	L	B	D	CF	Quantity	Remark
7STP-Annual Operation and Maintenance for 9 years (2nd year to 10th year) (Cost Index:36.44 %)								
1	od336210/2021_2022 STP-Annual Operation and Maintenance for 9 year							
	2 nd Year - Add 8 % to 1st year	1	1.080				1.080	
	3rd Year - Add 16 % to 1st year	1	1.160				1.160	
	4th Year - Add 24 % to 1st year	1	1.240				1.240	
	5th Year - Add 32 % to 1st year	1	1.320				1.320	
	6th Year - Add 40 % to 1st year	1	1.400				1.400	

	7th Year - Add 48 % to 1st year	1	1.480				1.480	
	8th Year - Add 56 % to 1st year	1	1.560				1.560	
	9th 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	
						Say 12.600 No @ Rs 6147469.29 / No	**Rs 77458113.05**	
Sl No	Description	No	L	B	D	CF	Quantity	Remark
8SEWER- O&M OF WET WELLS AND CONNECTED WORKS (Cost Index:36.44 %)								
1	100.98.1030 Engaging Operator (pile/ Special Machine)							
		1	3.000	365.000			1095.000	
						Total Quantity	1095.000 Day	
						Total Deducted Quantity	0.000 Day	
						Net Total Quantity	1095.000 Day	
						Say 1095.000 Day @ Rs 1169.56 / Day	**Rs 1280668.20**	
2	100.98.1008 Engaging Coolie							
		1	3.000	365.000			1095.000	
						Total Quantity	1095.000 Day	
						Total Deducted Quantity	0.000 Day	
						Net Total Quantity	1095.000 Day	
						Say 1095.000 Day @ Rs 884.27 / Day	**Rs 968275.65**	
Sl No	Description	No	L	B	D	CF	Quantity	Remark
9SEWER- O&M OF CIVIL, ELECTRICAL, MECHANICAL WORKS, O&M OF LIFTING STATIONS, ETC (Cost Index:36.44 %)								
1	od329441/2021_2022 Civil structures maintenance and painting							
		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 100000.00 / L.S						**Rs 100000.00**	
2	od329442/2021_2022 Replacement of mechanical items (Including painting existing items)							
		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 100000.00 / L.S						**Rs 100000.00**	
3	od329443/2021_2022 Replacement of electrical items (Including painting existing items)							
		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 100000.00 / L.S						**Rs 100000.00**	
4	od329444/2021_2022 Cotton waste ,Lubricants (oil and Grease)soap ,chemicals,Glass ware,safety equipment & Devices, Cleaning etc.. for wet well and pumping station							
		12					12.000	
	Total Quantity						12.000 L.S	
	Total Deducted Quantity						0.000 L.S	
	Net Total Quantity						12.000 L.S	
	Say 12.000 L.S @ Rs 8000.00 / L.S						**Rs 96000.00**	
5	100.98.1032 Engaging Technician							
		1	365.000				365.000	
	Total Quantity						365.000 Day	
	Total Deducted Quantity						0.000 Day	
	Net Total Quantity						365.000 Day	
	Say 365.000 Day @ Rs 1228.16 / Day						**Rs 448278.40**	
6	od336221/2021_2022 Generator Fuel Charges for Wet wells (1 No) and Lifting Stations (14Nos)							
		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 330000.00 / set	**Rs 330000.00**	
Sl No	Description	No	L	B	D	CF	Quantity	Remark
10SEWER-O&M OF SEWER LINE (Cost Index:36.44 %)								
1	100.98.1008 Engaging Coolie							
		1	365.000				365.000	
						Total Quantity	365.000 Day	
						Total Deducted Quantity	0.000 Day	
						Net Total Quantity	365.000 Day	
						Say 365.000 Day @ Rs 884.27 / Day	**Rs 322758.55**	
2	100.98.1009 Engaging Fitter (grade 1)							
		1	365.000				365.000	
						Total Quantity	365.000 Day	
						Total Deducted Quantity	0.000 Day	
						Net Total Quantity	365.000 Day	
						Say 365.000 Day @ Rs 1169.56 / Day	**Rs 426889.40**	
3	100.98.1035 Supply of sewer man.							
		2	365.000				730.000	
						Total Quantity	730.000 No	
						Total Deducted Quantity	0.000 No	
						Net Total Quantity	730.000 No	
						Say 730.000 No @ Rs 884.27 / No	**Rs 645517.10**	
4	od328827/2021_2022 Vehicle hire charges							
		12					12.000	
						Total Quantity	12.000 Month	
						Total Deducted Quantity	0.000 Month	
						Net Total Quantity	12.000 Month	
						Say 12.000 Month @ Rs 29037.50 / Month	**Rs 348450.00**	
5	od329445/2021_2022 Rent for sewer cleaning machine							

		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 200000.00 / L.S	**Rs 200000.00**	
Sl No	Description	No	L	B	D	CF	Quantity	Remark
11SEWER-O&M for 2nd year to 10th Year (Cost Index:36.44 %)								
1	od336211/2021_2022 SEWER-Annual Operation and Maintenance for 9 year							
	2 nd Year - Add 8 % to 1st year	1	1.080				1.080	
	3rd Year - Add 16 % to 1st year	1	1.160				1.160	
	4th Year - Add 24 % to 1st year	1	1.240				1.240	
	5th Year - Add 32 % to 1st year	1	1.320				1.320	
	6th Year - Add 40 % to 1st year	1	1.400				1.400	
	7th Year - Add 48 % to 1st year	1	1.480				1.480	
	8th Year - Add 56 % to 1st year	1	1.560				1.560	
	9th Year - Add 64 % to 1st year	1	1.640				1.640	
	10th Year - Add 45 % 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 5366837.30 / No	**Rs 67622149.98**	
Sl No	Description	No	L	B	D	CF	Quantity	Remark
12Electricity Charges for 10 years @ Rs14009601.6/year								
						Lump-Sum Total	**Rs 140096016.00**	
						Total	**296690585.61**	
						Centage @	**0.0%**	

Centage Amount	**0.00**
Provision for GST payments (in %) @	**18.0%**
Amount reserved for GST payments	**53404305.41**
Total & Centage	**350094891.02**
Lumpsum for round off	**0.00**
GRAND TOTAL Rs	**350094891.02**
Rounded Grand Total Rs 35,00,94,891	
Rupees Thirty Five Crore Ninety Four Thousand Eight Hundred and Ninety One Only	

APPENDIX-IV-DESIGN OF WETWELLS AND LIFTING STATIONS

Sl no.	Name of wetwel	Peak flowLPS	Detention Period in min.	Storage capacity m^3	SWD (m)	Area m^2	Size	Depth upto invert of pipe	Total Depth
1	LS1	3.01	10.00	1.81	1.00	1.81	1.52	5.09	6.09
							say 1.6 m dia		
		3.01							
2	LS2	5.72	10.00	3.43	1.00	3.43	2.09	5.9	6.90
							say 2.1 m dia		
		5.72							
3	LS3	8.26	10.00	4.96	1.00	4.96	2.51	5.33	6.33
							say 2.6 m dia		
		8.26							
4	LS4	17.21	10.00	10.33	1.00	10.33	3.63	5.7	6.70
							say 3.7 m dia		
		17.21							
5	LS5	1.42	10.00	0.85	1.00	0.85	1.04	5.49	6.49
							say 1.2 m dia		
		1.42							
6	LS6	3.31	10.00	1.99	1.00	1.99	1.59	5.21	6.21
							say 1.6 m dia		
		3.31							
7	LS7	1.21	10.00	0.73	1.00	0.73	0.96	4.73	5.73
							say 1 m dia		
		1.21							
8	LS8	3.87	10.00	2.32	1.00	2.32	1.72	5.31	6.31
							say 1.8m dia		
		3.87							
9	LS9	6.75	10.00	4.05	1.00	4.05	2.27	5.53	6.53
							say 2.3m dia		
		6.75							
10	LS10	15.26	10.00	9.16	1.80	5.09	2.55	4.82	6.62
							say2.6m dia		
		15.26							
11	LS11	6.84	10.00	4.10	1.00	4.10	2.29	5.39	6.39
							say 2.3m dia		
		6.84							
12	LS12	5.41	10.00	3.25	1.00	3.25	2.03	5.64	6.64
							say 2.1m dia		
		5.41							
13	LS13	4.21	10.00	2.52	1.00	2.52	1.79	4.79	5.79
							say 1.8m dia		
		4.21							
14	LS14	5.94	10.00	3.56	1.00	3.56	2.13	3.22	4.22
							say 2.2m dia		
		5.94							
15	PH-1	34.25	10.00	20.55	1.50	13.70	4.18	4.65	6.15
							say 4.2m dia		
		34.25							
16	STPWEL	78.25	10.00	46.95	1.25	37.56	6.92	5.8	7.05
							say 7.0m dia		
		78.25							

APPENDIX-V-Design of Pumpsets & Pumping mains

Sl no.	Name of station		length	Q Avg.	Q Peak		Area	Velocity	Pipe dia (Pumping main)	Provided Dia.(mm) (DI PIPE)	Provided Dia.(m)	Actual velocity	Hf For 1000m ($4flv^2/2gd$)	Total Hf	Static head(m)	Residual head(m)	Total Head (m)	Pump BHP
	From	To																
1	PH1	STP	3850	13.7000	34.2520	Ltrs/sec	0.0343	1.00	0.2089	200	0.200	1.0908	6.06	23.347	15.00	2.00	40.35	26.32
				0.0137	0.0343	m3/sec												
				0.8220	2.0550	m3/mint												**27 HP**
					0.0000													
2	COLLECTION WELL	receiving chamber	20	31.3000	78.2530	Ltrs/sec	0.0704	1.00	0.2995	300	0.3000	0.9968	3.38	0.068	16.00	2.00	18.07	24.24
				0.0313	0.0704	m3/sec												
				1.8780	4.2255	m3/mint												**25HP**
					0.0000													
3	LS1	mh	40	1.2040	3.0100	Ltrs/sec	0.0027	1.00	0.0587	100	0.1000	0.3451	1.21	0.049	10.00	2.00	12.05	0.54
	MH	MH		0.0012	0.0027	m3/sec												
				0.0722	0.1625	m3/mint												**1 HP**
4	LS2		40	2.2800	5.7200	Ltrs/sec	0.0051	1.00	0.0808	100	0.1000	0.6535	4.35	0.174	10.00	2.00	12.17	1.04
	MH	MH		0.0023	0.0051	m3/sec												
				0.1368	0.3078	m3/mint												**1 HP**
5	LS3	mh	40	3.3040	8.2600	Ltrs/sec	0.0074	1.00	0.0973	100	0.1000	0.9470	9.14	0.366	9.00	2.00	11.37	1.41
	MH	MH		0.0033	0.0074	m3/sec												
				0.1982	0.4460	m3/mint												**1.5 HP**
6	LS4	mh	40	6.8800	17.2100	Ltrs/sec	0.0155	1.00	0.1404	150	0.1500	0.8764	5.22	0.209	10.00	2.00	12.21	3.15
	MH	MH		0.0069	0.0155	m3/sec												
				0.4128	0.9288	m3/mint												**3.50 HP**
7	LS5	MH	50	0.5680	1.4200	Ltrs/sec	0.0014	1.00	0.0425	100	0.1000	0.1809	0.33	0.017	12.00	2.00	14.02	0.33
				0.0006	0.0014	m3/sec												
				0.0341	0.0852	m3/mint												**0.5 HP**
8	LS 6	mh	40	1.3240	3.3100	Ltrs/sec	0.0030	1.00	0.0616	100	0.1000	0.3795	1.47	0.059	12.00	2.00	14.06	0.70
	MH	MH		0.0013	0.0030	m3/sec												

				0.0794	0.1787	m3/mint												**1HP**
9	LS7	MH	50	0.4840	1.2100	Ltrs/sec	0.0012	1.00	0.0393	100	0.1000	0.1541	0.24	0.012	12.00	2.00	14.01	0.28
				0.0005	0.0012	m3/sec												
				0.0290	0.0726	m3/mint												**0.5 HP**
10	LS8	mh	40	1.5480	3.8700	Ltrs/sec	0.0035	1.00	0.0666	100	0.1000	0.4437	2.01	0.080	15.00	2.00	17.08	0.99
	MH	MH		0.0015	0.0035	m3/sec												
				0.0929	0.2090	m3/mint												**1HP**
11	LS9	MH	50	2.7000	6.7500	Ltrs/sec	0.0068	1.00	0.0927	100	0.1000	0.8599	7.54	0.377	12.00	2.00	14.38	1.62
				0.0027	0.0068	m3/sec												
				0.1620	0.4050	m3/mint												**2 HP**
12	LS10	mh	40	3.4000	15.2600	Ltrs/sec	0.0077	1.00	0.0987	100	0.1000	0.9745	9.68	0.387	12.00	2.00	14.39	1.83
	MH	MH		0.0034	0.0077	m3/sec												
				0.2040	0.4590	m3/mint												**2 HP**
14	LS11	MH N566	500	2.7360	6.8400	Ltrs/sec	0.0062	1.00	0.0886	100	0.1000	0.7842	6.27	3.134	18.00	2.00	23.13	2.37
	MH	MH		0.0027	0.0062	m3/sec												
				0.1642	0.3694	m3/mint												**3 HP**
15	LS12	MH N 566	380	2.1640	5.4100	Ltrs/sec	0.0054	1.00	0.0830	100	0.1000	0.6892	4.84	1.840	18.00	2.00	21.84	1.97
				0.0022	0.0054	m3/sec												
				0.1298	0.3246	m3/mint												**3HP**
16	LS13	mh	40	1.6900	4.2100	Ltrs/sec	0.0038	1.00	0.0696	100	0.1000	0.4844	2.39	0.096	10.00	2.00	12.10	0.77
	MH	MH		0.0017	0.0038	m3/sec												
				0.1014	0.2282	m3/mint												**1 HP**
17	LS14	n2726	1050	2.3760	5.9400	Ltrs/sec	0.0059	1.00	0.0870	100	0.100	0.7567	5.84	6.128	11.00	2.00	19.13	2.16
				0.0024	0.0059	m3/sec												
				0.1426	0.3564	m3/mint												
					0.0000													**3HP**

APPENDIX- VI-POWER CALCULATION

Sl no.	Name	Pumpset Capacity in HP	Pumpset Capacity in KW	No of Pumpset	No of Stand by	Working Time	Power Consumption/ day	Power Consumption/ year	Power cost @Rs7/unit	Remarks
STP										
1	Raw Sewage Sump	25	18.65	2	1	24	447.6	163374	1143618	
2	Air Blower	46	34.316	4	1	24	2470.752	901824.48	6312771.36	
3	Sludge Transfer to Thickner Pump	2	1.492	2	1	24	35.808	13069.92	91489.44	
4	Sludge Transfer to Centrifuge Pump	1	0.746	2	1	24	17.904	6534.96	45744.72	
5	Clarified water to ASF/PSF Pump	20	14.92	3	1	24	716.16	261398.4	1829788.8	
6	Mixer	3	2.238	2	1	24	53.712	19604.88	137234.16	
7	Clarifier to Sludge Sump Pump	2	1.492	2	1	24	35.808	13069.92	91489.44	
8	Centrate Sump to EQ Tank	2	1.492	2	1	24	35.808	13069.92	91489.44	
9	High Pressure Jet Pump	1	0.746	1	0	1	0.746	272.29	1906.03	
NET WORK										
1	LS1	1	0.746	2	1	24	17.904	6534.96	45744.72	
2	LS2	1	0.746	2	1	24	17.904	6534.96	45744.72	
3	LS3	1.5	1.119	2	1	24	26.856	9802.44	68617.08	
4	LS4	3.5	2.611	2	1	24	62.664	22872.36	160106.52	
5	LS5	0.5	0.373	2	1	24	8.952	3267.48	22872.36	
6	LS6	1	0.746	2	1	24	17.904	6534.96	45744.72	
7	LS7	0.5	0.373	2	1	24	8.952	3267.48	22872.36	
8	LS8	1	0.746	2	1	24	17.904	6534.96	45744.72	
9	LS9	2	1.492	2	1	24	35.808	13069.92	91489.44	
10	LS10	2	1.492	2	1	24	35.808	13069.92	91489.44	

11	LS11	3	2.238	2	1	24	53.712	19604.88	137234.16	
12	LS12	3	2.238	2	1	24	53.712	19604.88	137234.16	
13	LS13	3	2.238	2	1	24	53.712	19604.88	137234.16	
14	LS14	3	2.238	2	1	24	53.712	19604.88	137234.16	
15	PH-1	27	20.142	2	1	24	483.408	176443.92	1235107.44	
16	STP Ligting		15			24	360	131400	919800	
17	Ligting-Well and Lifting stations		15			24	360	131400	919800	
								2001371.7	**14009601.6**	

APPENDIX- VII- FLEX TABLE-CONDUITS

ID	Label	Start Node	Invert (Start) (m)	Stop Node	Invert (Stop) (m)	Length (Scaled) (m)	Slope (Calculated) (%)	Elevation Ground (Start) (m)	Elevation Ground (Stop) (m)	Size (Display)
5443	CO-598	MH-453	7.04	n926	12.86	35	16.757	8.16	13.98	200 mm
3359	p910(2)	MH-279	17.18	n1334	13.53	24	15.471	18.3	14.65	200 mm
3000	p603(1)	n900	14.07	MH-473	11.37	19	14.43	15.19	12.49	200 mm
3468	p1447	n1465	2.14	n2094	5.24	23	13.59	6.48	6.36	200 mm
3347	p900	n1318	9.35	n1319	12.09	22	12.361	10.47	13.21	200 mm
2735	p366	n567	7.03	n568	8.51	13	11.547	9.02	9.62	200 mm
4595	p1959(2)	MH-109	14.91	n2856	12.35	22	11.532	16.02	13.47	200 mm
4252	p1668	n2424	8.28	n2425	11.54	30	11.002	9.39	12.66	200 mm
4247	p1662	n2415	51.72	n2416	48.11	36	10.119	52.84	49.23	200 mm
2999	CO-138	MH-474	7.83	n899	11.51	37	9.885	8.95	12.63	200 mm
3363	p916	n1339	8.2	n1340	10.73	29	8.702	9.32	11.84	200 mm
2759	p1274	n1854	4.44	n594	2.13	27	8.692	5.56	5.76	200 mm
4946	p2269	n3293	8.59	n3295	9.66	12	8.633	9.71	10.78	200 mm
3086	p675(1)	n1004	10.62	MH-686	9	20	8.095	11.74	10.12	200 mm
3693	p1190	n1739	17.91	n1740	16.5	19	7.265	19.03	17.64	200 mm
4818	p2146	n3128	13.3	n3129	14.83	24	6.502	14.41	15.95	200 mm
3784	p1268(1)	n1844	5.05	MH-703	7.14	35	5.94	6.16	8.26	200 mm
4015	p1475	n2140	9.77	n2139	8.24	30	5.121	10.89	9.36	200 mm
4111	p1551(2)	MH-190	20.74	n2254	21.59	18	4.837	21.85	22.71	200 mm
3370	p926	n1352	6.37	n1353	4.97	30	4.677	7.49	6.09	200 mm
4017	p1477	n2144	7.61	n2142	8.99	30	4.606	8.73	10.11	200 mm
3619	p1127	n1637	9.07	n1639	7.73	30	4.468	10.19	8.85	200 mm
3173	CO-280	n1116	6.81	n1112	8.01	28	4.243	9.05	9.13	200 mm
3027	p625(1)	n929	12.34	MH-457	11.01	32	4.099	13.46	12.13	200 mm
3100	p688	n1022	10.79	n1023	9.57	30	4.075	11.91	10.69	200 mm
4931	p2252	n3270	5.47	n3269	6.69	30	4.059	6.59	7.81	200 mm
3316	p875	n1283	17.22	n1281	18.4	30	3.964	18.34	19.52	200 mm
3002	p603(2)	MH-473	11.37	n901	8.17	22	14.479	12.49	9.28	200 mm
4817	p2145	n3126	9.35	n3128	13.3	27	14.347	10.47	14.41	200 mm
4461	p1848	n2687	5.97	n2689	6.53	19	2.934	7.09	7.65	200 mm
2622	p600(1)	n248	6.08	MH-474	7.83	17	10.568	7.2	8.95	200 mm
5217	CO-186	n2483	7.31	n2487	11.5	43	9.745	8.43	12.73	200 mm
3395	p950	n1387	6.54	n1388	7.36	36	2.26	7.66	8.48	200 mm
3692	CO-68	n1736	18.45	MH-393	19.31	38	2.249	19.57	20.43	200 mm
3082	p672	n1000	10.23	n1001	12.44	25	8.734	11.34	13.56	200 mm
4063	p1516	n2203	5.87	n2201	5.06	38	2.127	6.98	6.18	200 mm
3867	p1349	n1954	5.51	n1956	5.87	17	2.12	6.63	6.99	200 mm
4937	p2259	n3279	9.6	n3281	10.16	26	2.113	10.72	11.28	200 mm
4594	p1960	n2856	12.35	n2858	9.86	30	8.389	13.47	10.97	200 mm

5284	CO-314	n2204	7.2	n2205	6.59	29	2.079	8.31	7.7	200 mm
4936	p2258	n3278	7.25	n3279	9.6	30	7.978	8.36	10.72	200 mm
3312	p872	n1277	19.64	n1276	18.02	21	7.833	20.93	19.14	200 mm
5361	CO-464	n2422	8.11	n1534	2.88	30	17.487	9.64	5.57	200 mm
2829	p446	n682	18.82	n683	19.4	30	1.933	19.94	20.52	200 mm
3346	p899	n1316	7.38	n1318	9.35	30	6.592	8.5	10.47	200 mm
2567	p96	n172	7.4	n174	7.9	30	1.646	8.52	9.01	200 mm
4945	p2268	n3291	6.65	n3293	8.59	30	6.472	7.77	9.71	200 mm
3641	p1143	n1664	4.41	n1666	1.93	18	14.119	5.86	5.35	200 mm
4374	p1767	n2561	35	n2562	39.1	30	13.804	36.12	40.22	200 mm
2739	p369	n571	9.55	n573	8.61	16	5.927	10.67	9.72	200 mm
3088	p675(2)	MH-686	9	n1006	8.2	14	5.875	10.12	9.31	200 mm
4189	p1616	n2348	3.13	n2347	3.44	21	1.468	4.43	4.55	200 mm
3726	CO-330	n1842	4.68	n1782	0.74	30	13.197	5.8	5.65	200 mm
2702	p924	n524	4.81	n1351	5.25	30	1.457	6.14	6.37	200 mm
5583	CO-662	n2248	20.02	MH-192	22.79	41	6.768	21.14	23.91	200 mm
4494	p1882	n2733	8.46	n2735	8.03	30	1.435	9.58	9.15	200 mm
2579	p108	n191	18.17	n193	17.76	30	1.357	19.28	18.88	200 mm
3701	p1195(2)	MH-395	16.63	n1746	13.41	26	12.159	18.01	14.53	200 mm
4589	p1956	n2850	15.06	n2852	16.6	30	5.116	16.18	17.9	200 mm
3083	p673(1)(1)	n1001	12.44	MH-685	12.59	12	1.263	13.56	13.71	200 mm
4014	p1474	n2139	8.24	n2137	6.75	30	4.988	9.36	7.86	200 mm
4113	p1551(1)	n2255	20.17	MH-190	20.74	12	4.796	21.28	21.85	200 mm
3001	p604	n901	8.17	n902	5.71	23	10.698	9.28	6.83	200 mm
4372	p1766	n2559	28.94	n2561	35	32	18.786	30.06	36.12	200 mm
5285	CO-316	n2205	6.59	n2207	5.21	30	4.669	7.7	6.32	200 mm
2738	p368	n569	9.64	n571	9.55	7	1.151	10.76	10.67	200 mm
3362	p915	n1338	6.85	n1339	8.2	30	4.519	7.97	9.32	200 mm
3228	p795	n1177	4.64	n1179	4.94	27	1.115	6.14	6.06	200 mm
3317	p876(2)(2)	MH-281	16.58	n1283	17.22	14	4.439	17.7	18.34	200 mm
4248	p1663	n2416	48.11	n2418	47.08	23	4.416	49.23	48.47	200 mm
4588	p1955	n2848	12.43	n2850	15.06	27	9.89	13.55	16.18	200 mm
3030	CO-136	n931	10.62	MH-457	11.01	9	4.367	11.74	12.13	200 mm
3406	p956(2)	MH-262	7.51	n1396	7.73	20	1.08	8.68	8.84	200 mm
4990	p1549(2)(1	MH-191	22.84	MH-192	22.79	5	1.075	23.96	23.91	200 mm
2831	p448	n684	19.53	n686	19.22	30	1.033	20.65	20.34	200 mm
3426	p975	n1420	5.92	n1421	5.61	30	1.018	7.04	6.85	200 mm
3193	p768	n1138	6.35	n1139	6.04	30	1.015	7.46	7.3	200 mm
5059	p599(2)(1)	MH-498	4.18	MH-499	4.37	19	1.015	5.73	5.49	200 mm
4938	p2261	n3283	4.33	n3282	4.63	30	1.015	5.67	5.75	200 mm
4575	p1944	n2832	8.62	n2833	8.86	24	1.015	9.77	9.98	200 mm
3827	p1314	n1904	9.91	n1906	10.11	20	1.015	11.41	11.23	200 mm
3163	p743	n1101	5.4	n1102	5.9	49	1.014	6.78	7.02	200 mm
3171	p748	n1109	7.78	n1110	8.08	30	1.013	9.24	9.2	200 mm
4659	p2025	n2957	5.97	n2959	5.67	30	1.013	7.09	6.98	200 mm
4464	p1852	n2693	6.45	n2695	6.75	30	1.013	7.87	7.87	200 mm
4640	p2007	n2930	1.99	n2931	2.34	35	1.013	3.64	3.46	200 mm

3788	p1273	n1851	4.08	n1853	4.26	18	1.013	5.42	5.38	200 mm
3204	p776	n1151	5.61	n1152	5.31	30	1.013	6.73	6.53	200 mm
3698	p1193	n1742	17.12	n1743	16.82	30	1.013	18.24	19.01	200 mm
3812	p1298	n1887	4.34	n1888	4.03	30	1.013	5.46	5.55	200 mm
3302	p863	n1266	7.62	n1267	8.07	44	1.013	9.41	9.19	200 mm
4376	p1769	n2563	39.7	n2564	39.91	20	1.013	41.48	41.03	200 mm
3407	p958	n1397	7.77	n1399	7.47	30	1.013	8.89	8.63	200 mm
2576	p105	n187	17.36	n188	17.66	30	1.013	18.49	18.78	200 mm
3007	p608	n907	5.13	n906	5.43	30	1.013	6.42	6.55	200 mm
4889	CO-380	n3210	4.12	MH-356	3.74	38	1.013	5.24	5.27	200 mm
5170	CO-106	n2795	5.21	n2796	5.47	26	1.013	6.7	6.59	200 mm
5190	CO-136	MH-110	17	n2852	16.6	40	1.013	18.12	17.9	200 mm
5460	CO-614	MH-30	2.13	n2525	1.66	46	1.013	3.25	3.36	200 mm
5420	CO-580	n2418	47.08	MH-211	47.14	5	1.013	48.47	48.26	200 mm
3424	p973	n1417	6.37	n1419	6.67	30	1.013	7.8	7.79	200 mm
3695	p1191	n1740	16.5	n1741	16.6	10	1.012	17.64	17.72	200 mm
3314	p873	n1279	19.95	n1277	19.64	30	1.012	21.06	20.93	200 mm
4653	p2021	n2950	6.08	n2952	5.77	30	1.012	7.19	7.23	200 mm
4186	p1614	n2345	3.59	n2344	3.29	30	1.012	4.71	4.68	200 mm
3639	p1141	n1660	4.89	n1662	4.58	30	1.012	6.01	6	200 mm
4826	p2152	n3137	5.06	n3138	5.46	39	1.012	6.35	6.58	200 mm
4925	p2244	n3259	4.4	n3261	4.59	19	1.012	5.56	5.71	200 mm
3612	p1121	n1629	33.49	n1631	33.85	36	1.012	35.87	34.97	200 mm
5456	p1737(2)	MH-29	1.93	n2522	2	6	1.008	3.13	3.12	200 mm
5344	CO-430	n2124	3.14	n2126	5.28	14	15.47	6	6.4	200 mm
3081	p671	n999	8.12	n1000	10.23	25	8.329	9.23	11.34	200 mm
3101	p689	n1023	9.57	n1024	8.54	28	3.688	10.69	9.66	200 mm
3620	p1128	n1639	7.73	n1641	6.65	30	3.616	8.85	7.77	200 mm
3311	CO-276	n1274	15.56	n1276	18.02	30	8.065	16.68	19.14	200 mm
5392	CO-526	MH-592	18.51	n686	19.22	20	3.552	19.63	20.34	200 mm
4305	p1713(1)	n2489	11.8	MH-330	11.69	12	0.847	12.92	12.9	200 mm
3691	p1187	n1735	17.44	n1736	18.45	30	3.38	18.55	19.57	200 mm
3696	p1210	n1740	16.5	n1766	14.29	30	7.393	17.64	15.41	200 mm
2580	p109	n193	17.76	n194	16.78	30	3.256	18.88	17.9	200 mm
4306	p1714	n2490	11.6	n2491	7.88	30	12.582	12.87	9	200 mm
4811	p2144	n3120	7.3	n3126	9.35	30	6.873	8.42	10.47	200 mm
2827	p445	n680	18.26	n682	18.82	19	2.92	19.38	19.94	200 mm
4107	p1547(1)	n2248	20.02	MH-193	19.14	14	6.39	21.14	20.26	200 mm
4007	p1478	n2129	6.77	n2144	7.61	30	2.816	7.89	8.73	200 mm
4300	p1708	n2481	5.45	n2483	7.31	30	6.2	6.57	8.43	200 mm
2574	p103	n183	14.95	n185	16.77	30	6.059	16.07	17.89	200 mm
4303	p1711	n2487	11.5	n2488	11.81	47	0.653	12.73	12.92	200 mm
3358	p911(1)	n1334	13.53	MH-278	11.36	18	11.766	14.65	12.48	200 mm
2833	p450	n687	18.17	n689	15.72	26	9.324	19.29	16.84	200 mm
2835	p451(1)(1)	n689	15.72	MH-591	13.15	18	14.016	16.84	14.26	200 mm
3087	p676	n1006	8.2	n1007	6.97	26	4.623	9.31	8.09	200 mm
4375	p1768	n2562	39.1	n2563	39.7	30	2.021	40.22	41.48	200 mm

4932	p2254	n3272	4.87	n3270	5.47	30	2.008	5.99	6.59	200 mm
5011	p876(2)(1)	MH-280	16.24	MH-281	16.58	8	4.439	17.36	17.7	200 mm
2575	p104	n185	16.77	n187	17.36	30	1.968	17.89	18.49	200 mm
2732	p1303	n1893	3.53	n563	1.22	13	17.375	5.71	6.04	200 mm
4587	p1954	n2846	9.95	n2848	12.43	33	7.518	11.07	13.55	200 mm
4660	p2026(1)	n2959	5.67	MH-57	5.32	19	1.874	6.98	6.44	200 mm
4373	p1765(2)	MH-750	28.49	n2559	28.94	4	11.05	29.6	30.06	200 mm
5503	p1884(1)	n2737	7.86	MH-50	7.29	15	3.893	9.2	8.41	200 mm
4003	p1473	n2137	6.75	n2126	5.28	38	3.891	7.86	6.4	200 mm
3357	p911(2)	MH-278	11.36	n1332	10.27	9	11.814	12.48	11.39	200 mm
3191	p897	n1133	4.74	n1315	6.69	30	6.496	7.86	7.81	200 mm
2668	p189	n316	33.71	n318	38	48	9.001	34.83	39.12	200 mm
3211	p783	n1160	4.53	n1161	1.34	12	25.502	6.2	6.19	200 mm
5391	CO-524	n690	10.95	MH-591	13.15	15	14.282	12.07	14.26	200 mm
4991	p1547(2)(1	MH-193	19.14	MH-194	18.79	6	6.344	20.26	19.9	200 mm
2581	p110	n194	16.78	n196	16.01	22	3.566	17.9	17.13	200 mm
3728	CO-334	n1846	3.66	n1784	0.72	30	9.824	5.39	5.64	200 mm
4576	p1961	n2858	9.86	n2832	8.62	22	5.721	10.97	9.77	200 mm
2573	p102	n181	13.16	n183	14.95	30	5.988	14.28	16.07	200 mm
4379	p2137	n3117	6.88	n2566	3.93	22	13.216	8.71	7.48	200 mm
4308	p1715	n2491	7.88	n2493	5.2	30	8.976	9	6.32	200 mm
5404	CO-550	MH-848	29.26	n316	33.71	39	11.387	30.38	34.83	200 mm
3608	p1118(2)	MH-254	32.11	n1627	33.2	12	8.694	33.23	34.39	200 mm
4104	p1545	n2244	15.41	n2243	10.5	30	16.59	16.53	11.62	200 mm
5504	p1884(2)	MH-50	7.29	n2739	6.59	13	5.384	8.41	7.71	200 mm
5012	p878(2)(1)	MH-282	12.28	MH-283	12.93	5	11.935	13.4	14.05	200 mm
4371	p1765(1)	n2557	25.86	MH-750	28.49	23	11.647	26.98	29.6	200 mm
2997	p599(1)	n896	4.1	MH-498	4.18	6	1.29	5.9	5.73	200 mm
4992	CO-4	MH-194	18.79	MH-195	16.51	28	8.038	19.9	17.63	200 mm
5453	CO-612	n1284	15.89	MH-283	12.93	37	8.008	17.01	14.05	200 mm
5107	CO-4	MH-2	1.72	n2924	0.51	43	2.801	3.78	3.72	200 mm
4219	p1664	n2385	46.64	n2418	47.08	9	4.953	47.76	48.47	200 mm
3008	p609	n909	4.76	n907	5.13	30	1.222	5.88	6.42	200 mm
3783	p1267	n1842	4.68	n1844	5.05	30	1.213	5.8	6.16	200 mm
3606	p1117(2)	MH-253	29.2	n1626	30.49	9	14.75	30.32	31.6	200 mm
5390	CO-522	n691	7.27	n690	10.95	25	14.714	8.38	12.07	200 mm
3711	p1207	n1759	10.76	n1758	8.97	13	14.289	11.88	10.09	200 mm
3089	p677	n1007	6.97	n1009	5.59	30	4.619	8.09	6.71	200 mm
3360	p914	n1337	6.07	n1338	6.85	30	2.584	7.19	7.97	200 mm
4935	p2257	n3277	6.48	n3278	7.25	30	2.57	7.59	8.36	200 mm
2572	p101	n180	11.03	n181	13.16	30	7.105	12.15	14.28	200 mm
3319	p876(1)	n1284	15.89	MH-280	16.24	8	4.444	17.01	17.36	200 mm
3714	p1211	n1766	14.29	n1763	12.96	30	4.427	15.41	14.08	200 mm
3423	p972	n1416	6.09	n1417	6.37	25	1.104	7.21	7.8	200 mm
2834	p449(2)	MH-592	18.51	n687	18.17	14	2.413	19.63	19.29	200 mm
5431	p621(1)(2)(	MH-23	6.98	MH-453	7.04	6	1.061	8.1	8.16	200 mm
3607	p1118(1)	n1626	30.49	MH-254	32.11	17	9.436	31.6	33.23	200 mm

3345	p898	n1315	6.69	n1316	7.38	30	2.296	7.81	8.5	200 mm
4105	p1546(2)	MH-195	16.51	n2244	15.41	12	8.927	17.63	16.53	200 mm
3321	p878(1)	n1287	10.2	MH-282	12.28	17	12.088	11.32	13.4	200 mm
4832	p2253	n3146	4.21	n3272	4.87	30	2.214	5.68	5.99	200 mm
3079	p669	n996	5.61	n997	6.88	21	6.033	6.73	8	200 mm
3605	p1117(1)	n1624	26.1	MH-253	29.2	21	14.792	27.22	30.32	200 mm
5019	p1309(2)(1	MH-308	7.52	MH-309	8.33	8	10.788	8.64	9.45	200 mm
4586	p1953	n2844	8.31	n2846	9.95	30	5.494	9.42	11.07	200 mm
4454	p1849	n2675	5.11	n2690	6.15	30	3.473	7.65	7.77	200 mm
3713	p1209	n1763	12.96	n1761	11.36	30	5.351	14.08	12.48	200 mm
3681	p1182	n1720	10.65	n1728	13.75	30	10.388	11.77	14.87	200 mm
4011	p1472	n2135	3.3	n2134	6.09	27	10.374	7.12	7.21	200 mm
3009	p610	n910	4.19	n909	4.76	30	1.904	5.36	5.88	200 mm
3621	p1129	n1641	6.65	n1643	6.08	30	1.898	7.77	7.2	200 mm
5377	CO-496	MH-252	19.91	n1624	26.1	36	17.004	21.03	27.22	200 mm
4944	p2267	n3289	6.1	n3291	6.65	30	1.863	7.21	7.77	200 mm
4220	p1641(2)	MH-212	45.67	n2385	46.64	19	5.133	46.78	47.76	200 mm
3700	p1196	n1746	13.41	n1747	9.14	30	14.39	14.53	10.26	200 mm
3408	p959(1)	n1399	7.47	MH-263	7.35	14	0.81	8.63	8.47	200 mm
4370	p1764	n2556	22.9	n2557	25.86	30	9.913	24.02	26.98	200 mm
3080	p670	n997	6.88	n999	8.12	39	3.173	8	9.23	200 mm
4102	p1544	n2243	10.5	n2242	6.75	30	12.621	11.62	7.87	200 mm
4846	p2171	n3161	8.53	n3163	9.96	30	4.792	9.65	11.08	200 mm
3397	CO-292	n1389	3.98	n1390	6.7	29	9.282	7.45	7.89	200 mm
3866	p1348	n1953	5.22	n1954	5.51	39	0.742	6.34	6.63	200 mm
4112	p1552	n2257	19.61	n2255	20.17	34	1.663	20.72	21.28	200 mm
3610	p1120	n1628	33.32	n1629	33.49	24	0.734	36.2	35.87	200 mm
4169	p1622	n2323	-1.13	n2358	2.35	30	11.723	4.29	4.79	200 mm
3689	p1185	n1731	16.05	n1733	17	34	2.848	17.17	18.12	200 mm
2571	CO-112	n180	11.03	n177	9.12	30	6.4	12.15	10.24	200 mm
5286	CO-318	n2207	5.21	n2209	4.73	30	1.598	6.32	5.85	200 mm
5368	CO-478	MH-262	7.51	MH-260	7.36	21	0.707	8.68	8.47	200 mm
4119	p1556	n2262	10.69	n2260	14.82	30	13.895	11.81	15.94	200 mm
4117	p1555	n2260	14.82	n2259	18.44	33	10.832	15.94	19.56	200 mm
5155	CO-78	n2962	4.69	MH-57	5.32	41	1.522	5.81	6.44	200 mm
3821	p1309(1)	n1897	6.85	MH-308	7.52	6	10.794	7.97	8.64	200 mm
3615	p1124	n1633	6.73	n1635	9.81	21	14.689	10.18	11.07	200 mm
3690	p1186	n1733	17	n1735	17.44	30	1.442	18.12	18.55	200 mm
5028	p2209(2)(1	MH-355	3.64	MH-356	3.74	15	0.634	5.34	5.27	200 mm
4250	p1667	n2422	8.11	n2424	8.28	26	0.624	9.64	9.39	200 mm
3164	p742(2)	MH-828	5.25	n1101	5.4	24	0.623	6.75	6.78	200 mm
5104	CO-108	MH-848	29.26	MH-839	27.58	24	7.033	30.38	28.7	200 mm
3371	p927	n1353	4.97	n1354	4.79	28	0.614	6.09	6.09	200 mm
5571	CO-638	n921	6.11	n923	6.91	28	2.848	7.23	8.61	200 mm
5421	CO-582	n2384	45.11	MH-212	45.67	10	5.372	46.23	46.78	200 mm
3702	CO-70	n1747	9.14	n1748	6.23	22	13.226	10.26	7.35	200 mm
3003	p605	n902	5.71	n903	5.06	27	2.378	6.83	6.18	200 mm

5283	CO-312	MH-133	4.86	n2201	5.06	33	0.591	5.98	6.18	200 mm
5455	p1737(1)	n2521	1.8	MH-29	1.93	23	0.585	3.18	3.13	200 mm
3787	p1272	n1849	3.9	n1851	4.08	30	0.584	5.38	5.42	200 mm
4190	p1617	n2350	2.96	n2348	3.13	30	0.581	4.33	4.43	200 mm
3640	p1142	n1662	4.58	n1664	4.41	30	0.581	6	5.86	200 mm
3194	p769	n1139	6.04	n1141	5.87	30	0.581	7.3	7.15	200 mm
3170	p747	n1107	7.61	n1109	7.78	30	0.581	9.29	9.24	200 mm
4340	p1740	n2525	1.66	n2526	1.49	30	0.581	3.36	3.23	200 mm
4460	p1847	n2685	5.79	n2687	5.97	30	0.581	7.05	7.09	200 mm
4495	p1883	n2735	8.03	n2737	7.86	30	0.581	9.15	9.2	200 mm
3205	p777	n1152	5.31	n1153	5.13	30	0.581	6.53	6.41	200 mm
2566	p95	n171	7.23	n172	7.4	30	0.581	8.4	8.52	200 mm
5260	CO-266	n2794	5.04	n2795	5.21	28	0.581	6.52	6.7	200 mm
5312	CO-368	MH-176	4.86	n3137	5.06	35	0.581	6.48	6.35	200 mm
5357	CO-456	n2344	3.29	MH-163	3.2	15	0.581	4.68	4.54	200 mm
5238	CO-224	n2930	1.99	MH-2	1.72	46	0.581	3.64	3.78	200 mm
3699	CO-348	MH-395	16.63	n1743	16.82	32	0.581	18.01	19.01	200 mm
4463	p1851	n2691	6.27	n2693	6.45	30	0.581	7.82	7.87	200 mm
3394	p949	n1386	6.37	n1387	6.54	30	0.581	7.59	7.66	200 mm
3427	p976	n1421	5.61	n1422	5.44	30	0.581	6.85	6.91	200 mm
3301	p862	n1265	7.45	n1266	7.62	30	0.581	9.57	9.41	200 mm
4924	p2243	n3258	4.22	n3259	4.4	30	0.581	5.55	5.56	200 mm
3813	p1299(1)	n1888	4.03	MH-766	3.94	16	0.581	5.55	5.53	200 mm
3687	p1183	n1728	13.75	n1729	15.31	30	5.217	14.87	16.43	200 mm
4847	p2172(1)	n3163	9.96	MH-465	10.59	27	2.318	11.08	11.75	200 mm
3712	p1208	n1761	11.36	n1759	10.76	12	5.137	12.48	11.88	200 mm
3306	p867	n1272	12.86	n1271	9.88	26	11.268	13.97	11	200 mm
4844	p2169	n3158	5.66	n3160	7.12	22	6.622	6.78	8.24	200 mm
4939	p2262	n3285	4.15	n3283	4.33	33	0.531	5.74	5.67	200 mm
3308	p868	n1273	14.87	n1272	12.86	25	8.142	15.99	13.97	200 mm
5191	CO-138	n2840	6.65	n2573	4.38	28	8.242	7.77	7.28	200 mm
3227	p794	n1176	4.47	n1177	4.64	34	0.512	6.03	6.14	200 mm
3410	p959(2)	MH-263	7.35	n1400	7.17	16	1.134	8.47	8.29	200 mm
5353	CO-448	MH-751	19.53	n2551	15.81	25	15.046	20.65	16.93	200 mm
3990	p1541	n2239	4.52	n2106	1.98	14	17.809	5.64	5.65	200 mm
3017	p619	n920	5.49	n921	6.11	20	3.079	6.61	7.23	200 mm
5024	p1713(2)(1	MH-330	11.69	MH-331	11.65	8	0.486	12.9	12.89	200 mm
4309	p1716	n2493	5.2	n2495	4.41	18	4.35	6.32	5.53	200 mm
3402	p955(1)	n1394	7.17	MH-260	7.36	17	1.086	8.29	8.47	200 mm
3322	p879(2)	MH-284	9.73	n1287	10.2	6	7.692	10.85	11.32	200 mm
5103	p186(2)(1)	MH-838	26.82	MH-839	27.58	11	7.013	27.94	28.7	200 mm
2665	p185(2)	MH-850	24.28	n313	25.77	14	10.869	25.4	26.88	200 mm
3823	p1309(2)(2	MH-309	8.33	n1898	9.37	25	4.06	9.45	11.12	200 mm
3826	p1313	n1903	9.73	n1904	9.91	39	0.446	11.61	11.41	200 mm
3688	p1184	n1729	15.31	n1731	16.05	27	2.777	16.43	17.17	200 mm
4115	p1554(2)	MH-186	18.62	n2258	19.49	22	3.914	19.74	20.67	200 mm
4299	p1707	n2480	4.93	n2481	5.45	30	1.734	6.05	6.57	200 mm

4933	p2256	n3275	6.1	n3277	6.48	22	1.722	7.22	7.59	200 mm
3090	p678	n1009	5.59	n1010	4.79	30	2.657	6.71	5.91	200 mm
3355	CO-278	n1331	8.96	n1329	7.79	20	5.7	10.08	8.91	200 mm
5376	CO-494	n1621	17.66	MH-252	19.91	21	10.488	18.78	21.03	200 mm
4845	p2170	n3160	7.12	n3161	8.53	38	3.725	8.24	9.65	200 mm
4364	p1759	n2549	11.39	n2551	15.81	30	14.872	12.51	16.93	200 mm
4362	p1757	n2546	6.72	n2548	10.04	16	20.139	7.83	11.16	200 mm
2569	p98	n175	8.49	n177	9.12	13	4.853	9.61	10.24	200 mm
4920	p2242	n3252	4.07	n3258	4.22	18	0.889	5.51	5.55	200 mm
3324	p879(1)	n1289	7.88	MH-284	9.73	24	7.767	9	10.85	200 mm
2663	p185(1)	n312	22.53	MH-850	24.28	16	10.719	23.65	25.4	200 mm
2664	p186(1)	n313	25.77	MH-838	26.82	15	6.988	26.88	27.94	200 mm
4005	p1468	n2128	6.52	n2129	6.77	30	0.816	7.64	7.89	200 mm
3195	p770	n1141	5.87	n1142	5.77	12	0.799	7.15	7.07	200 mm
3005	p2153	n903	5.06	n3139	4.77	13	2.202	6.18	5.89	200 mm
4118	p1554(1)	n2259	18.44	MH-186	18.62	4	4.218	19.56	19.74	200 mm
3356	p909	n1332	10.27	n1331	8.96	39	3.361	11.39	10.08	200 mm
3601	p1114	n1619	14.63	n1621	17.66	30	10.148	15.75	18.78	200 mm
4120	p1557	n2264	8.25	n2262	10.69	30	8.169	9.37	11.81	200 mm
2838	p453	n691	7.27	n692	5.73	30	5.131	8.38	6.85	200 mm
2662	p184(2)	MH-837	20.98	n312	22.53	14	10.899	22.1	23.65	200 mm
5569	CO-634	n3275	6.1	n1915	5.28	36	2.271	7.22	6.99	200 mm
3169	p746	n1106	7.48	n1107	7.61	18	0.696	9.4	9.29	200 mm
4103	p1543(1)	n2242	6.75	MH-197	5.38	22	6.223	7.87	6.5	200 mm
3310	p869(1)	n1274	15.56	MH-811	15.36	11	1.812	16.68	16.48	200 mm
3422	p971	n1415	5.86	n1416	6.09	36	0.642	6.98	7.21	200 mm
3674	CO-324	n1715	8.38	MH-389	9.82	14	10.149	9.5	10.94	200 mm
4585	p1952	n2842	7.55	n2844	8.31	30	2.524	8.67	9.42	200 mm
5497	CO-618	n2744	5.1	MH-47	6.29	35	3.429	6.22	7.41	200 mm
3865	p1347	n1952	5.03	n1953	5.22	30	0.621	6.15	6.34	200 mm
4070	p1521	n2210	4.4	n2209	4.73	30	1.093	5.52	5.85	200 mm
3077	CO-124	n992	4.19	n994	4.61	12	3.317	5.31	5.72	200 mm
2661	p184(1)	n311	19.26	MH-837	20.98	16	10.918	20.38	22.1	200 mm
5078	p695(2)(1)	MH-677	7.25	MH-678	6.78	9	5.401	8.37	7.9	200 mm
5375	CO-492	MH-250	11.31	n1619	14.63	35	9.564	12.42	15.75	200 mm
3825	p1312	n1902	9.61	n1903	9.73	21	0.592	11.51	11.61	200 mm
4369	p1763	n2555	21.65	n2556	22.9	30	4.177	22.77	24.02	200 mm
4298	p1706	n2478	4.45	n2480	4.93	30	1.61	5.57	6.05	200 mm
2819	p439	n672	16.15	n674	17.67	30	5.083	17.27	18.79	200 mm
4810	p2139	n3120	7.3	n3119	7	30	0.984	8.42	8.12	200 mm
3710	p1206	n1758	8.97	n1757	7.56	36	3.934	10.09	8.68	200 mm
3078	p668	n994	4.61	n996	5.61	47	2.152	5.72	6.73	200 mm
4297	p1705	n2477	4.03	n2478	4.45	20	2.105	5.15	5.57	200 mm
5189	CO-134	n2830	7.98	n2832	8.62	32	1.989	9.09	9.77	200 mm
2660	p183	n310	16.07	n311	19.26	30	10.683	17.19	20.38	200 mm
4583	p1951	n2840	6.65	n2842	7.55	32	2.778	7.77	8.67	200 mm
5102	CO-274	MH-813	15.16	MH-811	15.36	10	1.924	16.28	16.48	200 mm

3225	p1122(1)	n1174	4.28	MH-306	6.61	9	27	8.15	8.61	200 mm
2818	CO-194	MH-588	4.98	n671	4.45	8	6.481	6.1	5.97	200 mm
4943	p2266	n3288	5.78	n3289	6.1	37	0.852	6.9	7.21	200 mm
2659	CO-110	n310	16.07	n307	11.16	43	11.502	17.19	12.28	200 mm
3016	p618	n919	4.77	n920	5.49	40	1.804	5.89	6.61	200 mm
4842	p2168	n3157	4.64	n3158	5.66	32	3.204	5.75	6.78	200 mm
3598	p1112(1)	n1617	9.28	MH-250	11.31	24	8.414	10.4	12.42	200 mm
3300	p861	n1264	7.32	n1265	7.45	28	0.448	9.54	9.57	200 mm
3162	p742(1)	n1099	5.23	MH-828	5.25	4	0.446	6.75	6.75	200 mm
4215	p1638(2)(2	MH-216	39.39	n2381	41.34	15	12.737	40.51	42.46	200 mm
3110	p695(1)	n1032	8.03	MH-677	7.25	25	3.122	9.23	8.37	200 mm
2570	p421	n647	7.5	n175	8.49	32	3.117	8.62	9.61	200 mm
4572	p1941	n2829	7.23	n2830	7.98	34	2.226	8.35	9.09	200 mm
3428	p977	n1422	5.44	n1423	5.32	30	0.415	6.91	6.66	200 mm
3305	p866(2)	MH-815	9.56	n1270	8.32	23	5.487	10.68	9.44	200 mm
2826	p444	n679	18.21	n680	18.26	11	0.415	19.89	19.38	200 mm
4341	p1741	n2526	1.49	n2527	1.36	30	0.415	3.23	3.28	200 mm
4326	p1736	n2508	1.67	n2521	1.8	30	0.415	3.24	3.18	200 mm
3393	p948	n1384	6.24	n1386	6.37	30	0.414	7.56	7.59	200 mm
4459	p1846	n2684	5.67	n2685	5.79	30	0.414	7.34	7.05	200 mm
4191	p1618	n2352	2.83	n2350	2.96	30	0.414	4.29	4.33	200 mm
4462	p1850	n2690	6.15	n2691	6.27	30	0.414	7.77	7.82	200 mm
4539	p1916	n2792	4.92	n2794	5.04	30	0.414	6.41	6.52	200 mm
5282	CO-310	MH-131	4.77	MH-133	4.86	23	0.414	6	5.98	200 mm
5311	CO-366	MH-176	4.86	n3134	4.77	22	0.414	6.48	6.66	200 mm
5383	CO-508	MH-766	3.94	n1891	3.77	42	0.414	5.53	4.97	200 mm
5337	CO-416	n3205	3.5	MH-355	3.64	35	0.414	5.46	5.34	200 mm
5358	CO-458	MH-163	3.2	MH-166	3.11	22	0.414	4.54	4.43	200 mm
5336	CO-414	n3285	4.15	MH-345	4.11	10	0.414	5.74	5.81	200 mm
5444	CO-600	n923	6.91	MH-23	6.98	16	0.414	8.61	8.1	200 mm
3029	CO-134	n931	10.62	MH-465	10.59	8	0.414	11.74	11.75	200 mm
3786	p1271	n1848	3.78	n1849	3.9	30	0.414	5.36	5.38	200 mm
3102	p690	n1024	8.54	n1026	8.41	32	0.414	9.66	11.22	200 mm
5575	CO-646	n1354	4.79	MH-784	4.62	36	0.486	6.09	5.76	200 mm
3226	p793	n1175	4.34	n1176	4.47	30	0.414	6.33	6.03	200 mm
2565	p94	n170	7.1	n171	7.23	30	0.414	8.23	8.4	200 mm
3206	p778	n1153	5.13	n1154	5.01	30	0.414	6.41	6.31	200 mm
5422	CO-584	n2379	37.55	MH-216	39.39	14	13.203	38.67	40.51	200 mm
2675	CO-242	n496	5.68	n499	2.45	44	7.413	6.99	7.05	200 mm
3361	p913(2)(2)	MH-810	5.96	n1337	6.07	16	0.697	7.08	7.19	200 mm
4214	p1639	n2381	41.34	n2382	44.19	30	9.544	42.46	45.31	200 mm
5500	p1888(1)	n2744	5.1	MH-49	4.56	19	2.768	6.22	5.68	200 mm
3864	p1346	n1951	4.83	n1952	5.03	30	0.671	5.95	6.15	200 mm
3131	p734	n1064	2.88	n1090	4.48	27	6.016	6.66	6.59	200 mm
5227	CO-206	MH-197	5.38	MH-199	4.81	14	4.153	6.5	5.93	200 mm
3375	p929(2)	MH-784	4.62	n1357	4.45	26	0.662	5.76	5.57	200 mm
4310	p1717	n2495	4.41	n2496	3.56	45	1.887	5.53	4.68	200 mm

5256	CO-258	MH-55	4.4	n2962	4.69	48	0.614	5.52	5.81	200 mm
4307	p1713(2)(2	MH-331	11.65	n2490	11.6	16	0.345	12.89	12.87	200 mm
2996	p597(2)	MH-495	3.91	n894	3.98	11	0.611	7.39	6.7	200 mm
3091	p679	n1010	4.79	n1012	4.39	30	1.352	5.91	5.51	200 mm
3114	p698	n1038	6.28	n1040	5.31	18	5.388	7.4	6.43	200 mm
5351	CO-444	n1559	0.73	n2542	3.9	30	10.716	4.22	5.02	200 mm
2995	p598	n894	3.98	n896	4.1	37	0.333	6.7	5.9	200 mm
4368	p1762	n2553	20.77	n2555	21.65	30	2.948	21.89	22.77	200 mm
5352	CO-446	n2553	20.77	MH-751	19.53	34	3.615	21.89	20.65	200 mm
3323	p880	n1291	6.81	n1289	7.88	30	3.557	7.93	9	200 mm
4211	p1636	n2376	30.61	n2378	34.43	30	12.845	31.73	35.55	200 mm
3673	p1171	n1714	6.61	n1715	8.38	30	5.931	7.73	9.5	200 mm
4072	p1522	n2212	4.15	n2210	4.4	30	0.855	5.26	5.52	200 mm
5501	p1888(2)	MH-49	4.56	n2745	4.29	10	2.767	5.68	5.4	200 mm
4114	p1553(2)	MH-189	19.55	n2257	19.61	10	0.545	20.7	20.72	200 mm
3709	p1205	n1757	7.56	n1756	6.74	30	2.744	8.68	7.86	200 mm
3401	p954	n1393	7	n1394	7.17	32	0.534	8.12	8.29	200 mm
4121	p1558	n2265	7.05	n2264	8.25	30	4.017	8.17	9.37	200 mm
4058	p1513(2)	MH-131	4.77	n2196	4.63	25	0.531	6	5.75	200 mm
3014	p617	n918	4.29	n919	4.77	30	1.604	5.41	5.89	200 mm
3184	p939	n1269	7.18	n1126	5.29	30	6.316	8.3	8.44	200 mm
4073	p1523(2)	MH-137	3.89	n2212	4.15	22	1.169	5.01	5.26	200 mm
4212	p1637	n2378	34.43	n2379	37.55	30	10.452	35.55	38.67	200 mm
3307	p866(1)	n1271	9.88	MH-815	9.56	10	3.1	11	10.68	200 mm
3704	p1204	n1756	6.74	n1748	6.23	16	3.114	7.86	7.35	200 mm
3597	p1111	n1615	7.49	n1617	9.28	30	5.973	8.61	10.4	200 mm
3200	p2265	n1146	5.6	n3288	5.78	24	0.757	6.87	6.9	200 mm
2770	p685	n1018	3.78	n610	3.18	10	5.868	5.64	6	200 mm
4210	p1635	n2374	27.1	n2376	30.61	30	11.771	28.22	31.73	200 mm
2692	p917	n1341	4.76	n518	0.89	21	18.023	6.46	6.41	200 mm
5154	CO-76	n2965	4.11	MH-55	4.4	40	0.715	5.23	5.52	200 mm
3611	p1119(2)	MH-255	33.27	n1628	33.32	19	0.256	35.47	36.2	200 mm
3309	p869(2)(2)	MH-813	15.16	n1273	14.87	21	1.356	16.28	15.99	200 mm
5101	p913(2)(1)	MH-809	5.92	MH-810	5.96	5	0.701	7.04	7.08	200 mm
3534	p1608	n2338	2.66	n1542	2.23	25	1.76	4.58	4.55	200 mm
4363	p1758	n2548	10.04	n2549	11.39	30	4.551	11.16	12.51	200 mm
5389	CO-520	n694	5.1	n692	5.73	29	2.18	6.22	6.85	200 mm
3417	p967	n1410	6.33	n1411	5.59	23	3.233	7.5	7.31	200 mm
3400	p953	n1391	6.82	n1393	7	28	0.651	7.94	8.12	200 mm
4183	p1612(2)	MH-166	3.11	n2341	3.02	21	0.404	4.43	4.47	200 mm
4054	p1510(1)	n2193	4.39	MH-128	4.12	22	1.236	5.61	5.24	200 mm
4458	p1845	n2682	5.55	n2684	5.67	30	0.401	7.06	7.34	200 mm
4192	p1619	n2354	2.71	n2352	2.83	30	0.401	4.37	4.29	200 mm
3224	p792	n1174	4.28	n1175	4.34	17	0.401	8.15	6.33	200 mm
4538	p1915	n2790	4.8	n2792	4.92	30	0.401	6.52	6.41	200 mm
3429	p978	n1423	5.32	n1425	5.2	30	0.401	6.66	6.75	200 mm
4006	p1469	n2130	6.4	n2128	6.52	30	0.4	7.66	7.64	200 mm

2825	p443	n678	18.09	n679	18.21	30	0.4	19.53	19.89	200 mm
3824	p1311	n1900	9.49	n1902	9.61	30	0.4	11.26	11.51	200 mm
4942	p2264(1)	n3287	4.05	MH-345	4.11	17	0.4	5.89	5.81	200 mm
3609	p1119(1)	n1627	33.2	MH-255	33.27	18	0.4	34.39	35.47	200 mm
3421	p970	n1414	5.74	n1415	5.86	30	0.4	7.25	6.98	200 mm
3207	p779	n1154	5.01	n1155	4.89	30	0.4	6.31	6.22	200 mm
3104	p691	n1026	8.41	n1027	8.29	30	0.4	11.22	12.68	200 mm
3409	p960	n1400	7.17	n1401	7.05	30	0.4	8.29	8.25	200 mm
3392	p947	n1383	6.12	n1384	6.24	30	0.4	7.43	7.56	200 mm
3785	p1270	n1846	3.66	n1848	3.78	30	0.4	5.39	5.36	200 mm
3816	p1301	n1891	3.77	n1892	3.65	30	0.4	4.97	5.49	200 mm
4342	p1742	n2527	1.36	n2528	1.24	30	0.4	3.28	3.27	200 mm
4209	p1634	n2373	23.87	n2374	27.1	30	10.829	24.99	28.22	200 mm
4343	p1743	n2528	1.24	n2529	1.12	20	0.605	3.27	3.09	200 mm
2562	p92	n167	6.91	n168	6.98	13	0.59	8.54	8.21	200 mm
3676	p1172(2)(2	MH-389	9.82	n1716	10.24	15	2.847	10.94	12.29	200 mm
3822	p1310	n1898	9.37	n1900	9.49	21	0.577	11.12	11.26	200 mm
3166	p860	n1103	7.2	n1264	7.32	33	0.367	9.59	9.54	200 mm
3304	p865	n1270	8.32	n1268	7.39	30	3.109	9.44	8.5	200 mm
3165	p744	n1103	7.2	n1104	7.36	29	0.541	9.59	9.55	200 mm
5568	CO-632	n1643	6.08	n1644	5.97	27	0.401	7.2	7.09	200 mm
3325	p881	n1293	6.04	n1291	6.81	30	2.58	7.16	7.93	200 mm
3161	p741	n1097	5.11	n1099	5.23	35	0.34	6.68	6.75	200 mm
4208	p1633	n2372	20.86	n2373	23.87	30	10.1	21.98	24.99	200 mm
3374	p930(1)(1)(	n1357	4.45	MH-783	4.39	12	0.519	5.57	5.51	200 mm
2564	p93	n168	6.98	n170	7.1	36	0.332	8.21	8.23	200 mm
5495	p1886(1)	n2740	6.47	MH-47	6.29	25	0.721	7.74	7.41	200 mm
4122	p1559(2)	MH-185	6.49	n2265	7.05	20	2.831	7.6	8.17	200 mm
4822	p2149(2)	MH-174	4.72	n3134	4.77	15	0.308	6.76	6.66	200 mm
5177	CO-120	MH-105	6.83	n2829	7.23	34	1.201	7.94	8.35	200 mm
5374	CO-490	n1472	3.47	n1610	5.52	30	6.899	7.22	6.64	200 mm
4218	p1640(2)	MH-214	44.64	n2384	45.11	15	3.075	45.76	46.23	200 mm
5587	CO-670	n1044	4.04	n1040	5.31	35	3.641	5.16	6.43	200 mm
2655	p177	n300	6.48	n302	8.4	30	6.394	7.6	9.51	200 mm
5397	CO-536	n211	6.56	n214	3.43	30	10.508	7.68	4.55	200 mm
4009	p1471	n2134	6.09	n2132	6.29	30	0.649	7.21	7.46	200 mm
3168	p745	n1104	7.36	n1106	7.48	43	0.279	9.55	9.4	200 mm
2631	p154	n260	3.71	n262	3.79	19	0.4	5.96	6.04	200 mm
4361	p1756	n2544	5.09	n2546	6.72	43	3.809	6.21	7.83	200 mm
4124	p1559(1)	n2267	6.37	MH-185	6.49	4	2.831	7.49	7.6	200 mm
4295	p1704	n2476	3.7	n2477	4.03	41	0.816	4.81	5.15	200 mm
4116	p1553(1)	n2258	19.49	MH-189	19.55	16	0.406	20.67	20.7	200 mm
3672	p1170	n1712	5.66	n1714	6.61	30	3.166	6.78	7.73	200 mm
3430	p979	n1425	5.2	n1426	5.08	30	0.402	6.75	6.55	200 mm
4216	p1640(1)	n2382	44.19	MH-214	44.64	15	3.066	45.31	45.76	200 mm
3411	p961	n1401	7.05	n1402	6.93	30	0.401	8.25	8.13	200 mm
4457	p1844	n2680	5.43	n2682	5.55	30	0.401	7.19	7.06	200 mm

4056	p1512	n2196	4.63	n2195	4.51	30	0.4	5.75	6.15	200 mm
3105	p692	n1027	8.29	n1029	8.27	6	0.4	12.68	12.99	200 mm
4497	p1885	n2739	6.59	n2740	6.47	30	0.4	7.71	7.74	200 mm
3817	p1302	n1892	3.65	n1893	3.53	30	0.4	5.49	5.71	200 mm
3208	p780	n1155	4.89	n1157	4.77	30	0.4	6.22	6.17	200 mm
2994	CO-166	n893	3.88	MH-495	3.91	7	0.4	7.87	7.39	200 mm
3160	CO-250	n1096	5.01	n1097	5.11	26	0.4	7.36	6.68	200 mm
5171	CO-108	MH-75	4.66	n2790	4.8	34	0.4	6.67	6.52	200 mm
5220	CO-192	n1414	5.74	n1411	5.59	37	0.4	7.25	7.31	200 mm
5278	CO-302	n2130	6.4	n2132	6.29	29	0.4	7.66	7.46	200 mm
4809	p2138	n3119	7	n3117	6.88	30	0.4	8.12	8.71	200 mm
4182	p1611	n2341	3.02	n2340	2.9	30	0.4	4.47	4.6	200 mm
2824	p442	n676	17.97	n678	18.09	30	0.4	19.31	19.53	200 mm
3863	p1345	n1949	4.71	n1951	4.83	30	0.4	5.83	5.95	200 mm
4941	p2263(2)	MH-344	3.94	n3287	4.05	25	0.4	6.65	5.89	200 mm
2656	p178	n302	8.4	n304	9.88	30	4.972	9.51	11	200 mm
3390	p945	n1380	5.88	n1382	6	21	0.57	7.38	7.3	200 mm
4359	p1755	n2542	3.9	n2544	5.09	30	3.959	5.02	6.21	200 mm
4206	p1632	n2370	18.11	n2372	20.86	34	8.087	19.23	21.98	200 mm
4207	p1631(2)	MH-217	16.6	n2370	18.11	17	8.698	17.72	19.23	200 mm
3377	CO-214	MH-783	4.39	n1359	4.32	14	0.526	5.51	5.43	200 mm
4201	p1628	n2364	10.95	n2366	14.12	30	10.667	12.07	15.24	200 mm
2657	p179	n304	9.88	n305	11.09	30	4.038	11	14.22	200 mm
5448	CO-602	MH-639	17.77	n674	17.67	11	0.918	19.11	18.79	200 mm
3182	p758	n1124	6.09	n1126	5.29	7	11.247	8.44	8.44	200 mm
2584	p112	n198	15.62	n199	14.86	24	3.216	16.74	15.98	200 mm
3108	p694	n1031	8.15	n1032	8.03	17	0.696	12.01	9.23	200 mm
3852	p1335	n1936	3.02	n1938	3.63	20	3.12	6.37	6.31	200 mm
4202	p1627(2)	MH-218	9.49	n2364	10.95	13	10.873	10.61	12.07	200 mm
4821	p2149(1)	n3132	4.65	MH-174	4.72	21	0.342	6.92	6.76	200 mm
2582	p111	n196	16.01	n198	15.62	14	2.651	17.13	16.74	200 mm
4193	p1620	n2355	2.59	n2354	2.71	36	0.337	4.41	4.37	200 mm
2671	CO-236	MH-612	6.56	n491	6.2	33	1.085	7.68	7.32	200 mm
4819	p2148	n3130	4.53	n3132	4.65	25	0.482	6.94	6.92	200 mm
2798	p422	n648	7.13	n647	7.5	34	1.077	8.25	8.62	200 mm
3354	p907	n1329	7.79	n1328	7.5	32	0.917	8.91	8.62	200 mm
2591	p119	n208	10.38	n209	8.47	30	6.371	11.49	9.59	200 mm
4501	p1889	n2745	4.29	n2746	3.89	30	1.313	5.4	5.01	200 mm
3703	p1198	n1748	6.23	n1749	5.57	12	5.462	7.35	6.69	200 mm
2563	CO-232	n485	6.82	n167	6.91	18	0.471	7.94	8.54	200 mm
4667	p2031	n2965	4.11	n2967	3.97	30	0.467	5.23	5.09	200 mm
4194	p1621	n2356	2.47	n2355	2.59	26	0.458	4.64	4.41	200 mm
3391	p946	n1382	6	n1383	6.12	39	0.308	7.3	7.43	200 mm
4203	p1629	n2366	14.12	n2368	16.06	23	8.361	15.24	17.17	200 mm
2802	CO-208	MH-575	5.87	n651	6.58	34	2.083	6.99	7.7	200 mm
5228	CO-208	n2752	3.54	n2755	2.47	45	2.381	4.71	4.71	200 mm
2592	p120	n209	8.47	n211	6.56	30	6.373	9.59	7.68	200 mm

2590	p118	n206	11.97	n208	10.38	30	5.309	13.08	11.49	200 mm
5411	CO-562	n3157	4.64	n2	4.37	28	0.969	5.75	5.49	200 mm
3594	p1109	n1611	6.47	n1613	7.38	30	3.038	7.59	9.62	200 mm
3118	p701	n1044	4.04	n1045	3.54	22	2.304	5.16	4.66	200 mm
2630	p153	n258	3.59	n260	3.71	30	0.4	5.78	5.96	200 mm
3075	p666	n990	3.89	n992	4.19	41	0.741	5.01	5.31	200 mm
2669	p312	n485	6.82	n487	6.63	34	0.564	7.94	7.75	200 mm
3344	p895(2)	MH-295	1.63	n1314	3.2	14	10.961	2.75	5.31	200 mm
5382	CO-506	n1169	3.86	n1167	1.57	19	11.758	6.11	5.86	200 mm
3399	p952	n1390	6.7	n1391	6.82	30	0.401	7.89	7.94	200 mm
4456	p1843	n2678	5.31	n2680	5.43	30	0.4	7.23	7.19	200 mm
4827	p2154	n3139	4.77	n3140	4.67	25	0.4	5.89	5.92	200 mm
3209	p781	n1157	4.77	n1158	4.65	30	0.4	6.17	6.24	200 mm
3862	p1344	n1948	4.59	n1949	4.71	30	0.4	5.79	5.83	200 mm
3843	p2263(1)	n1922	3.93	MH-344	3.94	5	0.4	6.79	6.65	200 mm
3412	p962	n1402	6.93	n1403	6.81	30	0.4	8.13	7.99	200 mm
5221	CO-194	MH-240	4.92	n1426	5.08	40	0.4	7.09	6.55	200 mm
5281	CO-308	n2193	4.39	n2195	4.51	31	0.4	5.61	6.15	200 mm
5415	CO-570	n1029	8.27	n1031	8.15	29	0.4	12.99	12.01	200 mm
5100	CO-272	MH-807	5.85	MH-809	5.92	19	0.4	7.04	7.04	200 mm
4181	p1610	n2340	2.9	n2339	2.78	30	0.4	4.6	4.49	200 mm
3595	p1108(2)	MH-249	6.03	n1611	6.47	14	3.202	7.15	7.59	200 mm
2654	p176	n298	5.2	n300	6.48	30	4.288	6.31	7.6	200 mm
3708	CO-74	MH-400	5.18	n1755	3.91	19	6.549	6.49	5.03	200 mm
2801	p424(1)	n651	6.58	MH-571	7.01	27	1.569	7.7	8.36	200 mm
4966	p1913(1)(2	MH-76	4.62	MH-75	4.66	9	0.39	6.59	6.67	200 mm
2645	p168	n285	0.7	n287	3.08	33	7.248	4.31	4.28	200 mm
4199	p1627(1)	n2362	8.03	MH-218	9.49	16	8.995	9.15	10.61	200 mm
3092	p680	n1012	4.39	n1013	4.27	23	0.517	5.51	5.53	200 mm
5345	CO-432	MH-199	4.81	n2239	4.52	23	1.24	5.93	5.64	200 mm
3326	p882(2)	MH-285	5.71	n1293	6.04	23	1.448	6.83	7.16	200 mm
3593	p1108(1)	n1610	5.52	MH-249	6.03	16	3.199	6.64	7.15	200 mm
3159	p739(2)	MH-826	4.92	n1096	5.01	26	0.35	6.97	7.36	200 mm
5402	CO-546	n910	4.19	n1	3.99	15	1.378	5.36	5.15	200 mm
4886	p2207(2)(2	MH-354	3.43	n3205	3.5	17	0.382	5.44	5.46	200 mm
5586	CO-668	n676	17.97	MH-638	17.83	37	0.4	19.31	19.46	200 mm
4130	p1565	n2275	5.09	n2274	5.68	17	3.404	6.21	6.89	200 mm
2585	p113	n199	14.86	n200	14.15	30	2.367	15.98	15.27	200 mm
2841	p455(1)(1)	n694	5.1	MH-588	4.98	13	0.919	6.22	6.1	200 mm
5452	CO-610	MH-286	5.5	n1296	5.08	24	1.8	6.62	6.19	200 mm
5013	CO-36	MH-286	5.5	MH-285	5.71	13	1.55	6.62	6.83	200 mm
4314	p1720	n2499	3.26	n2500	2.8	35	1.32	4.38	3.92	200 mm
5066	p440(1)(2)	MH-639	17.77	MH-638	17.83	12	0.438	19.11	19.46	200 mm
4195	p1623	n2358	2.35	n2356	2.47	28	0.434	4.79	4.64	200 mm
2589	p117	n205	13.01	n206	11.97	30	3.495	14.13	13.08	200 mm
5416	CO-572	n1036	6.49	MH-678	6.78	34	0.858	7.61	7.9	200 mm
5570	CO-636	n1454	2.8	n2359	6.05	30	10.945	6.56	7.17	200 mm

2629	p152	n257	3.47	n258	3.59	30	0.4	5.54	5.78	200 mm
2992	p596	n891	3.76	n893	3.88	40	0.303	8.34	7.87	200 mm
4455	p1842	n2677	5.19	n2678	5.31	29	0.411	7.42	7.23	200 mm
3434	p981(2)	MH-240	4.92	n1429	4.84	20	0.404	7.09	7.16	200 mm
2653	p175	n296	4.32	n298	5.2	30	2.922	5.44	6.31	200 mm
4180	p1609	n2339	2.78	n2338	2.66	30	0.4	4.49	4.58	200 mm
3389	p944	n1379	5.76	n1380	5.88	30	0.4	8.06	7.38	200 mm
3861	p1343	n1946	4.47	n1948	4.59	30	0.4	5.68	5.79	200 mm
3158	CO-248	n1094	4.84	MH-826	4.92	19	0.4	6.66	6.97	200 mm
5151	CO-70	n2968	3.85	n2967	3.97	30	0.4	5.12	5.09	200 mm
5269	CO-284	n2575	4.41	n3130	4.53	29	0.4	7.3	6.94	200 mm
5302	CO-350	MH-729	1.04	n2530	0.99	14	0.4	3.12	3.14	200 mm
5259	CO-264	n2787	4.56	MH-76	4.62	16	0.4	6.44	6.59	200 mm
5287	CO-320	MH-140	3.77	MH-137	3.89	31	0.4	4.9	5.01	200 mm
3197	CO-270	n1142	5.77	MH-807	5.85	19	0.4	7.07	7.04	200 mm
3413	p963	n1403	6.81	n1405	6.69	30	0.4	7.99	7.81	200 mm
4828	p2155	n3140	4.67	n3141	4.55	29	0.4	5.92	5.78	200 mm
3210	p782	n1158	4.65	n1160	4.53	30	0.4	6.24	6.2	200 mm
3376	p931	n1359	4.32	n1360	4.18	34	0.397	5.43	5.3	200 mm
2993	p595(2)(2)	MH-492	3.72	n891	3.76	8	0.396	8.53	8.34	200 mm
4344	p1744(1)(1	n2529	1.12	MH-729	1.04	28	0.288	3.09	3.12	200 mm
3617	p1125	n1635	9.81	n1636	9.93	21	0.567	11.07	11.05	200 mm
4884	CO-382	MH-354	3.43	n3204	3.37	14	0.4	5.44	5.43	200 mm
2599	p127	n222	2.85	n223	0.46	37	6.392	4.16	4.06	200 mm
4078	p1526(2)	MH-141	3.49	n2216	3.63	24	0.601	4.6	4.92	200 mm
4347	p1746	n2531	0.83	n2532	0.71	20	0.592	3.26	3.27	200 mm
4311	p1718(1)	n2496	3.56	MH-332	3.52	8	0.448	4.68	4.64	200 mm
2711	p938	n1371	3.47	n534	2.98	28	1.741	5.82	5.86	200 mm
3353	p906	n1328	7.5	n1326	7.32	30	0.591	8.62	8.44	200 mm
4883	p2206(2)	MH-350	3.33	n3204	3.37	11	0.427	6.61	5.43	200 mm
2627	p151	n255	3.31	n257	3.47	41	0.4	5.51	5.54	200 mm
3433	p982(1)(1)	n1429	4.84	MH-239	4.78	14	0.413	7.16	6.97	200 mm
4296	p1703(2)	MH-329	3.59	n2476	3.7	25	0.403	4.78	4.81	200 mm
5254	CO-254	MH-48	3.61	n2969	3.76	29	0.509	4.73	4.96	200 mm
3388	p943	n1377	5.65	n1379	5.76	30	0.401	7.5	8.06	200 mm
3378	p932	n1360	4.18	n1362	4.06	30	0.4	5.3	5.47	200 mm
3860	p1342	n1945	4.35	n1946	4.47	30	0.4	5.54	5.68	200 mm
5058	CO-164	MH-493	3.69	MH-492	3.72	9	0.4	8.75	8.53	200 mm
5255	CO-256	n2969	3.76	n2968	3.85	23	0.4	4.96	5.12	200 mm
5280	CO-306	MH-127	4.03	MH-128	4.12	22	0.4	5.31	5.24	200 mm
5258	CO-262	n2785	4.45	n2787	4.56	29	0.4	6.41	6.44	200 mm
5288	CO-322	MH-140	3.77	n2216	3.63	35	0.4	4.9	4.92	200 mm
5341	CO-424	n1720	10.65	MH-392	10.47	45	0.4	11.77	13.67	200 mm
3414	p964	n1405	6.69	n1407	6.57	30	0.4	7.81	7.7	200 mm
4453	p1841	n2675	5.11	n2677	5.19	20	0.4	7.65	7.42	200 mm
4829	p2156	n3141	4.55	n3143	4.43	31	0.4	5.78	5.64	200 mm
4313	p1719(1)	n2497	3.44	MH-333	3.41	6	0.615	4.56	4.53	200 mm

3667	p1166	n1706	4.3	n1708	4.89	30	1.977	5.42	6.01	200 mm
3076	CO-122	MH-682	3.84	n990	3.89	9	0.487	4.96	5.01	200 mm
3093	p681	n1013	4.27	n1014	4.15	32	0.381	5.53	5.67	200 mm
5289	CO-324	MH-141	3.49	MH-145	3.37	21	0.575	4.6	4.48	200 mm
5438	p659(1)	n981	2.91	MH-26	3.13	12	1.818	4.52	4.66	200 mm
4312	p1718(2)	MH-332	3.52	n2497	3.44	18	0.448	4.64	4.56	200 mm
5567	CO-630	n910	4.19	n918	4.29	24	0.4	5.36	5.41	200 mm
5574	CO-644	n2530	0.99	n2531	0.83	40	0.4	3.14	3.26	200 mm
3670	p1169	n1711	5.31	n1712	5.66	30	1.176	6.43	6.78	200 mm
3415	p965	n1407	6.57	n1408	6.45	30	0.421	7.7	7.56	200 mm
4882	p2206(1)	n3202	3.26	MH-350	3.33	15	0.422	8.19	6.61	200 mm
2670	p313(1)(1)	n487	6.63	MH-612	6.56	21	0.325	7.75	7.68	200 mm
5265	CO-276	n2826	6.73	MH-105	6.83	25	0.4	7.87	7.94	200 mm
5057	p595(2)(1)(	MH-490	3.67	MH-493	3.69	6	0.407	8.88	8.75	200 mm
5150	CO-68	n2971	3.44	MH-48	3.61	34	0.496	4.56	4.73	200 mm
4533	p1911(2)	MH-80	4.37	n2785	4.45	19	0.401	6.29	6.41	200 mm
4315	p1719(2)	MH-333	3.41	n2499	3.26	24	0.598	4.53	4.38	200 mm
4830	p2157	n3143	4.43	n3145	4.31	29	0.4	5.64	5.67	200 mm
4294	p1703(1)	n2474	3.58	MH-329	3.59	5	0.4	4.77	4.78	200 mm
3820	p1308(2)	MH-307	6.78	n1897	6.85	18	0.4	9.32	7.97	200 mm
3859	p1341	n1943	4.23	n1945	4.35	30	0.4	5.49	5.54	200 mm
3677	CO-346	n1717	10.36	MH-392	10.47	27	0.4	12.07	13.67	200 mm
3156	CO-246	n1093	4.72	MH-825	4.75	6	0.4	6.6	6.61	200 mm
5279	CO-304	n2187	3.86	MH-127	4.03	43	0.4	5.59	5.31	200 mm
3386	p942	n1376	5.53	n1377	5.65	30	0.4	7.51	7.5	200 mm
5006	p982(1)(2)	MH-239	4.78	MH-238	4.75	8	0.397	6.97	6.87	200 mm
2586	p114	n200	14.15	n201	13.73	30	1.399	15.27	14.85	200 mm
5396	CO-534	n672	16.15	n196	16.01	30	0.476	17.27	17.13	200 mm
2588	p116	n203	13.52	n205	13.01	30	1.685	14.64	14.13	200 mm
5426	CO-592	MH-219	7.44	n2360	6.79	14	4.475	8.56	7.91	200 mm
3113	p697	n1036	6.49	n1038	6.28	37	0.559	7.61	7.4	200 mm
3074	p665(1)(1)	n988	3.76	MH-682	3.84	18	0.461	4.88	4.96	200 mm
3675	p1173	n1716	10.24	n1717	10.36	26	0.46	12.29	12.07	200 mm
3379	p933	n1362	4.06	n1364	3.94	32	0.372	5.47	5.46	200 mm
4200	p1626(2)	MH-219	7.44	n2362	8.03	14	4.117	8.56	9.15	200 mm
5573	CO-642	n1300	4.16	MH-290	4.37	10	2.133	5.28	5.75	200 mm
2652	p174	n295	3.79	n296	4.32	30	1.775	4.91	5.44	200 mm
3155	p736	n1092	4.6	n1093	4.72	27	0.443	6.58	6.6	200 mm
3380	p934(1)	n1364	3.94	MH-778	3.9	9	0.431	5.46	5.43	200 mm
3351	p905	n1326	7.32	n1325	7.2	27	0.444	8.44	8.46	200 mm
5303	CO-352	n2506	2.27	n2508	1.67	40	1.492	3.45	3.24	200 mm
3381	p935	n1366	3.83	n1368	3.71	17	0.696	5.38	5.38	200 mm
4131	p1566	n2276	4.45	n2275	5.09	39	1.635	5.57	6.21	200 mm
4568	p1938	n2825	6.61	n2826	6.73	30	0.4	7.94	7.87	200 mm
3436	p982(2)	MH-238	4.75	n1431	4.72	8	0.404	6.87	6.76	200 mm
3303	p864	n1268	7.39	n1269	7.18	30	0.672	8.5	8.3	200 mm
4293	p1702	n2473	3.46	n2474	3.58	30	0.401	4.75	4.77	200 mm

3616	p1308(1)	n1633	6.73	MH-307	6.78	12	0.4	10.18	9.32	200 mm
2991	p595(1)	n889	3.64	MH-490	3.67	6	0.4	9.02	8.88	200 mm
3416	p966	n1408	6.45	n1410	6.33	30	0.4	7.56	7.5	200 mm
4831	p2158	n3145	4.31	n3146	4.21	26	0.4	5.67	5.68	200 mm
4049	p1507	n2187	3.86	n2186	3.74	30	0.4	5.59	5.81	200 mm
3858	p1340	n1942	4.11	n1943	4.23	30	0.4	5.62	5.49	200 mm
5403	CO-548	MH-851	4.21	n2	4.37	41	0.4	5.34	5.49	200 mm
3167	CO-284	n1103	7.2	n1262	7.09	29	0.4	9.59	9.96	200 mm
5172	CO-110	MH-81	4.31	MH-80	4.37	15	0.4	6.2	6.29	200 mm
2672	CO-238	n491	6.2	n492	6.04	41	0.4	7.32	7.17	200 mm
2799	CO-212	n650	7.04	n648	7.13	23	0.4	8.61	8.25	200 mm
4349	p1747	n2532	0.71	n2534	0.59	30	0.4	3.27	3.29	200 mm
5079	p682(1)(1)(	MH-689	4.12	MH-688	4.1	5	0.399	5.66	5.65	200 mm
4880	p2205	n3200	3.21	n3202	3.26	14	0.4	5.97	8.19	200 mm
3387	p941(2)(2)	MH-822	5.48	n1376	5.53	11	0.392	7.57	7.51	200 mm
3157	p737(2)(2)	MH-825	4.75	n1094	4.84	39	0.248	6.61	6.66	200 mm
4685	p2238	n2980	2.77	n3253	3.78	30	3.371	5.41	5.53	200 mm
3328	p884(2)	MH-288	5.03	n1296	5.08	6	0.773	6.15	6.19	200 mm
4906	p2229	n3238	5.23	n3240	4.97	30	0.885	6.66	6.09	200 mm
4567	p1937	n2823	6.49	n2825	6.61	30	0.4	7.93	7.94	200 mm
3330	p884(1)	n1297	4.84	MH-288	5.03	21	0.857	5.96	6.15	200 mm
5105	p1(1)(1)(2)	MH-852	4.08	MH-851	4.21	31	0.402	5.24	5.34	200 mm
3073	p664	n987	3.64	n988	3.76	30	0.401	4.77	4.88	200 mm
4502	p1890	n2746	3.89	n2748	3.77	30	0.401	5.01	4.92	200 mm
3435	p983	n1431	4.72	n1432	4.6	30	0.401	6.76	7.27	200 mm
4292	p1701	n2472	3.34	n2473	3.46	30	0.4	4.61	4.75	200 mm
4529	p1910(1)	n2782	4.21	MH-81	4.31	26	0.4	6.1	6.2	200 mm
4350	p1748	n2534	0.59	n2535	0.47	30	0.4	3.29	3.43	200 mm
3196	p771	n1142	5.77	n1144	5.7	18	0.4	7.07	6.98	200 mm
2800	CO-210	MH-571	7.01	n650	7.04	9	0.4	8.36	8.61	200 mm
3096	CO-96	n1015	4.01	MH-688	4.1	23	0.4	5.62	5.65	200 mm
2673	CO-240	n492	6.04	n495	5.8	59	0.4	7.17	7.17	200 mm
5290	CO-326	MH-145	3.37	MH-146	3.29	20	0.4	4.48	4.46	200 mm
3385	CO-262	n1374	5.41	MH-822	5.48	18	0.4	7.66	7.57	200 mm
5096	CO-216	MH-778	3.9	MH-780	3.88	6	0.4	5.43	5.41	200 mm
4675	p2036	n2971	3.44	n2972	3.32	30	0.4	4.56	4.63	200 mm
4048	p1506	n2186	3.74	n2184	3.62	30	0.4	5.81	6.11	200 mm
3299	p858	n1261	6.97	n1262	7.09	30	0.4	10.06	9.96	200 mm
3857	p1339	n1941	3.99	n1942	4.11	30	0.4	5.69	5.62	200 mm
3154	p735	n1090	4.48	n1092	4.6	30	0.4	6.59	6.58	200 mm
5632	CO-700	n1835	3.65	MH-75	-0.01	14	25.463	5.59	5.38	200 mm
5427	CO-594	n2952	5.77	n2955	5.59	45	0.4	7.23	7.09	200 mm
4879	p2204	n3199	3.14	n3200	3.21	16	0.4	5.93	5.97	200 mm
2806	CO-206	n656	5.64	MH-576	5.73	11	0.798	6.76	6.89	200 mm
3095	p683(1)	n1015	4.01	MH-690	3.94	17	0.435	5.62	5.37	200 mm
3669	CO-64	n1708	4.89	MH-387	5.21	38	0.851	6.01	6.49	200 mm
3329	p885	n1298	4.57	n1297	4.84	32	0.85	5.69	5.96	200 mm

4316	p1721(1)	n2500	2.8	MH-334	2.78	5	0.485	3.92	3.9	200 mm
4658	p2226	n2955	5.59	n3234	5.47	29	0.411	7.09	6.73	200 mm
4566	p1936	n2821	6.37	n2823	6.49	30	0.4	7.94	7.93	200 mm
4833	p2159(1)	n3146	4.21	MH-450	4.13	15	0.549	5.68	5.58	200 mm
2550	p1(1)(1)(1)	n1	3.99	MH-852	4.08	23	0.402	5.15	5.24	200 mm
3072	p663	n986	3.52	n987	3.64	30	0.401	4.78	4.77	200 mm
3437	p984	n1432	4.6	n1434	4.48	30	0.401	7.27	7.18	200 mm
4676	p2037	n2972	3.32	n2973	3.2	30	0.4	4.63	4.78	200 mm
2674	p318	n495	5.8	n496	5.68	30	0.4	7.17	6.99	200 mm
4528	p1909	n2780	4.09	n2782	4.21	30	0.4	5.8	6.1	200 mm
3856	p1338	n1940	3.87	n1941	3.99	30	0.4	5.95	5.69	200 mm
4046	p1505	n2184	3.62	n2182	3.5	30	0.4	6.11	6.35	200 mm
4291	p1700	n2471	3.22	n2472	3.34	30	0.4	4.7	4.61	200 mm
3298	p857	n1260	6.85	n1261	6.97	30	0.4	10.15	10.06	200 mm
5214	CO-180	n2535	0.47	MH-730	0.3	42	0.4	3.43	3.4	200 mm
5291	CO-328	n2220	3.19	MH-146	3.29	23	0.4	4.52	4.46	200 mm
3185	CO-266	n1126	5.29	n1374	5.41	30	0.4	8.44	7.66	200 mm
2990	CO-162	MH-489	3.5	n888	3.52	6	0.4	8.13	8.93	200 mm
4503	p1891	n2748	3.77	n2750	3.65	30	0.4	4.92	4.8	200 mm
3198	p772	n1144	5.7	n1146	5.6	25	0.4	6.98	6.87	200 mm
4878	p2203	n3197	3.02	n3199	3.14	30	0.4	5.97	5.93	200 mm
3349	p903	n1323	7.08	n1321	6.96	25	0.485	8.55	8.53	200 mm
2989	p594	n888	3.52	n889	3.64	38	0.317	8.93	9.02	200 mm
3094	p682(1)(1)(	n1014	4.15	MH-689	4.12	11	0.209	5.67	5.66	200 mm
4128	p1562(1)	n2271	5.97	MH-184	6.11	21	0.654	7.09	7.24	200 mm
3350	p904(2)	MH-276	7.16	n1323	7.08	21	0.382	8.49	8.55	200 mm
3383	p936	n1368	3.71	n1370	3.59	25	0.489	5.38	5.55	200 mm
3352	p904(1)	n1325	7.2	MH-276	7.16	13	0.312	8.46	8.49	200 mm
4322	p1723(2)(2	MH-337	2.52	n2504	2.39	18	0.702	3.64	3.51	200 mm
4196	p1625	n2359	6.05	n2360	6.79	30	2.482	7.17	7.91	200 mm
4565	p1935	n2820	6.25	n2821	6.37	30	0.401	7.4	7.94	200 mm
4289	p1699	n2469	3.1	n2471	3.22	30	0.401	4.83	4.7	200 mm
3855	p1337	n1939	3.75	n1940	3.87	30	0.4	6.19	5.95	200 mm
3297	p856	n1258	6.73	n1260	6.85	30	0.4	10.03	10.15	200 mm
4527	p1908	n2778	3.97	n2780	4.09	30	0.4	5.67	5.8	200 mm
4504	p1892	n2750	3.65	n2752	3.54	27	0.4	4.8	4.71	200 mm
5277	CO-300	n2181	3.38	n2182	3.5	30	0.4	6.75	6.35	200 mm
5147	CO-62	n2974	3.08	n2973	3.2	31	0.4	4.58	4.78	200 mm
5213	CO-178	MH-730	0.3	MH-732	0.21	23	0.4	3.4	3.37	200 mm
5423	CO-586	MH-236	4.41	n1434	4.48	17	0.4	7.05	7.18	200 mm
3097	CO-94	n1018	3.78	MH-690	3.94	38	0.4	5.64	5.37	200 mm
2988	p593(1)(1)	n887	3.44	MH-489	3.5	14	0.4	7.38	8.13	200 mm
4452	p1840	n2674	5.07	n2675	5.11	10	0.4	7.68	7.65	200 mm
3071	p662	n985	3.4	n986	3.52	30	0.4	4.82	4.78	200 mm
5159	CO-84	MH-58	5.39	n3234	5.47	21	0.4	6.64	6.73	200 mm
4877	p2202	n3195	2.9	n3197	3.02	30	0.4	5.86	5.97	200 mm
5257	CO-260	MH-61	4.85	n3240	4.97	18	0.659	5.97	6.09	200 mm

4083	p1529	n2221	3.07	n2220	3.19	32	0.379	4.49	4.52	200 mm
2587	p115	n201	13.73	n203	13.52	30	0.707	14.85	14.64	200 mm
4317	p1721(2)	MH-334	2.78	n2502	2.68	23	0.416	3.9	3.82	200 mm
3440	p985(2)	MH-236	4.41	n1435	4.36	12	0.406	7.05	6.96	200 mm
4451	p1839	n2673	4.95	n2674	5.07	30	0.401	7.82	7.68	200 mm
2803	p426(1)	n654	5.79	MH-575	5.87	20	0.4	7.06	6.99	200 mm
3070	p661	n984	3.28	n985	3.4	30	0.4	4.76	4.82	200 mm
3296	p855	n1256	6.61	n1258	6.73	30	0.4	8.67	10.03	200 mm
5212	CO-176	MH-732	0.21	MH-735	0.13	21	0.4	3.37	3.3	200 mm
5318	CO-378	n2222	2.97	n2221	3.07	26	0.4	4.31	4.49	200 mm
5146	CO-60	n2974	3.08	n2977	2.97	28	0.4	4.58	5.01	200 mm
4013	p1503	n2181	3.38	n2135	3.3	21	0.4	6.75	7.12	200 mm
4526	p1907	n2776	3.85	n2778	3.97	30	0.4	5.53	5.67	200 mm
3854	p1336	n1938	3.63	n1939	3.75	30	0.4	6.31	6.19	200 mm
5160	CO-86	MH-59	5.34	MH-58	5.39	12	0.4	6.6	6.64	200 mm
4876	p2201	n3193	2.78	n3195	2.9	30	0.4	5.91	5.86	200 mm
4318	p1722(1)	n2502	2.68	MH-335	2.59	21	0.452	3.82	3.73	200 mm
2987	p592	n886	3.32	n887	3.44	32	0.38	6.59	7.38	200 mm
5225	CO-202	MH-217	16.6	n2368	16.06	45	1.21	17.72	17.17	200 mm
3123	p706	n1052	3.06	n1053	2.94	18	0.682	4.57	4.53	200 mm
2985	p591	n885	3.2	n886	3.32	29	0.411	6.04	6.59	200 mm
4127	p1563	n2272	5.8	n2271	5.97	32	0.523	6.92	7.09	200 mm
5442	p660(2)	MH-27	3.18	n984	3.28	24	0.401	4.74	4.76	200 mm
4290	p1698(2)(2	MH-328	3.02	n2469	3.1	21	0.349	4.82	4.83	200 mm
4682	p2041	n2977	2.97	n2978	2.85	30	0.401	5.01	5.25	200 mm
3596	p1110	n1613	7.38	n1615	7.49	30	0.4	9.62	8.61	200 mm
4450	p1838	n2671	4.83	n2673	4.95	30	0.4	7.77	7.82	200 mm
4835	CO-140	MH-450	4.13	n3148	4.09	9	0.4	5.58	5.58	200 mm
5223	CO-198	n1435	4.36	MH-235	4.22	35	0.4	6.96	6.86	200 mm
5319	CO-380	MH-151	2.81	n2222	2.97	40	0.4	4.6	4.31	200 mm
5209	CO-170	MH-735	0.13	MH-738	0.06	15	0.4	3.3	3.29	200 mm
3295	p854	n1254	6.49	n1256	6.61	30	0.4	9.65	8.67	200 mm
4525	p1906	n2775	3.73	n2776	3.85	30	0.4	5.44	5.53	200 mm
2651	p173	n294	3.56	n295	3.79	30	0.764	4.68	4.91	200 mm
4907	p2228(2)	MH-59	5.34	n3238	5.23	27	0.398	6.6	6.66	200 mm
2804	p427(2)	MH-576	5.73	n654	5.79	16	0.394	6.89	7.06	200 mm
3121	p704	n1048	3.3	n1050	3.18	24	0.505	4.59	4.47	200 mm
3348	p902	n1321	6.96	n1320	6.84	34	0.357	8.53	9.02	200 mm
3634	p1137	n1653	2.13	n1655	2.25	17	0.702	6.37	6.3	200 mm
3671	p1168(2)	MH-387	5.21	n1711	5.31	21	0.439	6.49	6.43	200 mm
3175	CO-282	n1116	6.81	n1320	6.84	8	0.4	9.05	9.02	200 mm
4123	p1560	n2269	6.25	n2267	6.37	36	0.333	7.47	7.49	200 mm
4875	p2200	n3192	2.66	n3193	2.78	31	0.384	6.02	5.91	200 mm
2658	p180	n305	11.09	n307	11.16	16	0.417	14.22	12.28	200 mm
5304	CO-354	MH-335	2.59	MH-337	2.52	16	0.422	3.73	3.64	200 mm
5401	CO-544	n911	3.79	n255	3.31	40	1.198	5.16	5.51	200 mm
5441	p660(1)	n983	3.16	MH-27	3.18	6	0.402	4.73	4.74	200 mm

4563	p1934	n2818	6.13	n2820	6.25	30	0.402	7.44	7.4	200 mm
4287	p1697	n2466	2.86	n2468	2.98	27	0.452	4.68	4.82	200 mm
3294	p853	n1253	6.37	n1254	6.49	30	0.4	9.7	9.65	200 mm
4683	p2042	n2978	2.85	n2980	2.77	19	0.4	5.25	5.41	200 mm
5222	CO-196	n1438	4.12	MH-235	4.22	24	0.4	6.99	6.86	200 mm
5300	CO-346	MH-738	0.06	n2539	-0.04	25	0.4	3.29	3.28	200 mm
5310	CO-364	MH-82	3.55	n2775	3.73	45	0.4	5.4	5.44	200 mm
2986	CO-160	MH-487	3.16	n885	3.2	8	0.4	6.06	6.04	200 mm
4091	p1532(1)	n2225	2.73	MH-151	2.81	20	0.4	4.71	4.6	200 mm
4449	p1837	n2669	4.71	n2671	4.83	30	0.4	7.76	7.77	200 mm
5023	p1698(2)(1	MH-327	3	MH-328	3.02	6	0.351	4.82	4.82	200 mm
2805	p428	n657	5.52	n656	5.64	27	0.448	6.79	6.76	200 mm
4841	p2174	n3155	3.37	n3166	3.25	15	0.745	5.08	5.2	200 mm
5581	CO-658	n2269	6.25	MH-184	6.11	36	0.4	7.47	7.24	200 mm
3384	p937	n1370	3.59	n1371	3.47	35	0.339	5.55	5.82	200 mm
3382	p934(2)(2)(	MH-780	3.88	n1366	3.83	25	0.209	5.41	5.38	200 mm
2753	p381	n588	0.56	n590	1.82	23	5.588	5.46	5.47	200 mm
3624	CO-304	n1644	5.97	MH-714	6.13	13	1.197	7.09	7.25	200 mm
4521	p1904(1)	n2771	3.49	MH-82	3.55	15	0.405	5.4	5.4	200 mm
3119	p702	n1045	3.54	n1047	3.42	38	0.315	4.66	4.57	200 mm
3442	p988(1)	n1438	4.12	MH-232	4.07	13	0.4	6.99	6.92	200 mm
4836	p2161	n3149	3.96	n3150	3.84	30	0.4	5.44	5.39	200 mm
4448	p1836	n2667	4.59	n2669	4.71	30	0.4	7.78	7.76	200 mm
5367	CO-476	n1411	5.59	n1501	5.47	29	0.4	7.31	7.29	200 mm
5208	CO-168	n2539	-0.04	n1981	-0.11	17	0.4	3.28	2.91	200 mm
4090	p1533	n2226	2.61	n2225	2.73	30	0.4	4.94	4.71	200 mm
3293	p852	n1252	6.25	n1253	6.37	30	0.4	9.6	9.7	200 mm
5175	CO-116	n2817	6.01	n2818	6.13	29	0.4	7.14	7.44	200 mm
5439	p659(2)	MH-26	3.13	n983	3.16	6	0.398	4.66	4.73	200 mm
3638	CO-48	n3191	2.54	n1659	2.45	24	0.4	6.03	6.05	200 mm
4288	p1698(1)	n2468	2.98	MH-327	3	7	0.35	4.82	4.82	200 mm
4874	p2199	n3191	2.54	n3192	2.66	34	0.351	6.03	6.02	200 mm
3174	p752	n1116	6.81	n1117	6.69	30	0.401	9.05	8.6	200 mm
3120	p703	n1047	3.42	n1048	3.3	36	0.331	4.57	4.59	200 mm
4283	p1693	n2459	2.38	n2461	2.5	21	0.563	7.46	4.73	200 mm
2983	p590(1)(1)	n884	3.08	MH-487	3.16	24	0.365	6.11	6.06	200 mm
3841	p1325	n1920	4.98	n1922	3.93	32	3.261	6.83	6.79	200 mm
4092	p1534	n2228	2.49	n2226	2.61	30	0.4	5.04	4.94	200 mm
3292	p851	n1251	6.13	n1252	6.25	30	0.4	9.41	9.6	200 mm
4447	p1835	n2666	4.47	n2667	4.59	30	0.4	7.72	7.78	200 mm
4837	p2162	n3150	3.84	n3151	3.73	29	0.4	5.39	5.34	200 mm
3500	p1028	n1501	5.47	n1503	5.35	30	0.4	7.29	7.43	200 mm
5309	CO-362	n2769	3.37	n2771	3.49	30	0.4	5.6	5.4	200 mm
2984	CO-158	MH-485	3.04	n884	3.08	8	0.4	6	6.11	200 mm
3331	p886	n1299	4.45	n1298	4.57	30	0.4	6.62	5.69	200 mm
4321	p1724	n2504	2.39	n2506	2.27	30	0.4	3.51	3.45	200 mm
5264	CO-274	n2815	5.89	n2817	6.01	30	0.4	7.48	7.14	200 mm

3445	p988(2)	MH-232	4.07	n1440	4	17	0.398	6.92	6.84	200 mm
4834	p2160	n3148	4.09	n3149	3.96	41	0.314	5.58	5.44	200 mm
5161	CO-88	MH-62	4.66	MH-61	4.85	49	0.4	5.86	5.97	200 mm
3636	p1139	n1657	2.37	n1659	2.45	19	0.4	6.18	6.05	200 mm
5636	CO-704	n573	8.61	MH-74	6.01	28	9.198	9.72	7.13	200 mm
4285	p1695	n2463	2.62	n2464	2.74	28	0.427	4.68	4.64	200 mm
3487	p1018	n1485	6.29	n1483	7.49	16	7.531	8	8.61	200 mm
3658	p1157	n1690	3.22	n1692	3.34	13	0.901	5.28	5.32	200 mm
2807	p429	n659	5.4	n657	5.52	33	0.362	6.7	6.79	200 mm
4286	p1696	n2464	2.74	n2466	2.86	33	0.36	4.64	4.68	200 mm
3203	p922	n1149	5.48	n1348	5.36	30	0.4	6.76	6.61	200 mm
2808	CO-204	MH-579	5.32	n659	5.4	19	0.4	6.76	6.7	200 mm
5142	CO-56	n2767	3.26	n2769	3.37	28	0.4	5.43	5.6	200 mm
5366	CO-474	n1503	5.35	MH-243	5.2	40	0.4	7.43	8.24	200 mm
5424	CO-588	MH-230	3.93	n1440	4	18	0.4	6.87	6.84	200 mm
3668	CO-344	MH-386	4.14	n1706	4.3	39	0.4	5.35	5.42	200 mm
3290	p850	n1250	6.01	n1251	6.13	30	0.4	9.22	9.41	200 mm
4446	p1834	n2665	4.35	n2666	4.47	30	0.4	7.71	7.72	200 mm
4838	p2163	n3151	3.73	n3153	3.6	31	0.4	5.34	5.33	200 mm
5056	p589(2)(1)(	MH-482	3.01	MH-485	3.04	8	0.4	5.92	6	200 mm
4559	p1931	n2813	5.77	n2815	5.89	30	0.4	7.43	7.48	200 mm
3332	p887(2)	MH-290	4.37	n1299	4.45	19	0.398	5.75	6.62	200 mm
5162	CO-90	n3245	4.57	MH-62	4.66	21	0.4	5.83	5.86	200 mm
4129	p1564	n2274	5.68	n2272	5.8	34	0.353	6.89	6.92	200 mm
4093	p1535	n2229	2.37	n2228	2.49	24	0.499	5.28	5.04	200 mm
5588	CO-672	n1149	5.48	n1146	5.6	29	0.4	6.76	6.87	200 mm
3291	p849(2)	MH-272	5.91	n1250	6.01	24	0.417	9.13	9.22	200 mm
3486	p1017	n1483	7.49	n1481	9.43	30	6.481	8.61	10.55	200 mm
3705	p1199	n1749	5.57	n1751	5.46	25	0.472	6.69	9.13	200 mm
2597	p125	n218	3.19	n220	2.97	30	0.732	4.4	4.09	200 mm
4445	p1833	n2663	4.23	n2665	4.35	30	0.4	8.07	7.71	200 mm
3368	p923	n1348	5.36	n1346	5.24	30	0.4	6.61	6.6	200 mm
2982	CO-156	n882	2.98	MH-482	3.01	8	0.4	5.85	5.92	200 mm
3666	CO-62	n1703	4.06	MH-386	4.14	21	0.4	5.45	5.35	200 mm
4839	p2164	n3153	3.6	n3154	3.48	30	0.4	5.33	5.21	200 mm
4515	p1901	n2765	3.15	n2767	3.26	28	0.4	5.85	5.43	200 mm
3068	p707	n1053	2.94	n981	2.91	7	0.4	4.53	4.52	200 mm
4558	p1930	n2812	5.65	n2813	5.77	30	0.4	7.44	7.43	200 mm
5164	CO-94	MH-64	4.42	n3245	4.57	37	0.4	5.75	5.83	200 mm
2809	p430(1)(1)	n660	5.28	MH-579	5.32	10	0.39	6.79	6.76	200 mm
4859	p2186	n3177	1.94	n3178	1.8	9	1.573	4.93	4.91	200 mm
3633	p1136	n1652	2.01	n1653	2.13	28	0.426	6.27	6.37	200 mm
2980	p587	n878	2.74	n880	2.86	26	0.463	5.71	5.74	200 mm
5002	p989(1)(2)	MH-230	3.93	MH-229	3.89	10	0.383	6.87	6.89	200 mm
5467	p1832(2)	MH-32	4.21	n2663	4.23	4	0.413	8.01	8.07	200 mm
2810	p431(2)	MH-580	5.17	n660	5.28	28	0.401	6.67	6.79	200 mm
3367	p921	n1346	5.24	n1345	5.12	30	0.4	6.6	6.54	200 mm

4132	p1567	n2277	4.33	n2276	4.45	30	0.4	6.63	5.57	200 mm
3665	p1163	n1701	3.94	n1703	4.06	30	0.4	5.48	5.45	200 mm
3334	CO-40	n1300	4.16	MH-293	4.08	22	0.4	5.28	5.21	200 mm
5224	CO-200	MH-228	3.87	MH-229	3.89	5	0.4	6.88	6.89	200 mm
5365	CO-472	n1505	5.11	MH-244	5	28	0.4	9.79	9.35	200 mm
5010	CO-286	MH-272	5.91	MH-271	5.87	9	0.4	9.13	9.09	200 mm
2981	p588	n880	2.86	n882	2.98	30	0.4	5.74	5.85	200 mm
4556	p1929	n2811	5.53	n2812	5.65	30	0.4	7.32	7.44	200 mm
5163	CO-92	n3249	4.34	MH-64	4.42	22	0.4	5.86	5.75	200 mm
3012	p612	n911	3.79	n912	3.91	20	0.601	5.16	5.15	200 mm
3122	p705	n1050	3.18	n1052	3.06	42	0.283	4.47	4.57	200 mm
5466	p1832(1)	n2661	4.11	MH-32	4.21	24	0.422	7.69	8.01	200 mm
3614	p1122(2)	MH-306	6.61	n1632	6.7	21	0.399	8.61	9.73	200 mm
3337	p890	n1305	3.8	n1303	3.92	22	0.542	5.28	5.26	200 mm
5009	p848(2)(1)	MH-269	5.79	MH-271	5.87	19	0.415	8.97	9.09	200 mm
3449	p990(2)	MH-228	3.87	n1443	3.76	27	0.412	6.88	6.72	200 mm
3335	p888(1)(1)	n1301	4.04	MH-293	4.08	8	0.406	5.18	5.21	200 mm
2650	p172	n293	3.44	n294	3.56	30	0.4	4.75	4.68	200 mm
4282	p1692	n2458	2.26	n2459	2.38	29	0.405	4.97	7.46	200 mm
3664	p1162	n1699	3.82	n1701	3.94	30	0.4	5.57	5.48	200 mm
4133	p1568	n2278	4.21	n2277	4.33	30	0.4	6.71	6.63	200 mm
5062	CO-202	MH-581	5.15	MH-580	5.17	5	0.4	6.65	6.67	200 mm
3366	p920	n1345	5.12	n1344	5	30	0.4	6.54	6.43	200 mm
4012	p1479	n2148	3.17	n2135	3.3	33	0.4	7.08	7.12	200 mm
4915	p2235	n3249	4.34	n3250	4.22	30	0.402	5.86	5.82	200 mm
5263	CO-272	MH-98	5.47	n2811	5.53	16	0.4	7.32	7.32	200 mm
3176	CO-364	MH-819	6.63	n1117	6.69	13	0.4	8.4	8.6	200 mm
3632	p1135	n1651	1.89	n1652	2.01	30	0.4	6.4	6.27	200 mm
2613	p139	n238	1.67	n240	2.03	20	1.838	4.05	4.07	200 mm
3288	p848(1)	n1248	5.77	MH-269	5.79	6	0.424	8.93	8.97	200 mm
3706	p1200	n1751	5.46	n1752	5.34	30	0.4	9.13	6.91	200 mm
3505	p1030(2)	MH-243	5.2	n1505	5.11	26	0.317	8.24	9.79	200 mm
4850	p2177	n3168	3	n3169	2.89	23	0.486	5.2	5.14	200 mm
2649	p171	n291	3.32	n293	3.44	30	0.4	4.63	4.75	200 mm
3507	p1033	n1509	4.91	n1510	4.79	30	0.404	6.95	6.76	200 mm
5545	p1927(1)	n2809	5.28	MH-65	5.39	24	0.439	7.29	7.31	200 mm
3508	p1032(2)	MH-244	5	n1509	4.91	24	0.368	9.35	6.95	200 mm
3448	p991(1)	n1443	3.76	MH-227	3.69	17	0.402	6.72	6.71	200 mm
3336	p889(2)	MH-294	4.02	n1301	4.04	7	0.402	5.2	5.18	200 mm
3663	p1161	n1697	3.7	n1699	3.82	30	0.4	5.66	5.57	200 mm
4325	p1727	n2508	1.67	n2509	1.59	19	0.4	3.24	3.28	200 mm
4443	p1831	n2659	3.99	n2661	4.11	30	0.4	7.63	7.69	200 mm
4280	p1691	n2456	2.14	n2458	2.26	30	0.4	5.3	4.97	200 mm
5317	CO-376	n2151	2.95	n2148	3.17	55	0.4	7.37	7.08	200 mm
4134	p1569	n2280	4.09	n2278	4.21	30	0.4	6.66	6.71	200 mm
3365	p919	n1344	5	n1342	4.88	30	0.4	6.43	6.44	200 mm
5063	p432(1)(2)	MH-582	5.1	MH-581	5.15	13	0.399	6.59	6.65	200 mm

5166	CO-98	n3252	4.07	n3250	4.22	37	0.4	5.51	5.82	200 mm
3630	p1134	n1650	1.77	n1651	1.89	30	0.4	6.45	6.4	200 mm
4284	p1694	n2461	2.5	n2463	2.62	40	0.3	4.73	4.68	200 mm
3178	p753(2)(2)	MH-819	6.63	n1119	6.57	16	0.397	8.4	8.18	200 mm
3766	p1253	n1827	4.51	MH-74	6.01	26	5.73	5.63	7.13	200 mm
3707	CO-350	n1752	5.34	MH-400	5.18	38	0.4	6.91	6.49	200 mm
3635	p1138	n1655	2.25	n1657	2.37	45	0.265	6.3	6.18	200 mm
4095	p1537	n2233	2.13	n2231	2.25	30	0.4	5.57	5.23	200 mm
4848	p2175	n3166	3.25	n3167	3.13	32	0.377	5.2	5.19	200 mm
4135	p1570(2)	MH-183	4.02	n2280	4.09	17	0.406	6.56	6.66	200 mm
2648	p170	n289	3.2	n291	3.32	30	0.4	4.32	4.63	200 mm
3613	p1123	n1632	6.7	n1633	6.73	8	0.4	9.73	10.18	200 mm
3223	p791	n1172	4.22	n1174	4.28	10	0.524	7.5	8.15	200 mm
3451	p991(2)	MH-227	3.69	n1444	3.64	13	0.401	6.71	6.7	200 mm
3364	p918	n1342	4.88	n1341	4.76	30	0.4	6.44	6.46	200 mm
3509	p1034	n1510	4.79	n1511	4.67	30	0.4	6.76	6.6	200 mm
4327	p1728	n2509	1.59	n2511	1.47	30	0.4	3.28	3.43	200 mm
3662	p1160	n1695	3.58	n1697	3.7	30	0.4	5.56	5.66	200 mm
5406	CO-554	n877	2.62	n875	2.5	28	0.4	5.61	5.33	200 mm
5316	CO-374	n2154	2.74	n2151	2.95	51	0.4	7.35	7.37	200 mm
2812	CO-200	n663	5.05	MH-582	5.1	12	0.4	6.52	6.59	200 mm
4442	p1830	n2657	3.87	n2659	3.99	30	0.4	7.72	7.63	200 mm
3177	p754	n1119	6.57	n1121	6.45	30	0.4	8.18	8.12	200 mm
3631	p1133(2)	MH-707	1.72	n1650	1.77	13	0.4	6.42	6.45	200 mm
4281	p1690(2)	MH-326	2.09	n2456	2.14	12	0.39	5.82	5.3	200 mm
2776	p400	n618	3.74	n620	3.82	20	0.4	5.24	4.94	200 mm
3289	p847(2)	MH-270	5.7	n1248	5.77	18	0.385	8.81	8.93	200 mm
2813	p434	n666	4.81	n664	4.93	27	0.452	6.24	6.41	200 mm
5326	CO-394	MH-152	1.96	n2233	2.13	42	0.4	5.71	5.57	200 mm
2978	p586	n877	2.62	n878	2.74	34	0.35	5.61	5.71	200 mm
2729	p1304	n1894	3.38	n560	1.37	31	6.409	5.39	5.76	200 mm
4137	p1570(1)	n2281	3.97	MH-183	4.02	12	0.407	6.5	6.56	200 mm
4094	p1536	n2231	2.25	n2229	2.37	36	0.33	5.23	5.28	200 mm
2647	p169	n287	3.08	n289	3.2	30	0.4	4.28	4.32	200 mm
5572	CO-640	MH-65	5.39	MH-98	5.47	19	0.4	7.31	7.32	200 mm
2548	p613	n912	3.91	n1	3.99	20	0.4	5.15	5.15	200 mm
2595	p123	n214	3.43	n216	3.31	30	0.4	4.55	4.97	200 mm
4279	p1690(1)	n2454	2.02	MH-326	2.09	18	0.4	6.65	5.82	200 mm
3498	p1035	n1511	4.67	n1498	4.58	22	0.4	6.6	6.37	200 mm
4441	p1829	n2655	3.75	n2657	3.87	30	0.4	7.68	7.72	200 mm
3450	p992(1)(1)	n1444	3.64	MH-226	3.59	13	0.4	6.7	6.7	200 mm
4552	p1926	n2808	5.16	n2809	5.28	30	0.4	7.05	7.29	200 mm
3179	p755	n1121	6.45	n1122	6.33	30	0.4	8.12	8.26	200 mm
5081	CO-310	MH-709	1.69	MH-707	1.72	9	0.4	6.4	6.42	200 mm
4849	p2176	n3167	3.13	n3168	3	36	0.363	5.19	5.2	200 mm
2778	CO-80	n1755	3.91	n620	3.82	22	0.403	5.03	4.94	200 mm
4840	p2165	n3154	3.48	n3155	3.37	43	0.275	5.21	5.08	200 mm

3342	p894	n1313	3.32	n1311	3.44	23	0.521	5.31	5.51	200 mm
4328	p1729(1)	n2511	1.47	MH-338	1.44	10	0.387	3.43	3.46	200 mm
3287	p847(1)	n1247	5.65	MH-270	5.7	13	0.386	8.72	8.81	200 mm
2775	p399	n617	3.62	n618	3.74	30	0.4	5.48	5.24	200 mm
5325	CO-392	n2067	1.77	MH-152	1.96	47	0.4	5.51	5.71	200 mm
4267	p1682	n2442	6.41	n2443	6.53	17	0.704	8.2	7.65	200 mm
5001	p992(1)(2)	MH-226	3.59	MH-225	3.56	7	0.41	6.7	6.7	200 mm
3485	p1016	n1481	9.43	n1480	10.52	30	3.646	10.55	11.64	200 mm
5026	p1729(2)(1	MH-338	1.44	MH-339	1.38	14	0.403	3.46	3.51	200 mm
2811	p433	n664	4.93	n663	5.05	32	0.372	6.41	6.52	200 mm
3286	p846	n1246	5.53	n1247	5.65	30	0.401	8.59	8.72	200 mm
4277	p1689	n2452	1.9	n2454	2.02	30	0.401	5.93	6.65	200 mm
4440	p1828	n2653	3.63	n2655	3.75	30	0.4	7.6	7.68	200 mm
2596	p124	n216	3.31	n218	3.19	30	0.4	4.97	4.4	200 mm
3339	p891	n1307	3.68	n1305	3.8	30	0.4	5.35	5.28	200 mm
5405	CO-552	n873	2.38	MH-479	2.43	12	0.4	5.16	5.22	200 mm
3661	CO-322	MH-383	3.41	n1694	3.46	12	0.4	5.38	5.42	200 mm
4553	p1925(2)	MH-95	5.06	n2808	5.16	26	0.4	6.96	7.05	200 mm
5307	CO-358	n3001	4.22	n2765	3.15	29	3.703	5.63	5.85	200 mm
2974	p583	n872	2.26	n873	2.38	28	0.43	4.96	5.16	200 mm
3180	p756	n1122	6.33	n1123	6.21	30	0.4	8.26	8.49	200 mm
4136	p1571(2)(2	MH-182	3.94	n2281	3.97	10	0.397	6.39	6.5	200 mm
3626	p1132(1)	LS7	1.54	MH-711	1.62	17	0.459	6.29	6.35	200 mm
2774	p398	n616	3.5	n617	3.62	30	0.4	5.47	5.48	200 mm
3883	p1365	n1975	1.22	n1976	0.63	21	2.807	3.29	3.18	200 mm
2976	p584(2)(2)	MH-479	2.43	n875	2.5	21	0.349	5.22	5.33	200 mm
3284	p843(2)	MH-268	5.24	n1242	5.29	11	0.462	8.3	8.34	200 mm
4439	p1827	n2651	3.51	n2653	3.63	30	0.401	7.58	7.6	200 mm
3285	p845	n1244	5.41	n1246	5.53	30	0.4	8.43	8.59	200 mm
5216	CO-184	MH-340	1.25	MH-339	1.38	32	0.4	3.44	3.51	200 mm
2814	CO-198	n667	4.68	n666	4.81	32	0.4	6.18	6.24	200 mm
3340	p892	n1309	3.56	n1307	3.68	30	0.4	5.49	5.35	200 mm
4989	p1571(2)(1	MH-181	3.92	MH-182	3.94	5	0.399	6.33	6.39	200 mm
5262	CO-270	MH-88	4.98	MH-95	5.06	19	0.4	7.01	6.96	200 mm
4278	p1688(2)	MH-325	1.88	n2452	1.9	5	0.399	5.96	5.93	200 mm
3181	p757	n1123	6.21	n1124	6.09	30	0.4	8.49	8.44	200 mm
5165	CO-96	MH-67	3.98	n3252	4.07	21	0.4	5.67	5.51	200 mm
3629	CO-308	MH-711	1.62	n1648	1.66	9	0.4	6.35	6.39	200 mm
3660	p1159	n1694	3.46	n1695	3.58	36	0.334	5.42	5.56	200 mm
2772	CO-88	n614	3.36	n616	3.5	36	0.4	5.78	5.47	200 mm
3282	p843(1)	n1241	5.17	MH-268	5.24	14	0.464	8.26	8.3	200 mm
4139	p1571(1)	n2282	3.85	MH-181	3.92	15	0.402	6.16	6.33	200 mm
4276	p1688(1)	n2450	1.78	MH-325	1.88	25	0.4	6.08	5.96	200 mm
4438	p1826	n2649	3.27	n2651	3.51	60	0.4	7.63	7.58	200 mm
2973	p582	n870	2.14	n872	2.26	30	0.4	5.15	4.96	200 mm
2598	p126	n220	2.97	n222	2.85	30	0.4	4.09	4.16	200 mm
3283	p844	n1242	5.29	n1244	5.41	30	0.4	8.34	8.43	200 mm

4549	p1924(1)	n2804	4.93	MH-88	4.98	14	0.4	7.07	7.01	200 mm
4332	p1730(2)	MH-340	1.25	n2514	1.23	4	0.398	3.44	3.43	200 mm
4922	p2240(1)	n3255	3.9	MH-67	3.98	22	0.4	5.68	5.67	200 mm
5463	p993(1)(2)	MH-31	3.46	MH-223	3.45	5	0.396	6.87	6.93	200 mm
3338	p889(1)	n1303	3.92	MH-294	4.02	31	0.291	5.26	5.2	200 mm
2815	p436	n669	4.56	n667	4.68	31	0.388	6.11	6.18	200 mm
2773	CO-90	n614	3.36	MH-692	3.22	33	0.4	5.78	5.94	200 mm
4138	p1572	n2283	3.73	n2282	3.85	30	0.405	5.99	6.16	200 mm
4331	p1731	n2514	1.23	n2516	1.11	30	0.402	3.43	3.25	200 mm
5603	CO-690	n2106	1.98	n2102	1.45	24	2.222	5.65	5.55	200 mm
3657	p1156	n1688	3.1	n1690	3.22	30	0.4	5.31	5.28	200 mm
2971	p581	n868	2.02	n870	2.14	30	0.4	4.94	5.15	200 mm
5519	CO-624	MH-54	3.1	n2649	3.27	43	0.4	7.45	7.63	200 mm
5218	CO-188	n2450	1.78	MH-324	1.62	41	0.4	6.08	7.41	200 mm
2816	CO-196	n671	4.45	n669	4.56	29	0.4	5.97	6.11	200 mm
3455	p993(2)	MH-223	3.45	n1447	3.4	11	0.4	6.93	7.07	200 mm
5261	CO-268	n2800	4.74	n2804	4.93	46	0.4	6.72	7.07	200 mm
4921	p2239	n3253	3.78	n3255	3.9	30	0.4	5.53	5.68	200 mm
5584	CO-664	MH-225	3.56	MH-31	3.46	24	0.4	6.7	6.87	200 mm
2970	p580(1)(1)	n866	1.91	MH-477	1.97	15	0.445	4.66	4.82	200 mm
3220	p789	n1170	3.98	n1171	4.1	30	0.4	6.11	6.38	200 mm
2771	p395(1)	n610	3.18	MH-692	3.22	11	0.402	6	5.94	200 mm
3454	p994	n1447	3.4	n1448	3.28	30	0.403	7.07	6.73	200 mm
5517	p1824(1)	n2646	3.03	MH-54	3.1	17	0.4	7.29	7.45	200 mm
4140	p1573	n2285	3.61	n2283	3.73	30	0.4	5.57	5.99	200 mm
5215	CO-182	n2517	1	n2516	1.11	29	0.4	3.25	3.25	200 mm
3656	CO-318	n1686	3.02	n1688	3.1	21	0.4	5.34	5.31	200 mm
2972	CO-152	MH-477	1.97	n868	2.02	12	0.4	4.82	4.94	200 mm
3343	p896	n1314	3.2	n1313	3.32	30	0.4	5.31	5.31	200 mm
4273	p1686(1)	n2448	1.54	MH-324	1.62	19	0.4	6.3	7.41	200 mm
4421	p1921	n2623	4.7	n2800	4.74	11	0.4	7.1	6.72	200 mm
3222	p790	n1171	4.1	n1172	4.22	34	0.355	6.38	7.5	200 mm
4852	p2179	n3170	2.77	n3171	2.65	28	0.429	5.08	5.04	200 mm
3281	p841(2)	MH-267	4.97	n1240	5.05	18	0.444	8.12	8.16	200 mm
3221	p788(2)	MH-310	3.93	n1170	3.98	14	0.399	6.11	6.11	200 mm
4272	p1685(2)	MH-323	1.5	n2448	1.54	10	0.406	6.51	6.3	200 mm
3456	p995	n1448	3.28	n1449	3.16	30	0.402	6.73	6.74	200 mm
5506	p1822(1)	n2643	2.8	MH-51	2.86	15	0.428	6.79	6.91	200 mm
4334	p1733	n2517	1	n2518	0.88	30	0.401	3.25	3.23	200 mm
4141	p1574	n2287	3.49	n2285	3.61	30	0.4	5.73	5.57	200 mm
5515	CO-622	MH-51	2.86	n2646	3.03	43	0.4	6.91	7.29	200 mm
4419	p1808	n2622	4.65	n2623	4.7	12	0.4	7.18	7.1	200 mm
3458	p997	n1451	3.04	n1453	2.92	27	0.441	6.84	6.75	200 mm
4851	p2178	n3169	2.89	n3170	2.77	31	0.375	5.14	5.08	200 mm
3219	CO-6	MH-310	3.93	n1169	3.86	16	0.4	6.11	6.11	200 mm
3341	p893	n1311	3.44	n1309	3.56	38	0.315	5.51	5.49	200 mm
3279	p841(1)	n1239	4.93	MH-267	4.97	10	0.435	8.1	8.12	200 mm

4271	p1685(1)	n2446	1.42	MH-323	1.5	19	0.409	6.92	6.51	200 mm
3628	p1133(1)(1	n1648	1.66	MH-709	1.69	12	0.27	6.39	6.4	200 mm
3833	p1318(2)	MH-721	5.7	n1912	5.6	14	0.638	6.95	6.8	200 mm
3459	p998(1)	n1453	2.92	MH-222	2.84	19	0.456	6.75	6.82	200 mm
4336	p1734	n2518	0.88	n2519	0.76	30	0.4	3.23	3.31	200 mm
5340	CO-422	n1682	2.78	MH-380	2.93	38	0.4	5.43	5.32	200 mm
3216	p895(1)	n1167	1.57	MH-295	1.63	16	0.4	5.86	2.75	200 mm
4142	p1575	n2288	3.37	n2287	3.49	30	0.4	5.85	5.73	200 mm
4418	p1807	n2621	4.53	n2622	4.65	30	0.4	7.36	7.18	200 mm
4853	p2180	n3171	2.65	n3172	2.53	29	0.4	5.04	5	200 mm
3280	p842	n1240	5.05	n1241	5.17	33	0.359	8.16	8.26	200 mm
3277	p839	n1236	4.69	n1238	4.81	26	0.456	7.68	8.04	200 mm
5513	p1821(2)	MH-53	2.77	n2643	2.8	7	0.403	6.77	6.79	200 mm
3885	p1735	n2519	0.76	n1976	0.63	32	0.4	3.31	3.18	200 mm
4143	p1577	n2289	3.25	n2288	3.37	30	0.4	5.85	5.85	200 mm
5399	CO-540	n865	1.79	n238	1.67	30	0.4	4.35	4.05	200 mm
4270	p1684	LS5	1.3	n2446	1.42	30	0.4	7.27	6.92	200 mm
4417	p1806	n2620	4.41	n2621	4.53	30	0.4	7.45	7.36	200 mm
3653	p1152(2)	MH-379	2.68	n1682	2.78	26	0.397	5.39	5.43	200 mm
3723	p1218	n1778	1.69	n1776	1.57	15	0.799	5.96	6.22	200 mm
4854	p2181	n3172	2.53	n3173	2.4	32	0.4	5	4.93	200 mm
2968	p579	n865	1.79	n866	1.91	33	0.363	4.35	4.66	200 mm
3457	p996	n1449	3.16	n1451	3.04	33	0.362	6.74	6.84	200 mm
4855	p2182	n3173	2.4	n3174	2.29	27	0.416	4.93	4.85	200 mm
5512	p1821(1)	n2641	2.68	MH-53	2.77	22	0.403	6.7	6.77	200 mm
3659	p1158(1)	n1692	3.34	MH-383	3.41	28	0.253	5.32	5.38	200 mm
5035	CO-316	MH-378	2.58	MH-379	2.68	23	0.4	5.4	5.39	200 mm
4416	p1805	n2619	4.29	n2620	4.41	30	0.4	7.44	7.45	200 mm
3625	CO-306	n1644	5.97	MH-717	5.93	12	0.4	7.09	7.07	200 mm
3828	p1316(2)(2	MH-717	5.93	n1908	5.84	20	0.42	7.07	7.01	200 mm
4144	p1576(2)(2	MH-180	3.2	n2289	3.25	15	0.388	5.92	5.85	200 mm
5510	p1820(2)	MH-52	2.58	n2641	2.68	23	0.403	6.73	6.7	200 mm
5343	CO-428	MH-180	3.2	n2124	3.14	15	0.4	5.92	6	200 mm
3651	CO-314	n1677	2.52	MH-378	2.58	17	0.4	5.27	5.4	200 mm
4415	p1804	n2617	4.17	n2619	4.29	30	0.4	7.43	7.44	200 mm
3829	p1317(1)	n1908	5.84	MH-719	5.8	9	0.418	7.01	7	200 mm
3655	p1154(2)	MH-380	2.93	n1686	3.02	27	0.308	5.32	5.34	200 mm
3064	p656	n977	2.65	n978	2.77	23	0.512	4.44	4.45	200 mm
4856	CO-142	n3174	2.29	MH-448	2.25	9	0.4	4.85	4.86	200 mm
3994	p1460	n2115	2.51	n2113	2.39	18	0.661	5.65	5.58	200 mm
2626	p150	n254	3.11	n255	3.31	49	0.4	5.63	5.51	200 mm
5514	CO-620	n2639	2.44	MH-52	2.58	37	0.4	6.83	6.73	200 mm
5339	CO-420	n1675	2.42	n1677	2.52	23	0.4	5.29	5.27	200 mm
3276	p838	n1234	4.57	n1236	4.69	30	0.4	7.54	7.68	200 mm
4414	p1803	n2615	4.05	n2617	4.17	30	0.4	7.51	7.43	200 mm
5082	p1317(2)(1	MH-719	5.8	MH-720	5.77	7	0.417	7	7	200 mm
5349	CO-440	n1569	-2.09	MH-756	0.12	15	14.403	4.14	4.18	200 mm

5050	p2183(1)(2	MH-448	2.25	MH-447	2.2	14	0.398	4.86	4.87	200 mm
5535	p1876(2)	MH-60	8.55	n2726	9.3	13	5.781	9.67	10.42	200 mm
5534	p1876(1)	n2725	7.57	MH-60	8.55	17	5.809	8.69	9.67	200 mm
5565	p1818(2)	MH-71	2.36	n2639	2.44	18	0.404	6.86	6.83	200 mm
2625	p149	n253	2.99	n254	3.11	30	0.4	5.85	5.63	200 mm
3274	p837	n1232	4.45	n1234	4.57	30	0.4	7.34	7.54	200 mm
3647	p1148	n1674	2.3	n1675	2.42	30	0.4	5.29	5.29	200 mm
4413	p1802	n2613	3.93	n2615	4.05	30	0.4	7.6	7.51	200 mm
3830	p1317(2)(2	MH-720	5.77	n1910	5.72	12	0.418	7	6.99	200 mm
5049	CO-144	MH-447	2.2	MH-445	2.15	11	0.4	4.87	4.88	200 mm
3278	p840	n1238	4.81	n1239	4.93	37	0.326	8.04	8.1	200 mm
5564	p1818(1)	n2637	2.32	MH-71	2.36	11	0.406	6.88	6.86	200 mm
2624	p148	n252	2.87	n253	2.99	30	0.4	6.37	5.85	200 mm
3646	p1147	n1672	2.18	n1674	2.3	30	0.4	5.31	5.29	200 mm
4412	p1801	n2612	3.81	n2613	3.93	30	0.4	7.63	7.6	200 mm
3849	p1332	n1931	3.29	n1932	3.17	30	0.4	6.36	6.31	200 mm
3462	p998(2)	MH-222	2.84	n1454	2.8	13	0.327	6.82	6.56	200 mm
5400	CO-542	n248	2.71	n252	2.87	41	0.4	7.2	6.37	200 mm
3834	p1320	n1913	5.48	n1914	5.36	26	0.467	6.86	6.96	200 mm
4429	p1817	n2635	2.2	n2637	2.32	30	0.4	6.85	6.88	200 mm
3645	CO-312	n1670	2.1	n1672	2.18	22	0.4	5.34	5.31	200 mm
5008	CO-288	MH-265	4.35	MH-266	4.26	22	0.4	7.57	7.47	200 mm
3066	CO-120	n978	2.77	n981	2.91	36	0.4	4.45	4.52	200 mm
4411	p1800	n2611	3.69	n2612	3.81	30	0.4	7.67	7.63	200 mm
2911	p519	n784	2.62	n783	-0.46	30	10.263	4.21	4.19	315mm
5332	CO-406	n1936	3.02	n1932	3.17	40	0.4	6.37	6.31	200 mm
3275	p836(2)	MH-265	4.35	n1232	4.45	26	0.363	7.57	7.34	200 mm
4000	p1466	n2124	3.14	n2123	3.11	8	0.4	6	6.01	200 mm
3273	CO-290	MH-266	4.26	n1228	4.1	41	0.4	7.47	7.33	200 mm
5562	p1816(2)	MH-70	2.15	n2635	2.2	12	0.4	6.89	6.85	200 mm
4410	p1799	n2610	3.57	n2611	3.69	30	0.4	7.94	7.67	200 mm
3840	p1324	n1919	5.1	n1920	4.98	20	0.612	6.86	6.83	200 mm
5561	p1816(1)	n2633	2.08	MH-70	2.15	18	0.405	6.95	6.89	200 mm
3831	p1318(1)	n1910	5.72	MH-721	5.7	8	0.367	6.99	6.95	200 mm
4409	p1798	n2609	3.45	n2610	3.57	30	0.403	7.98	7.94	200 mm
3999	p1465	n2123	3.11	n2121	2.99	30	0.4	6.01	5.84	200 mm
3065	CO-118	MH-500	2.5	n977	2.65	36	0.4	4.4	4.44	200 mm
2817	p456	n671	4.45	n696	4.41	9	0.4	5.97	5.95	200 mm
3642	p1144	n1666	1.93	n1668	1.98	12	0.4	5.35	5.49	200 mm
3272	p1005(2)(2	MH-817	4.06	n1228	4.1	11	0.399	7.37	7.33	200 mm
4268	p1681(2)	MH-321	6.35	n2442	6.41	22	0.287	8.2	8.2	200 mm
5559	p1815(2)	MH-69	2.01	n2633	2.08	15	0.413	6.95	6.95	200 mm
3055	p651	n969	2.01	n971	2.13	21	0.582	4.42	4.46	200 mm
2620	p145	n247	2.63	n248	2.71	19	0.4	7.01	7.2	200 mm
3998	p1464	n2121	2.99	n2120	2.87	30	0.4	5.84	5.77	200 mm
3398	CO-386	MH-817	4.06	n1389	3.98	21	0.4	7.37	7.45	200 mm
2843	p457	n696	4.41	n698	4.29	30	0.4	5.95	5.83	200 mm

5543	p1797(2)	MH-64	3.38	n2609	3.45	18	0.4	8.07	7.98	200 mm
5558	p1815(1)	n2631	1.96	MH-69	2.01	14	0.415	6.94	6.95	200 mm
5188	CO-132	n2719	4.96	n2594	2.46	41	6.033	7.63	7.87	200 mm
2766	p389(2)	MH-695	2.63	n600	2.66	6	0.537	5.86	5.88	200 mm
4861	p2188(1)(1	n3179	1.68	MH-444	1.62	14	0.4	4.81	4.78	200 mm
2619	p144	n246	2.51	n247	2.63	30	0.4	6.17	7.01	200 mm
5542	p1797(1)	n2607	3.33	MH-64	3.38	12	0.403	8.13	8.07	200 mm
3997	p1463	n2120	2.87	n2118	2.75	30	0.4	5.77	5.59	200 mm
2844	CO-192	n699	4.17	n698	4.29	30	0.4	5.88	5.83	200 mm
3063	CO-116	MH-504	2.41	n976	2.48	19	0.4	4.44	4.39	200 mm
5333	CO-408	n1915	5.28	n1914	5.36	22	0.4	6.99	6.96	200 mm
3061	p653(2)	MH-507	2.28	n974	2.37	22	0.431	4.43	4.46	200 mm
4866	p2191	n3182	1.33	n3183	1.2	26	0.477	4.76	4.84	200 mm
4863	CO-146	MH-444	1.62	n3180	1.59	8	0.4	4.78	4.77	200 mm
5556	p1814(2)	MH-68	1.92	n2631	1.96	8	0.409	6.92	6.94	200 mm
4858	p2184(2)	MH-445	2.15	n3176	2.05	34	0.311	4.88	4.92	200 mm
3058	p653(1)	n973	2.25	MH-507	2.28	6	0.444	4.43	4.43	200 mm
2618	p143	n244	2.39	n246	2.51	30	0.4	5.03	6.17	200 mm
3996	p1462	n2118	2.75	n2116	2.63	30	0.4	5.59	5.61	200 mm
2845	p459	n699	4.17	n700	4.05	30	0.4	5.88	5.89	200 mm
5418	CO-576	MH-504	2.41	n974	2.37	8	0.4	4.44	4.46	200 mm
4407	p1796	n2605	3.21	n2607	3.33	30	0.4	8.1	8.13	200 mm
3497	p1025	n1498	4.58	n1499	5.53	30	3.154	6.37	6.74	200 mm
5555	p1814(1)	n2629	1.84	MH-68	1.92	21	0.411	6.87	6.92	200 mm
4862	p2189(1)(1	n3180	1.59	MH-442	1.51	18	0.4	4.77	4.77	200 mm
3489	p1681(1)	n1485	6.29	MH-321	6.35	22	0.262	8	8.2	200 mm
4860	p2187	n3178	1.8	n3179	1.68	35	0.346	4.91	4.81	200 mm
2769	CO-92	n606	3.02	n610	3.18	40	0.4	5.94	6	200 mm
2617	p142	n242	2.27	n244	2.39	30	0.4	4.47	5.03	200 mm
5538	p1795(2)	MH-61	3.15	n2605	3.21	14	0.402	8.13	8.1	200 mm
3643	p1219	n1666	1.93	n1780	1.81	30	0.4	5.35	5.82	200 mm
2846	p460	n700	4.05	n701	3.93	30	0.4	5.89	5.8	200 mm
3644	p1145	n1668	1.98	n1670	2.1	38	0.315	5.49	5.34	200 mm
4865	CO-148	MH-442	1.51	n3181	1.45	16	0.4	4.77	4.77	200 mm
5537	p1795(1)	n2603	3.09	MH-61	3.15	16	0.406	8.17	8.13	200 mm
4425	p1813	n2628	1.72	n2629	1.84	30	0.404	6.86	6.87	200 mm
2616	p141	n241	2.15	n242	2.27	30	0.4	3.97	4.47	200 mm
2847	p461	n701	3.93	n703	3.81	30	0.4	5.8	5.8	200 mm
2768	p392	n604	2.9	n606	3.02	30	0.4	5.87	5.94	200 mm
4864	p2190	n3181	1.45	n3182	1.33	31	0.4	4.77	4.76	200 mm
3722	p1217	n1776	1.57	n1774	1.45	28	0.427	6.22	6.83	200 mm
5606	CO-694	n526	4.71	n527	3.45	26	4.942	5.99	5.88	200 mm
2615	p140	n240	2.03	n241	2.15	30	0.4	4.07	3.97	200 mm
4869	p2192(2)	MH-440	1.13	n3184	1.08	10	0.444	4.89	4.92	200 mm
4424	p1812	n2626	1.6	n2628	1.72	30	0.4	6.84	6.86	200 mm
2848	p462	n703	3.81	n704	3.69	30	0.4	5.8	5.75	200 mm
4405	p1794	n2602	2.97	n2603	3.09	30	0.4	8.19	8.17	200 mm

2767	p391	n602	2.78	n604	2.9	30	0.4	5.89	5.87	200 mm
5149	CO-66	n2982	2.61	n2980	2.77	41	0.4	5.06	5.41	200 mm
4857	p2185	n3176	2.05	n3177	1.94	41	0.278	4.92	4.93	200 mm
4423	p1811	n2625	1.48	n2626	1.6	30	0.4	6.99	6.84	200 mm
2849	p463	n704	3.69	n706	3.58	30	0.4	5.75	5.71	200 mm
3992	p1458	n2112	2.27	n2110	2.15	30	0.4	5.45	5.45	200 mm
4404	p1793	n2600	2.85	n2602	2.97	30	0.4	8.14	8.19	200 mm
5252	CO-250	MH-14	2.44	n2982	2.61	43	0.4	4.9	5.06	200 mm
3832	p1319	n1912	5.6	n1913	5.48	41	0.292	6.8	6.86	200 mm
3993	p1459	n2113	2.39	n2112	2.27	32	0.371	5.58	5.45	200 mm
3991	p1457	n2110	2.15	n2108	2.03	30	0.4	5.45	5.59	200 mm
4422	p1810	n2624	1.36	n2625	1.48	30	0.4	7.26	6.99	200 mm
3721	p1216	n1774	1.45	n1773	1.33	30	0.4	6.83	8.51	200 mm
2850	p464(1)	n706	3.58	MH-596	3.52	14	0.4	5.71	5.78	200 mm
4403	p1792	n2599	2.73	n2600	2.85	30	0.4	8.07	8.14	200 mm
5168	CO-102	n2987	2.25	MH-14	2.44	47	0.4	4.89	4.9	200 mm
3059	p652(2)	MH-508	2.21	n973	2.25	11	0.367	4.44	4.43	200 mm
5334	CO-410	n1915	5.28	n1919	5.1	43	0.4	6.99	6.86	200 mm
5451	CO-608	n817	5.23	n567	7.03	30	6.032	6.45	9.02	315mm
2763	p388(2)	MH-694	2.51	n598	2.54	7	0.446	5.8	5.81	200 mm
2762	p388(1)	n597	2.42	MH-694	2.51	19	0.456	5.77	5.8	200 mm
3767	p1254	n1828	4.31	n1827	4.51	16	1.283	5.43	5.63	200 mm
3720	p1215	n1773	1.33	n1772	1.21	30	0.4	8.51	6.11	200 mm
5369	CO-480	n1466	3.86	n1389	3.98	28	0.4	7.55	7.45	200 mm
4394	p1809	n2584	1.24	n2624	1.36	30	0.4	7.57	7.26	200 mm
3989	p1456	n2108	2.03	n2106	1.98	12	0.4	5.59	5.65	200 mm
4402	p1791	n2597	2.61	n2599	2.73	30	0.4	7.96	8.07	200 mm
5120	CO-30	n2987	2.25	MH-16	2.16	22	0.4	4.89	4.92	200 mm
5061	p652(1)(2)	MH-509	2.18	MH-508	2.21	8	0.367	4.44	4.44	200 mm
2705	p464(2)	MH-596	3.52	n527	3.45	18	0.398	5.78	5.88	200 mm
2765	p390	n600	2.66	n602	2.78	33	0.364	5.88	5.89	200 mm
4872	p2196(1)(1	n3187	0.72	MH-438	0.66	14	0.464	5.07	5.21	200 mm
3716	p1213(2)	MH-700	1.04	n1769	0.98	15	0.439	5.81	5.84	200 mm
3062	p655(1)	n976	2.48	MH-500	2.5	7	0.273	4.39	4.4	200 mm
3057	p652(1)(1)	n971	2.13	MH-509	2.18	14	0.37	4.46	4.44	200 mm
3470	p1007	n1467	3.74	n1466	3.86	30	0.4	7.44	7.55	200 mm
5178	CO-122	n2597	2.61	n2594	2.46	37	0.4	7.96	7.87	200 mm
5251	CO-248	n2991	2.03	MH-16	2.16	33	0.4	4.71	4.92	200 mm
4870	p2194	n3185	0.96	n3186	0.85	28	0.4	5.03	5.08	200 mm
3995	p1461	n2116	2.63	n2115	2.51	40	0.304	5.61	5.65	200 mm
5371	CO-484	MH-257	3.58	n1467	3.74	40	0.4	7.33	7.44	200 mm
3719	CO-342	MH-700	1.04	n1771	1.09	12	0.4	5.81	5.78	200 mm
5134	CO-48	n2991	2.03	n2992	1.9	33	0.4	4.71	4.76	200 mm
4867	p2192(1)	n3183	1.2	MH-440	1.13	22	0.343	4.84	4.89	200 mm
5446	p2195(1)	n3186	0.85	MH-28	0.75	24	0.4	5.08	5.07	200 mm
4868	p2193	n3184	1.08	n3185	0.96	34	0.362	4.92	5.03	200 mm
5372	CO-486	n1472	3.47	MH-257	3.58	28	0.4	7.22	7.33	200 mm

3053	p649	n966	1.77	n968	1.89	30	0.4	4.52	4.52	200 mm
4699	p2051(1)	n2992	1.9	MH-12	1.81	22	0.401	4.76	4.65	200 mm
3718	p1214	n1772	1.21	n1771	1.09	33	0.368	6.11	5.78	200 mm
3871	p1353	n1960	2.66	n1961	2.54	25	0.479	5.05	4.95	200 mm
5447	p2195(2)	MH-28	0.75	n3187	0.72	7	0.393	5.07	5.07	200 mm
3052	p648	n964	1.65	n966	1.77	30	0.4	4.55	4.52	200 mm
3715	p1212	n1769	0.98	n1770	0.86	30	0.4	5.84	5.73	200 mm
2761	p387	n596	2.3	n597	2.42	30	0.4	5.67	5.77	200 mm
2764	p389(1)(1)	n598	2.54	MH-696	2.62	21	0.357	5.81	5.86	200 mm
5553	CO-626	MH-67	1.75	MH-12	1.81	15	0.4	4.57	4.65	200 mm
3875	p1357	n1966	2.18	n1967	2.06	23	0.52	4.57	4.42	200 mm
3846	p1329	n1926	3.65	n1928	3.53	25	0.48	6.6	6.61	200 mm
5552	p2052(2)	MH-67	1.75	n2995	1.66	23	0.402	4.57	4.42	200 mm
3183	p759	n1126	5.29	n1127	5.2	23	0.4	8.44	8.48	200 mm
5080	p389(1)(2)	MH-696	2.62	MH-695	2.63	4	0.331	5.86	5.86	200 mm
3717	CO-340	n1782	0.74	n1770	0.86	29	0.4	5.65	5.73	200 mm
5436	CO-596	n964	1.65	MH-25	1.51	36	0.4	4.55	4.36	200 mm
2760	p386	n595	2.18	n596	2.3	30	0.4	5.7	5.67	200 mm
4873	CO-150	MH-438	0.66	n3189	0.61	10	0.4	5.21	5.31	200 mm
5331	CO-404	n1957	2.9	n1936	3.02	29	0.4	5.4	6.37	200 mm
3138	p720	n1070	3.48	n1072	3.6	15	0.801	6.26	6.21	200 mm
3186	p760	n1127	5.2	n1129	5.08	30	0.4	8.48	8.45	200 mm
5434	p646(1)	n962	1.41	MH-25	1.51	24	0.4	4.37	4.36	200 mm
2758	p385	n594	2.13	n595	2.18	13	0.4	5.76	5.7	200 mm
4702	p2053	n2995	1.66	n2997	1.54	30	0.4	4.42	4.37	200 mm
3868	p1351	n1957	2.9	n1958	2.78	30	0.4	5.4	5.16	200 mm
4703	p2054	n2997	1.54	n2998	1.42	29	0.402	4.37	4.32	200 mm
3187	p761	n1129	5.08	n1131	4.96	30	0.4	8.45	8.36	200 mm
3049	p645	n960	1.29	n962	1.41	30	0.4	4.46	4.37	200 mm
3724	p1220	n1780	1.81	n1778	1.69	47	0.256	5.82	5.96	200 mm
3888	p1369	n1980	0.23	n1981	-0.11	25	1.383	2.92	2.91	200 mm
4704	p2055	n2998	1.42	n2999	1.3	31	0.402	4.32	4.25	200 mm
3188	p762	n1131	4.96	n1132	4.84	30	0.4	8.36	8.12	200 mm
3048	p644	n959	1.17	n960	1.29	30	0.4	4.45	4.46	200 mm
2757	p384	n593	2.06	n594	2.13	17	0.4	5.68	5.76	200 mm
5335	CO-412	n1925	3.77	n1922	3.93	38	0.4	6.63	6.79	200 mm
3056	p650(2)	MH-510	1.96	n969	2.01	16	0.305	4.46	4.42	200 mm
3146	p726	n1079	4.22	n1081	4.34	22	0.551	6.46	7.05	200 mm
5320	CO-382	n2069	3.24	n2067	1.77	32	4.549	5.67	5.51	250 mm
3189	p763	n1132	4.84	n1133	4.74	24	0.4	8.12	7.86	200 mm
3047	p643	n958	1.05	n959	1.17	30	0.4	4.37	4.45	200 mm
3725	p1222	n1782	0.74	n1784	0.72	6	0.4	5.65	5.64	200 mm
4706	p2056	n2999	1.3	n3000	1.2	24	0.4	4.25	4.31	200 mm
3054	p650(1)	n968	1.89	MH-510	1.96	23	0.309	4.52	4.46	200 mm
3872	p1354	n1961	2.54	n1963	2.42	30	0.4	4.95	4.82	200 mm
3046	p642	n956	0.93	n958	1.05	30	0.4	4.21	4.37	200 mm
4707	p2069	n3019	1.13	n3000	1.2	18	0.4	4.58	4.31	200 mm

2756	p383	n592	1.94	n593	2.06	30	0.4	5.61	5.68	200 mm
3873	p1355	n1963	2.42	n1965	2.3	30	0.4	4.82	4.68	200 mm
3877	p1359	n1968	1.94	n1969	1.82	27	0.453	4.17	4.11	200 mm
3045	p641	n954	0.81	n956	0.93	30	0.4	4.08	4.21	200 mm
4720	p2068	n3017	1.01	n3019	1.13	30	0.4	4.56	4.58	200 mm
3847	p1330	n1928	3.53	n1930	3.41	30	0.4	6.61	6.5	200 mm
2755	p382	n590	1.82	n592	1.94	30	0.4	5.47	5.61	200 mm
3874	p1356	n1965	2.3	n1966	2.18	30	0.4	4.68	4.57	200 mm
2646	CO-114	n285	0.7	n954	0.81	29	0.4	4.31	4.08	200 mm
3848	p1331	n1930	3.41	n1931	3.29	30	0.4	6.5	6.36	200 mm
4719	p2067	n3015	0.89	n3017	1.01	30	0.4	4.62	4.56	200 mm
3870	p1352	n1958	2.78	n1960	2.66	36	0.336	5.16	5.05	200 mm
4718	p2066	n3013	0.77	n3015	0.89	30	0.4	4.85	4.62	200 mm
3136	p717(2)(2)(	MH-794	3.21	n1068	3.24	5	0.674	6.47	6.45	200 mm
3190	p764	n1133	4.74	n1135	4.72	6	0.4	7.86	7.81	200 mm
3876	p1358	n1967	2.06	n1968	1.94	30	0.394	4.42	4.17	200 mm
4717	p2065	n3011	0.65	n3013	0.77	30	0.401	4.91	4.85	200 mm
3845	p1328	n1925	3.77	n1926	3.65	36	0.336	6.63	6.6	200 mm
4716	p2064	n3010	0.53	n3011	0.65	30	0.403	4.88	4.91	200 mm
3192	p765	n1135	4.72	n1136	4.6	30	0.4	7.81	7.6	200 mm
3727	p1223(1)	n1784	0.72	MH-697	0.7	4	0.4	5.64	5.64	200 mm
3215	p786	n1165	1.53	n1167	1.57	10	0.4	5.96	5.86	200 mm
2754	p2197	n3189	0.61	n588	0.56	18	0.296	5.31	5.46	200 mm
3150	p766	n1136	4.6	n1084	4.51	21	0.4	7.6	7.45	200 mm
4715	p2063	n3008	0.41	n3010	0.53	30	0.4	5.28	4.88	200 mm
3730	p1223(2)	MH-697	0.7	n1786	0.62	20	0.399	5.64	5.61	200 mm
3214	p785	n1163	1.41	n1165	1.53	30	0.4	6.14	5.96	200 mm
3144	p724	n1077	3.98	n1078	4.1	26	0.469	6.38	6.5	200 mm
3879	p1361	n1971	1.7	n1972	1.58	30	0.4	3.97	3.78	200 mm
5549	p2062(2)	MH-66	0.35	n3008	0.41	13	0.404	5.26	5.28	200 mm
3149	p728	n1082	4.46	n1084	4.51	14	0.4	7.38	7.45	200 mm
3729	p1224	n1786	0.62	n1788	0.52	25	0.4	5.61	5.57	200 mm
3212	p784	n1161	1.34	n1163	1.41	18	0.4	6.19	6.14	200 mm
3880	p1362	n1972	1.58	n1973	1.46	30	0.4	3.78	3.6	200 mm
5548	p2062(1)	n3007	0.29	MH-66	0.35	17	0.406	5.24	5.26	200 mm
3148	p727	n1081	4.34	n1082	4.46	30	0.4	7.05	7.38	200 mm
3731	CO-332	n1841	0.4	n1788	0.52	30	0.4	5.1	5.57	200 mm
3881	p1363	n1973	1.46	n1974	1.34	30	0.4	3.6	3.51	200 mm
3460	p999	n1454	2.8	n1456	2.68	29	0.4	6.56	6.23	200 mm
4713	p2061	n3006	0.17	n3007	0.29	30	0.4	5.25	5.24	200 mm
3882	p1364	n1974	1.34	n1975	1.22	30	0.4	3.51	3.29	200 mm
3463	p1000	n1456	2.68	n1458	2.56	30	0.401	6.23	6.13	200 mm
4712	p2060	LS 1	0.05	n3006	0.17	30	0.4	5.39	5.25	200 mm
5187	CO-130	MH-12	2.07	n2584	1.24	21	3.917	7.72	7.57	200 mm
3464	p1001	n1458	2.56	n1460	2.44	30	0.4	6.13	6.16	200 mm
3465	p1002	n1460	2.44	n1462	2.32	30	0.4	6.16	6.26	200 mm
3142	p723	n1076	3.86	n1077	3.98	30	0.4	6.24	6.38	200 mm

5373	CO-488	n1474	3.39	n1472	3.47	18	0.4	7.42	7.22	200 mm
3466	p1003	n1462	2.32	n1463	2.2	30	0.4	6.26	6.95	200 mm
3797	p1285	n1865	0.5	n1867	0.38	22	0.541	5.22	5.23	200 mm
3479	p1012(2)	MH-246	3.32	n1474	3.39	19	0.404	7.54	7.42	200 mm
3482	p1012(1)	n1476	3.27	MH-246	3.32	11	0.414	7.61	7.54	200 mm
3143	p722(2)(2)	MH-800	3.78	n1076	3.86	19	0.399	6.16	6.24	200 mm
3467	p1004	n1463	2.2	n1465	2.14	16	0.4	6.95	6.48	200 mm
5578	CO-652	MH-424	0.3	n1841	0.4	24	0.4	5.39	5.1	200 mm
3141	CO-260	n1074	3.74	MH-800	3.78	10	0.4	6.12	6.16	200 mm
3804	p1292	n1877	4.28	n1879	4.16	20	0.589	5.4	5.41	200 mm
2933	p543	n817	5.23	n816	4.45	30	2.601	6.45	5.67	315mm
3795	p1283	n1863	0.75	n1864	0.63	25	0.475	5.24	5.31	200 mm
3481	p1013	n1477	3.15	n1476	3.27	29	0.407	8.36	7.61	200 mm
3984	p1452	n2101	1.54	n2099	1.66	30	0.4	5.51	5.63	200 mm
3134	p716(1)	n1065	3	MH-791	3.09	20	0.502	6.67	6.55	200 mm
5577	CO-650	MH-425	0.19	MH-424	0.3	29	0.4	5.37	5.39	200 mm
3140	CO-258	MH-796	3.68	n1074	3.74	16	0.4	6.15	6.12	200 mm
3469	p1448	n2095	2.02	n1465	2.14	29	0.4	5.99	6.48	200 mm
3985	p1453	n2102	1.45	n2101	1.54	24	0.4	5.55	5.51	200 mm
3213	CO-24	n1857	1.22	n1161	1.34	30	0.4	5.43	6.19	200 mm
3483	p1014	LS 6	3.03	n1477	3.15	30	0.403	9.51	8.36	200 mm
5579	CO-654	MH-75	-0.01	MH-425	0.19	51	0.4	5.38	5.37	200 mm
3981	p1449	n2096	1.9	n2095	2.02	30	0.4	5.83	5.99	200 mm
3791	p1279	n1857	1.22	n1858	1.1	30	0.4	5.43	5.38	200 mm
3878	p1360	n1969	1.82	n1971	1.7	42	0.282	4.11	3.97	200 mm
3773	p1259(2)	MH-427	3.86	n1833	3.89	4	0.644	5.54	5.48	200 mm
3982	p1450	n2097	1.78	n2096	1.9	30	0.4	5.73	5.83	200 mm
4709	p2058	n3001	4.22	n3003	4.34	30	0.401	5.63	5.46	200 mm
3792	p1280(1)	n1858	1.1	MH-769	0.99	27	0.4	5.38	5.45	200 mm
3983	p1451	n2099	1.66	n2097	1.78	30	0.4	5.63	5.73	200 mm
5095	CO-362	MH-771	0.92	MH-769	0.99	19	0.4	5.4	5.45	200 mm
3819	p1307	n1896	3.62	n1895	3.5	20	0.591	5.07	5.03	200 mm
3137	p719	n1069	3.36	n1070	3.48	30	0.4	6.44	6.26	200 mm
3794	p1281(2)(2	MH-771	0.92	n1861	0.87	13	0.398	5.4	5.35	200 mm
3793	p1282	n1861	0.87	n1863	0.75	30	0.4	5.35	5.24	200 mm
2612	p138	n237	1.63	n238	1.67	10	0.4	4.06	4.05	200 mm
3799	p1286	n1867	0.38	n1869	0.26	27	0.439	5.23	5.09	200 mm
2611	p137	n236	1.51	n237	1.63	30	0.4	4.22	4.06	200 mm
5098	CO-256	MH-792	3.15	MH-794	3.21	16	0.4	6.5	6.47	200 mm
3796	CO-360	MH-774	0.57	n1864	0.63	13	0.4	5.28	5.31	200 mm
3147	p725(2)	MH-801	4.15	n1079	4.22	22	0.279	6.48	6.46	200 mm
2610	p136	n235	1.39	n236	1.51	30	0.4	4.28	4.22	200 mm
5097	CO-254	MH-791	3.09	MH-792	3.15	13	0.4	6.55	6.5	200 mm
3145	p725(1)	n1078	4.1	MH-801	4.15	21	0.281	6.5	6.48	200 mm
2608	p135	n233	1.32	n235	1.39	17	0.4	4.23	4.28	200 mm
5268	CO-282	n2578	6.05	n2575	4.41	40	4.145	7.55	7.3	200 mm
5398	CO-538	n230	1.15	n233	1.32	43	0.4	4.1	4.23	200 mm

3133	CO-252	n1064	2.88	n1065	3	29	0.4	6.66	6.67	200 mm
2605	p132	n229	1.03	n230	1.15	30	0.4	4.15	4.1	200 mm
3135	p718	n1068	3.24	n1069	3.36	35	0.346	6.45	6.44	200 mm
4486	p1875	n2724	7.26	n2725	7.57	30	1.039	8.38	8.69	200 mm
2604	p131	n228	0.91	n229	1.03	30	0.4	4.15	4.15	200 mm
5047	p1256(2)(1	MH-434	4.19	MH-435	4.2	4	0.423	5.44	5.43	200 mm
2644	p167	n283	0.59	n285	0.7	27	0.4	4.31	4.31	200 mm
2603	p130	n227	0.79	n228	0.91	30	0.4	4.1	4.15	200 mm
3802	CO-358	n1874	-0.08	n1872	0.02	26	0.4	5.23	5.32	200 mm
2602	p129	n225	0.67	n227	0.79	30	0.4	3.89	4.1	200 mm
2643	p166	n282	0.47	n283	0.59	30	0.4	4.3	4.31	200 mm
2904	p512	n774	0.25	n773	0.37	16	0.734	4.21	4.07	200 mm
3803	CO-356	LS 8	-0.24	n1874	-0.08	38	0.4	5.29	5.23	200 mm
2642	p165	n280	0.35	n282	0.47	30	0.4	4.67	4.3	200 mm
2600	p128	n223	0.46	n225	0.67	53	0.4	4.06	3.89	200 mm
3798	p1284(2)(2	MH-774	0.57	n1865	0.5	21	0.34	5.28	5.22	200 mm
3771	p1258(2)(2	MH-430	3.97	n1832	4.01	9	0.442	5.51	5.53	200 mm
3801	p1288	n1871	0.14	n1872	0.02	33	0.369	5.17	5.32	200 mm
2641	p164	n278	0.23	n280	0.35	30	0.4	4.61	4.67	200 mm
3806	p1293	n1879	4.16	n1881	4.04	30	0.4	5.41	5.32	200 mm
2640	p163	n276	0.11	n278	0.23	30	0.4	4.32	4.61	200 mm
3807	p1294	n1881	4.04	n1882	3.92	30	0.4	5.32	5.49	200 mm
2639	p162	n275	-0.01	n276	0.11	30	0.4	4.16	4.32	200 mm
3808	p1295	n1882	3.92	n1884	3.8	30	0.4	5.49	5.47	200 mm
4510	p1897	n2758	2.66	n2760	2.78	25	0.481	4.79	4.8	200 mm
2638	p161	n274	-0.13	n275	-0.01	30	0.4	4.12	4.16	200 mm
3809	p1296	n1884	3.8	n1885	3.74	17	0.4	5.47	5.31	200 mm
5099	p721(2)(1)	MH-795	3.66	MH-796	3.68	4	0.262	6.16	6.15	200 mm
2637	p160	n272	-0.25	n274	-0.13	30	0.4	4.25	4.12	200 mm
3811	p1306	n1885	3.74	n1896	3.62	30	0.4	5.31	5.07	200 mm
3139	p721(1)	n1072	3.6	MH-795	3.66	23	0.262	6.21	6.16	200 mm
2636	p159	n270	-0.37	n272	-0.25	30	0.4	4.41	4.25	200 mm
5046	p1257(2)(1	MH-433	4.09	MH-432	4.11	4	0.367	5.47	5.46	200 mm
5045	p1257(2)(1	MH-431	4.05	MH-433	4.09	13	0.373	5.51	5.47	200 mm
5592	CO-680	n1828	4.31	MH-435	4.2	26	0.4	5.43	5.43	200 mm
2635	p158	LS 13	-0.49	n270	-0.37	30	0.4	4.7	4.41	200 mm
3772	p1257(1)	n1832	4.01	MH-431	4.05	10	0.37	5.53	5.51	200 mm
2633	p156	n264	3.95	n266	4.07	30	0.4	5.66	5.19	200 mm
3132	CO-244	n1088	2.75	n1064	2.88	32	0.4	6.57	6.66	200 mm
5591	CO-678	MH-434	4.19	MH-432	4.11	20	0.4	5.44	5.46	200 mm
3776	p1259(1)	n1834	3.77	MH-427	3.86	23	0.401	5.73	5.54	200 mm
2632	p155	n262	3.79	n264	3.95	41	0.4	6.04	5.66	200 mm
3153	p731	n1087	2.63	n1088	2.75	30	0.4	6.55	6.57	200 mm
5308	CO-360	n2765	3.15	n2763	3.02	31	0.4	5.85	5.59	200 mm
3152	p730	n1085	2.51	n1087	2.63	30	0.4	6.82	6.55	200 mm
3775	p1260	n1835	3.65	n1834	3.77	30	0.4	5.59	5.73	200 mm
4512	p1899	n2762	2.9	n2763	3.02	31	0.4	5.1	5.59	200 mm

5044	p1258(2)(1	MH-429	3.95	MH-430	3.97	5	0.366	5.51	5.51	200 mm
3800	p1287	n1869	0.26	n1871	0.14	41	0.293	5.09	5.17	200 mm
2676	p729	n499	2.45	n1085	2.51	16	0.4	7.05	6.82	200 mm
3774	p1258(1)	n1833	3.89	MH-429	3.95	17	0.367	5.48	5.51	200 mm
4509	p1896	n2757	2.54	n2758	2.66	30	0.4	4.79	4.79	200 mm
3884	p1366	n1976	0.63	n1977	0.47	39	0.4	3.18	2.99	200 mm
4507	p1895	n2755	2.47	n2757	2.54	18	0.401	4.71	4.79	200 mm
3886	p1367	n1977	0.47	n1979	0.35	30	0.4	2.99	2.94	200 mm
3887	p1368	n1979	0.35	n1980	0.23	30	0.4	2.94	2.92	200 mm
4511	p1898	n2760	2.78	n2762	2.9	35	0.342	4.8	5.1	200 mm
3818	p1305	n1895	3.5	n1894	3.38	41	0.296	5.03	5.39	200 mm
4485	p1874	n2722	7.08	n2724	7.26	30	0.608	8.2	8.38	200 mm
3978	p1446(1)	n2092	4.77	MH-118	4.98	20	1.072	5.93	6.14	250 mm
2677	CO-228	n501	2.33	n499	2.45	29	0.4	6.81	7.05	200 mm
2680	p324(1)	n504	2.09	MH-804	2.03	14	0.418	6.6	6.53	200 mm
3488	p1019	n1487	6.23	n1485	6.29	14	0.405	7.86	8	200 mm
2678	p322	n501	2.33	n502	2.21	30	0.4	6.81	6.68	200 mm
4626	p1994	n2909	1.71	n2910	1.59	26	0.453	4.38	4.46	200 mm
3490	p1020	n1489	6.11	n1487	6.23	30	0.401	7.38	7.86	200 mm
2682	p324(2)	MH-804	2.03	n506	1.97	15	0.411	6.53	6.46	200 mm
3491	p1021	n1491	5.99	n1489	6.11	30	0.4	7.28	7.38	200 mm
4627	p1995	n2910	1.59	n2912	1.47	27	0.447	4.46	4.2	200 mm
4624	p1992	n2905	1.95	n2907	1.83	28	0.426	4.35	4.3	200 mm
2752	p380	n586	0.53	n588	0.56	7	0.4	5.47	5.46	200 mm
3492	p1022	n1493	5.87	n1491	5.99	30	0.4	7.22	7.28	200 mm
4145	p1579	n2292	1.27	n2291	1.39	22	0.554	6.89	5.43	200 mm
5627	CO-698	MH-73	2.35	n2901	2.19	40	0.4	4.71	4.48	200 mm
2679	p323	n502	2.21	n504	2.09	31	0.385	6.68	6.6	200 mm
2751	p379	n584	0.41	n586	0.53	30	0.4	5.39	5.47	200 mm
2681	p325	n506	1.97	n508	1.85	30	0.4	6.46	6.52	200 mm
3493	p1023	n1495	5.75	n1493	5.87	30	0.4	7.05	7.22	200 mm
2750	p378	n583	0.29	n584	0.41	30	0.4	5.42	5.39	200 mm
2683	p326	n508	1.85	n510	1.73	30	0.4	6.52	6.63	200 mm
2684	p327(1)	n510	1.73	MH-802	1.69	10	0.404	6.63	6.63	200 mm
2749	p377	n582	0.17	n583	0.29	30	0.4	5.45	5.42	200 mm
2905	p513	n775	0.13	n774	0.25	30	0.4	4.27	4.21	200 mm
5219	CO-190	n1499	5.53	MH-245	5.67	35	0.4	6.74	6.88	200 mm
4484	p1873	n2721	6.91	n2722	7.08	30	0.539	8.03	8.2	200 mm
2748	p376	n581	0.05	n582	0.17	30	0.4	5.5	5.45	200 mm
5313	CO-370	n2566	3.93	n2154	2.74	50	2.365	7.48	7.35	200 mm
4629	p1997	n2913	1.35	n2915	1.23	28	0.428	3.95	4.04	200 mm
2686	CO-226	n511	1.61	MH-802	1.69	19	0.4	6.62	6.63	200 mm
2747	p375	n579	-0.07	n581	0.05	30	0.4	5.58	5.5	200 mm
2907	CO-168	n776	0.01	MH-785	-0.06	19	0.4	4.16	4.18	200 mm
2685	p328	n511	1.61	n512	1.49	30	0.4	6.62	6.65	200 mm
4163	p1595	n2317	-0.64	n2316	-0.52	19	0.639	4.64	4.53	200 mm
5207	CO-166	n1985	-0.25	n1981	-0.11	35	0.4	2.84	2.91	200 mm

4623	p1991	n2903	2.07	n2905	1.95	32	0.379	4.38	4.35	200 mm
2746	p374	LS 12	-0.19	n579	-0.07	30	0.4	5.81	5.58	200 mm
2909	CO-170	MH-785	-0.06	n780	-0.22	39	0.4	4.18	4.21	200 mm
2687	p329	n512	1.49	n513	1.37	30	0.4	6.65	6.5	200 mm
5206	CO-164	n1986	-0.37	n1985	-0.25	30	0.4	2.67	2.84	200 mm
2906	p514	n776	0.01	n775	0.13	31	0.382	4.16	4.27	200 mm
2908	p517	n782	-0.34	n780	-0.22	30	0.4	4.22	4.21	200 mm
2688	p330	n513	1.37	n515	1.25	30	0.4	6.5	6.35	200 mm
3893	p1373	n1986	-0.37	n1988	-0.49	30	0.4	2.67	2.78	200 mm
2910	p518	n783	-0.46	n782	-0.34	30	0.4	4.19	4.22	200 mm
2689	p331	n515	1.25	n516	1.13	30	0.4	6.35	6.39	200 mm
3895	p1374	n1988	-0.49	n1989	-0.61	30	0.401	2.78	3.17	200 mm
2690	p332	n516	1.13	n517	1.01	30	0.4	6.39	6.48	200 mm
3896	p1375	n1989	-0.61	n1991	-0.73	30	0.4	3.17	3.13	200 mm
2691	CO-224	n518	0.89	n517	1.01	29	0.4	6.41	6.48	200 mm
4631	p1999	n2916	1.11	n2917	0.99	30	0.4	4.03	3.96	200 mm
3897	p1376	n1991	-0.73	n1992	-0.85	30	0.4	3.13	3.06	200 mm
4632	p2000	n2917	0.99	n2919	0.87	30	0.402	3.96	3.87	200 mm
2932	p541	n816	4.45	n815	4.2	30	0.854	5.67	5.41	315mm
3494	p1024(2)	MH-245	5.67	n1495	5.75	25	0.346	6.88	7.05	200 mm
5200	CO-152	MH-118	4.98	MH-119	5.26	34	0.827	6.14	6.42	250 mm
4625	p1993	n2907	1.83	n2909	1.71	34	0.357	4.3	4.38	200 mm
3898	p1377	n1992	-0.85	n1993	-0.97	30	0.4	3.06	3.11	200 mm
4633	p2001	n2919	0.87	n2921	0.75	30	0.4	3.87	3.81	200 mm
3899	p1378	n1993	-0.97	n1994	-1.09	30	0.4	3.11	3.06	200 mm
4634	p2002	n2921	0.75	n2922	0.63	30	0.4	3.81	3.78	200 mm
4628	p1996	n2912	1.47	n2913	1.35	33	0.364	4.2	3.95	200 mm
3900	p1379	n1994	-1.09	n1995	-1.21	30	0.4	3.06	2.9	200 mm
4630	p1998	n2915	1.23	n2916	1.11	32	0.375	4.04	4.03	200 mm
4635	p2003	n2922	0.63	n2924	0.51	30	0.4	3.78	3.72	200 mm
3901	p1380	n1995	-1.21	n1996	-1.33	30	0.4	2.9	2.83	200 mm
3902	p1381	n1996	-1.33	n1997	-1.45	30	0.4	2.83	2.86	200 mm
4508	p1987	n2755	2.47	MH-73	2.35	38	0.313	4.71	4.71	200 mm
3903	p1382	n1997	-1.45	n1998	-1.57	30	0.4	2.86	2.83	200 mm
3518	p1045	n1525	3.59	n1526	3.47	22	0.535	5.73	5.97	200 mm
3904	p1383	n1998	-1.57	n2000	-1.69	30	0.4	2.83	2.87	200 mm
4151	p1583	n2299	0.8	n2298	0.92	27	0.448	5.03	5.13	200 mm
3905	p1384	n2000	-1.69	n2002	-1.81	30	0.4	2.87	3	200 mm
3906	p1385	n2002	-1.81	n2003	-1.93	30	0.4	3	3.1	200 mm
3907	p1386	n2003	-1.93	n2004	-2.05	30	0.4	3.1	3.13	200 mm
4173	p1603(2)	MH-159	-1.56	n2328	-1.49	12	0.621	4.01	4.17	200 mm
3908	p1387	n2004	-2.05	n2006	-2.17	30	0.4	3.13	3.04	200 mm
4148	p1581(2)	MH-201	1.08	n2294	1.16	18	0.406	5.28	5.49	200 mm
5346	CO-434	n2292	1.27	n2294	1.16	29	0.4	6.89	5.49	200 mm
3909	p1388	n2006	-2.17	n2008	-2.29	30	0.4	3.04	2.85	200 mm
4622	p1990	n2901	2.19	n2903	2.07	42	0.286	4.48	4.38	200 mm
4467	p1872	n2696	6.79	n2721	6.91	30	0.405	8.03	8.03	200 mm

3910	p1389	n2008	-2.29	n2009	-2.41	30	0.4	2.85	2.58	200 mm
4150	p1581(1)	n2296	1.04	MH-201	1.08	12	0.4	5.15	5.28	200 mm
3911	p1390	n2009	-2.41	n2011	-2.53	30	0.4	2.58	2.46	200 mm
3529	p1054	n1538	2.51	n1540	2.39	22	0.555	5.01	4.82	200 mm
5179	CO-124	n2696	6.79	n2700	6.64	39	0.4	8.03	7.98	200 mm
4149	p1582	n2298	0.92	n2296	1.04	30	0.4	5.13	5.15	200 mm
3912	p1391	n2011	-2.53	n2012	-2.65	30	0.4	2.46	2.28	200 mm
2697	CO-220	n520	5.07	MH-602	5.13	13	0.467	6.19	6.25	200 mm
4469	p1856	n2700	6.64	n2701	6.52	30	0.4	7.98	7.89	200 mm
3913	p1392	n2012	-2.65	n2013	-2.77	30	0.4	2.28	2.15	200 mm
3516	p1043	n1522	3.83	n1524	3.71	27	0.452	6.01	5.83	200 mm
4470	p1857	n2701	6.52	n2702	6.4	30	0.4	7.89	7.89	200 mm
3914	p1393	n2013	-2.77	n2014	-2.89	30	0.4	2.15	2.12	200 mm
5199	CO-150	MH-119	5.26	n2176	5.43	26	0.646	6.42	6.6	250 mm
4471	p1858	n2702	6.4	n2704	6.28	30	0.4	7.89	7.88	200 mm
4153	p1585	n2303	0.56	n2301	0.68	30	0.4	5.03	5.08	200 mm
3915	p1394	n2014	-2.89	n2016	-3.01	30	0.4	2.12	2.42	200 mm
4166	p1598	n2322	-1	n2320	-0.88	25	0.471	4.46	4.43	200 mm
4472	p1859	n2704	6.28	n2705	6.16	30	0.4	7.88	7.81	200 mm
4154	p1586	n2304	0.44	n2303	0.56	30	0.4	4.97	5.03	200 mm
3916	p1395	n2016	-3.01	n2017	-3.13	30	0.4	2.42	2.16	200 mm
5598	CO-684	n2924	0.51	WELL 1	0.46	13	0.4	3.72	3.7	200 mm
5521	p1861(1)	n2706	6.04	MH-55	5.98	13	0.407	7.31	7.49	200 mm
5364	CO-470	n1498	4.58	n1515	4.43	37	0.4	6.37	6.14	200 mm
4473	p1860	n2705	6.16	n2706	6.04	30	0.4	7.81	7.31	200 mm
4155	p1587	n2306	0.32	n2304	0.44	30	0.4	5.12	4.97	200 mm
3917	p1396	n2017	-3.13	n2018	-3.25	30	0.4	2.16	2.22	200 mm
3977	p1445	n2090	4.58	n2092	4.77	30	0.631	5.74	5.93	250 mm
3511	p1038	n1515	4.43	n1516	4.31	30	0.4	6.14	6.06	200 mm
4156	p1588	n2308	0.2	n2306	0.32	30	0.4	4.64	5.12	200 mm
3918	p1397	n2018	-3.25	n2020	-3.37	30	0.4	2.22	2.24	200 mm
5524	p1862(1)	n2707	5.92	MH-56	5.88	8	0.408	7.7	7.68	200 mm
5522	p1861(2)	MH-55	5.98	n2707	5.92	16	0.402	7.49	7.7	200 mm
3512	p1039	n1516	4.31	n1518	4.19	30	0.4	6.06	5.99	200 mm
4157	p1589	n2310	0.08	n2308	0.2	30	0.4	4.77	4.64	200 mm
3919	p1398	n2020	-3.37	n2021	-3.49	30	0.4	2.24	2.31	200 mm
3513	p1040	n1518	4.19	n1520	4.07	30	0.4	5.99	6.06	200 mm
4158	p1590	n2311	-0.04	n2310	0.08	30	0.4	4.96	4.77	200 mm
3514	p1041	n1520	4.07	n1521	3.95	30	0.4	6.06	5.98	200 mm
4152	p1584	n2301	0.68	n2299	0.8	33	0.365	5.08	5.03	200 mm
5527	p1863(1)	n2708	5.8	MH-57	5.7	23	0.404	7.62	7.71	200 mm
4159	p1591	n2312	-0.16	n2311	-0.04	30	0.4	4.93	4.96	200 mm
5525	p1862(2)	MH-56	5.88	n2708	5.8	22	0.399	7.68	7.62	200 mm
4160	p1592	n2314	-0.28	n2312	-0.16	30	0.4	4.86	4.93	200 mm
2693	CO-222	MH-604	0.85	n518	0.89	10	0.4	6.38	6.41	200 mm
2601	p511	n773	0.37	n223	0.46	35	0.24	4.07	4.06	200 mm
5530	p1864(1)	n2710	5.68	MH-58	5.63	12	0.406	7.73	7.72	200 mm

5528	p1863(2)	MH-57	5.7	n2710	5.68	7	0.4	7.71	7.73	200 mm
4161	p1593	n2315	-0.4	n2314	-0.28	30	0.4	4.72	4.86	200 mm
2695	p334(2)(2)	MH-604	0.85	LS 9	0.77	20	0.4	6.38	6.32	200 mm
5531	p1864(2)	MH-58	5.63	n2711	5.56	17	0.404	7.72	7.69	200 mm
3543	p1065	n1554	1.33	n1555	1.21	21	0.581	4.18	4.28	200 mm
3575	p1092	n1588	1.74	n1590	1.68	21	0.279	3.48	3.38	315mm
2696	p336(1)(1)	n520	5.07	MH-598	5.02	12	0.401	6.19	6.22	200 mm
5634	CO-702	MH-75	-0.01	LS 11	-0.04	7	0.4	5.38	5	200 mm
4478	p1865	n2711	5.56	n2713	5.44	30	0.4	7.69	7.7	200 mm
2699	CO-218	n521	4.96	MH-598	5.02	16	0.4	6.28	6.22	200 mm
3520	p1047	n1528	3.35	n1530	3.23	30	0.4	5.91	5.83	200 mm
4479	p1866	n2713	5.44	n2714	5.32	30	0.4	7.7	7.68	200 mm
4165	p1597	n2320	-0.88	n2319	-0.76	30	0.4	4.43	4.63	200 mm
5388	CO-518	n521	4.96	n524	4.81	37	0.4	6.28	6.14	200 mm
3521	p1048	n1530	3.23	n1531	3.11	30	0.4	5.83	5.76	200 mm
4480	p1867	n2714	5.32	n2715	5.2	30	0.4	7.68	7.68	200 mm
4162	p1594	n2316	-0.52	n2315	-0.4	32	0.378	4.53	4.72	200 mm
3522	p1049	n1531	3.11	n1533	2.99	30	0.4	5.76	5.66	200 mm
4481	p1868	n2715	5.2	n2717	5.08	30	0.4	7.68	7.58	200 mm
2701	p339	n524	4.81	n526	4.71	25	0.4	6.14	5.99	200 mm
3523	p1050	n1533	2.99	n1534	2.88	28	0.4	5.66	5.57	200 mm
4482	p1869	n2717	5.08	n2719	4.96	30	0.4	7.58	7.63	200 mm
3517	p1044	n1524	3.71	n1525	3.59	32	0.37	5.83	5.73	200 mm
3515	p1042	n1521	3.95	n1522	3.83	33	0.359	5.98	6.01	200 mm
2925	p535	n808	3.77	n807	3.52	45	0.55	4.98	4.73	315mm
3524	p1051(1)	n1534	2.88	MH-170	2.83	12	0.401	5.57	5.49	200 mm
3527	p1051(2)	MH-170	2.83	n1536	2.75	20	0.397	5.49	5.35	200 mm
3526	p1052	n1536	2.75	n1537	2.63	30	0.4	5.35	5.19	200 mm
3528	p1053	n1537	2.63	n1538	2.51	30	0.4	5.19	5.01	200 mm
3545	p1067	n1556	1.09	n1557	0.97	24	0.507	4.49	4.19	200 mm
3586	p1103	n1604	1.08	n1605	1.02	24	0.252	2.89	2.97	315mm
4168	p1600	n2325	-1.24	n2323	-1.13	29	0.4	4.19	4.29	200 mm
3519	p1046	n1526	3.47	n1528	3.35	35	0.342	5.97	5.91	200 mm
5356	CO-454	n1542	2.23	MH-169	2.34	27	0.4	4.55	4.77	200 mm
5347	CO-436	n2327	-1.37	MH-161	-1.33	10	0.4	4.17	4.18	200 mm
4167	p1599	n2323	-1.13	n2322	-1	36	0.35	4.29	4.46	200 mm
3555	p1074	n1565	0.33	n1567	0.21	20	0.611	3.97	4.05	200 mm
3566	p1083	n1576	2.28	n1578	2.22	27	0.22	3.7	3.69	315mm
4175	p1603(1)	n2330	-1.61	MH-159	-1.56	11	0.404	3.92	4.01	200 mm
4174	p1604	n2332	-1.73	n2330	-1.61	30	0.4	3.87	3.92	200 mm
4176	p1605(2)	MH-158	-1.79	n2332	-1.73	15	0.404	3.69	3.87	200 mm
4178	p1605(1)	n2334	-1.85	MH-158	-1.79	14	0.407	3.53	3.69	200 mm
3987	p1578	n2291	1.39	n2102	1.45	22	0.243	5.43	5.55	200 mm
4177	p1606	n2336	-1.97	n2334	-1.85	30	0.4	3.74	3.53	200 mm
5348	CO-438	n2336	-1.97	n1569	-2.09	30	0.4	3.74	4.14	200 mm
4170	p1601(2)(2	MH-161	-1.33	n2325	-1.24	23	0.36	4.18	4.19	200 mm
3533	p1057	n1542	2.23	n1544	2.16	18	0.4	4.55	4.28	200 mm

3564	p1081	n1574	2.4	n1575	2.34	30	0.2	3.62	3.7	315mm
3535	p1058	n1544	2.16	n1546	2.04	30	0.401	4.28	4.22	200 mm
3565	p1082	n1575	2.34	n1576	2.28	30	0.2	3.7	3.7	315mm
4171	p1602	n2328	-1.49	n2327	-1.37	33	0.362	4.17	4.17	200 mm
3536	p1059	n1546	2.04	n1547	1.92	30	0.4	4.22	4.32	200 mm
4164	p1596	n2319	-0.76	n2317	-0.64	40	0.299	4.63	4.64	200 mm
3568	p1085	n1579	2.16	n1581	2.1	30	0.2	3.72	3.64	315mm
3569	p1086	n1581	2.1	n1582	2.04	30	0.2	3.64	3.6	315mm
3537	p1060	n1547	1.92	n1549	1.8	30	0.4	4.32	4.37	200 mm
3570	p1087	n1582	2.04	n1583	1.98	30	0.2	3.6	3.56	315mm
3571	p1088	n1583	1.98	n1584	1.92	30	0.2	3.56	3.53	315mm
5355	CO-452	n1550	1.69	n1549	1.8	27	0.4	4.36	4.37	200 mm
3572	p1089	n1584	1.92	n1585	1.86	30	0.2	3.53	3.5	315mm
5074	p536(2)(1)	MH-666	3.85	MH-667	3.81	8	0.43	5.06	5.03	315mm
2926	p536(2)(2)	MH-667	3.81	n808	3.77	10	0.431	5.03	4.98	315mm
3573	p1090	n1585	1.86	n1587	1.8	30	0.2	3.5	3.51	315mm
3576	p1093	n1590	1.68	n1592	1.62	30	0.2	3.38	3.3	315mm
3541	p1063	n1551	1.57	n1552	1.45	30	0.4	4.39	4.3	200 mm
3577	p1094	n1592	1.62	n1593	1.56	30	0.2	3.3	3.35	315mm
3578	p1095	n1593	1.56	n1594	1.5	30	0.201	3.35	3.23	315mm
3579	p1096	n1594	1.5	n1595	1.44	30	0.2	3.23	3.11	315mm
3580	p1097	n1595	1.44	n1597	1.38	30	0.2	3.11	3.12	315mm
3581	p1098	n1597	1.38	n1599	1.32	30	0.2	3.12	3.13	315mm
3539	p1062	n1550	1.69	n1551	1.57	31	0.386	4.36	4.39	200 mm
3582	p1099	n1599	1.32	n1600	1.26	30	0.2	3.13	2.98	315mm
3583	p1100	n1600	1.26	n1602	1.2	30	0.2	2.98	2.91	315mm
3544	p1066	n1555	1.21	n1556	1.09	30	0.4	4.28	4.49	200 mm
3584	p1101	n1602	1.2	n1603	1.14	30	0.2	2.91	2.88	315mm
3585	p1102	n1603	1.14	n1604	1.08	30	0.2	2.88	2.89	315mm
3553	p1071(2)	MH-755	0.65	n1562	0.57	16	0.49	4.15	4.09	200 mm
3549	p1069(2)	MH-168	0.79	n1559	0.73	15	0.405	4.26	4.22	200 mm
5464	CO-616	n1607	0.96	n1609	0.9	30	0.2	3.07	2.8	315mm
5354	CO-450	MH-168	0.79	n1557	0.97	46	0.4	4.26	4.19	200 mm
3567	p1084	n1578	2.22	n1579	2.16	34	0.178	3.69	3.72	315mm
3562	p1079	n1571	2.7	n1572	2.53	30	0.588	3.86	3.69	250 mm
2931	p540	n815	4.2	n813	4.09	30	0.352	5.41	5.31	315mm
3587	p1104	n1605	1.02	n1607	0.96	36	0.165	2.97	3.07	315mm
5350	CO-442	MH-755	0.65	n1559	0.73	19	0.4	4.15	4.22	200 mm
3574	p1091	n1587	1.8	n1588	1.74	39	0.154	3.51	3.48	315mm
3552	p1072	n1562	0.57	n1564	0.45	30	0.4	4.09	3.95	200 mm
5276	CO-298	n2156	2.62	n2154	2.74	43	0.28	7.56	7.35	250 mm
2903	p534	n807	3.52	n772	3.45	22	0.326	4.73	4.67	315mm
5387	CO-516	n527	3.45	n529	3.31	34	0.4	5.88	5.92	200 mm
4025	p1486	n2157	2.54	n2156	2.62	30	0.28	7.48	7.56	250 mm
2707	p343	n529	3.31	n531	3.19	30	0.4	5.92	5.94	200 mm
3542	p1064	n1552	1.45	n1554	1.33	39	0.306	4.3	4.18	200 mm
4026	p1487	n2158	2.44	n2157	2.54	35	0.28	7.46	7.48	250 mm

4398	p1788	n2592	2.37	n2594	2.46	23	0.4	7.76	7.87	200 mm
4027	p1488	n2159	2.37	n2158	2.44	25	0.28	7.54	7.46	250 mm
2708	p344	n531	3.19	n533	3.07	30	0.4	5.94	5.9	200 mm
4397	p1787	n2590	2.25	n2592	2.37	30	0.4	7.64	7.76	200 mm
4029	p1489	LS3	2.28	n2159	2.37	30	0.28	7.56	7.54	250 mm
2709	p345	n533	3.07	n534	2.98	23	0.4	5.9	5.86	200 mm
4031	p1491	n2163	6.2	n2162	6.29	30	0.28	7.43	7.45	250 mm
4033	p1492	n2164	6.12	n2163	6.2	30	0.282	7.47	7.43	250 mm
4396	p1786	n2588	2.13	n2590	2.25	30	0.4	7.59	7.64	200 mm
5184	p1785(2)	MH-12	2.07	n2588	2.13	15	0.4	7.72	7.59	200 mm
5274	CO-294	n2166	6.04	n2164	6.12	30	0.28	7.44	7.47	250 mm
4035	p1494	n2167	5.95	n2166	6.04	30	0.28	7.3	7.44	250 mm
3591	p1416	n1609	0.9	n2051	1	26	0.388	2.8	3.1	250 mm
4037	p1495	n2169	5.87	n2167	5.95	30	0.28	7.16	7.3	250 mm
4038	p1496	n2170	5.78	n2169	5.87	30	0.28	7.19	7.16	250 mm
5450	CO-606	MH-666	3.85	n811	3.97	41	0.302	5.06	5.26	315mm
4039	p1497	n2172	5.7	n2170	5.78	30	0.28	7.12	7.19	250 mm
4040	p1498	n2174	5.62	n2172	5.7	30	0.28	7.02	7.12	250 mm
4041	p1499	n2175	5.53	n2174	5.62	30	0.28	6.86	7.02	250 mm
3556	p1075(1)	n1567	0.21	MH-756	0.12	25	0.376	4.05	4.18	200 mm
3530	p1055(1)	n1540	2.39	MH-169	2.34	24	0.229	4.82	4.77	200 mm
3976	p1444	n2089	4.49	n2090	4.58	30	0.28	7.57	5.74	250 mm
3975	p1443	n2088	4.41	n2089	4.49	29	0.281	5.89	7.57	250 mm
2728	p361	n560	1.37	n561	1.31	22	0.28	5.76	5.78	250 mm
5322	CO-386	n2088	4.41	MH-120	4.29	43	0.28	5.89	6.42	250 mm
2730	p362	n561	1.31	n563	1.22	32	0.28	5.78	6.04	250 mm
5323	CO-388	MH-120	4.29	n2083	4.17	43	0.28	6.42	6.26	250 mm
3590	p1415	n2047	0.88	n1609	0.9	17	0.14	2.88	2.8	400mm
3939	p1414	n2045	0.83	n2047	0.88	30	0.14	2.5	2.88	400mm
5201	CO-154	n2083	4.17	n2082	4.08	33	0.28	6.26	6.36	250 mm
3938	p1413	n2044	0.79	n2045	0.83	30	0.14	2.34	2.5	400mm
2714	p349	n538	2.71	n540	2.59	28	0.423	5.85	5.81	200 mm
3937	p1412	n2042	0.75	n2044	0.79	30	0.14	2.22	2.34	400mm
3936	p1411	n2041	0.71	n2042	0.75	30	0.14	2.16	2.22	400mm
3968	p1438	n2080	3.99	n2082	4.08	30	0.28	6.62	6.36	250 mm
5329	CO-400	n2041	0.71	MH-749	0.65	43	0.14	2.16	2.24	400mm
5330	CO-402	MH-749	0.65	MH-747	0.6	36	0.14	2.24	2.31	400mm
3967	p1437	n2079	3.91	n2080	3.99	30	0.28	6.71	6.62	250 mm
5297	CO-340	MH-747	0.6	n2035	0.54	39	0.14	2.31	2.35	400mm
5298	CO-342	n2035	0.54	MH-743	0.51	22	0.14	2.35	2.28	400mm
5600	CO-686	n783	-0.46	WELL 2	-0.47	9	0.14	4.19	4	400mm
3965	p1436	n2078	3.82	n2079	3.91	30	0.28	6.78	6.71	250 mm
5205	CO-162	MH-743	0.51	n2032	0.46	36	0.14	2.28	3.5	400mm
3925	p1404	n2030	0.42	n2032	0.46	30	0.14	2.36	3.5	400mm
3563	p1080	n1572	2.53	n1574	2.4	30	0.423	3.69	3.62	250 mm
5299	CO-344	n2030	0.42	n2028	0.39	24	0.14	2.36	2.32	400mm
5321	CO-384	n2078	3.82	n2077	3.74	30	0.28	6.78	6.73	250 mm

3922	p1401	n2024	0.3	n2026	0.35	30	0.14	2.51	2.51	400mm
3921	p1400	n2022	0.26	n2024	0.3	30	0.14	2.69	2.51	400mm
3963	p1434	n2076	3.66	n2077	3.74	30	0.28	6.71	6.73	250 mm
3920	p1399	n2021	0.22	n2022	0.26	30	0.14	2.31	2.69	400mm
2731	p363	n563	1.22	LS 10	1.14	28	0.28	6.04	6.95	250 mm
3962	p1433	n2075	3.57	n2076	3.66	30	0.279	6.93	6.71	250 mm
3961	p1432	n2074	3.49	n2075	3.57	30	0.28	7.54	6.93	250 mm
5386	CO-514	n534	2.98	n537	2.83	37	0.4	5.86	5.81	200 mm
3960	p1431	n2072	3.41	n2074	3.49	30	0.28	7.99	7.54	250 mm
3959	p1430	n2071	3.32	n2072	3.41	30	0.28	6.48	7.99	250 mm
2713	p348	n537	2.83	n538	2.71	30	0.4	5.81	5.85	200 mm
3957	p1429	n2069	3.24	n2071	3.32	30	0.28	5.67	6.48	250 mm
2715	p350	n540	2.59	n541	2.47	30	0.401	5.81	5.86	200 mm
5385	CO-512	n541	2.47	n543	2.36	26	0.4	5.86	5.67	200 mm
4042	p1500	n2176	5.43	n2175	5.53	40	0.244	6.6	6.86	250 mm
2719	p353	n545	2.24	n547	2.11	34	0.4	5.64	5.74	200 mm
2720	p354	n547	2.11	n549	2	26	0.4	5.74	5.73	200 mm
2722	p355	n549	2	n551	1.88	30	0.4	5.73	5.69	200 mm
2723	p356	n551	1.88	n553	1.76	30	0.401	5.69	5.69	200 mm
2724	p357	n553	1.76	n555	1.64	30	0.4	5.69	5.74	200 mm
2725	p358	n555	1.64	n556	1.52	30	0.4	5.74	5.79	200 mm
5384	CO-510	n560	1.37	n556	1.52	38	0.4	5.76	5.79	200 mm
3554	p1073	n1564	0.45	n1565	0.33	41	0.296	3.95	3.97	200 mm
3923	p1402	n2026	0.35	n2028	0.39	35	0.12	2.51	2.32	400mm
5293	CO-332	n2067	1.77	n2065	1.7	25	0.28	5.51	5.22	250 mm
3951	p1425	n2063	1.62	n2065	1.7	30	0.28	5.16	5.22	250 mm
3950	p1424	n2062	1.53	n2063	1.62	30	0.28	4.76	5.16	250 mm
2717	p352	n543	2.36	n545	2.24	34	0.35	5.67	5.64	200 mm
5324	CO-390	n2062	1.53	n2059	1.41	45	0.28	4.76	4.32	250 mm
5327	CO-396	n2058	1.32	MH-154	1.19	46	0.28	3.94	3.38	250 mm
2913	p521	n787	2.74	n786	2.68	26	0.234	4.53	4.31	315mm
5328	CO-398	MH-154	1.19	n2053	1.09	39	0.28	3.38	3.22	250 mm
3559	p1077	n1569	-2.09	LS4	-2.14	19	0.281	4.14	4.01	250 mm
2734	p365	n566	7.06	n567	7.03	17	0.2	8.28	9.02	315mm
5611	CO-696	n2584	1.24	LS 2	1.22	4	0.4	7.57	7	200 mm
2930	p539	n813	4.09	n812	4.03	30	0.2	5.31	5.27	315mm
2929	p538	n812	4.03	n811	3.97	30	0.2	5.27	5.26	315mm
4391	p1782	n2581	6.29	n2582	6.41	30	0.4	7.55	7.53	200 mm
3940	p1417	n2051	1	n2053	1.09	33	0.252	3.1	3.22	250 mm
4390	p1781	n2580	6.17	n2581	6.29	30	0.4	7.6	7.55	200 mm
4389	p1780	n2578	6.05	n2580	6.17	30	0.4	7.55	7.6	200 mm
2902	p533	n772	3.45	n804	3.4	24	0.2	4.67	4.66	315mm
2916	p524	n791	2.92	n790	2.86	29	0.205	4.48	4.42	315mm
2924	p532	n804	3.4	n802	3.34	30	0.2	4.66	4.69	315mm
2923	p531	n802	3.34	n800	3.28	30	0.2	4.69	4.74	315mm
2922	p530	n800	3.28	n799	3.22	30	0.2	4.74	4.82	315mm
2921	p529	n799	3.22	n798	3.16	30	0.2	4.82	4.76	315mm

2920	p528	n798	3.16	n796	3.1	30	0.2	4.76	4.56	315mm
2918	p527	n796	3.1	n794	3.04	30	0.2	4.56	4.53	315mm
2919	CO-174	MH-670	2.96	n794	3.04	41	0.2	4.51	4.53	315mm
5395	CO-532	MH-670	2.96	n791	2.92	19	0.2	4.51	4.48	315mm
2915	p523	n790	2.86	n789	2.8	30	0.2	4.42	4.44	315mm
2912	p520	n786	2.68	n784	2.62	30	0.2	4.31	4.21	315mm
4384	p1777	n2573	4.38	n2575	4.41	6	0.4	7.28	7.3	200 mm
5270	CO-286	n2573	4.38	n2570	4.21	44	0.4	7.28	7.54	200 mm
4381	p1774	n2569	4.09	n2570	4.21	30	0.4	7.51	7.54	200 mm
5192	CO-140	n2569	4.09	n2566	3.93	40	0.4	7.51	7.48	200 mm
5605	CO-692	n2021	-3.49	O-4	-3.52	22	0.14	2.31	2	400mm
2914	p522	n789	2.8	n787	2.74	35	0.171	4.44	4.53	315mm
3946	p1421	n2058	1.32	n2059	1.41	45	0.187	3.94	4.32	250 mm

APPENDIX- VIII-FLEX TABLE-MANHOLE

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	n1	5.15	5.15	3.99	1.032	1.075	4.02	4.02	1.16
31	n2	5.49	5.49	4.37	0.387	0.43	4.39	4.39	1.12
39	n167	8.54	8.54	6.91	0.215	0.258	6.92	6.92	1.64
40	n168	8.21	8.21	6.98	0.172	0.215	7	7	1.23
41	n170	8.23	8.23	7.1	0.129	0.172	7.12	7.12	1.13
42	n171	8.4	8.4	7.23	0.086	0.129	7.24	7.24	1.17
43	n172	8.52	8.52	7.4	0.043	0.086	7.41	7.41	1.12
44	n174	9.01	9.01	7.9	0	0.043	7.9	7.9	1.12
45	n175	9.61	9.61	8.49	0.301	0.344	8.51	8.51	1.12
46	n177	10.24	10.24	9.12	0.258	0.301	9.13	9.13	1.12
47	n180	12.15	12.15	11.03	0.215	0.258	11.05	11.05	1.12
48	n181	14.28	14.28	13.16	0.172	0.215	13.17	13.17	1.12
49	n183	16.07	16.07	14.95	0.129	0.172	14.96	14.96	1.12
50	n185	17.89	17.89	16.77	0.086	0.129	16.78	16.78	1.12
51	n187	18.49	18.49	17.36	0.043	0.086	17.36	17.36	1.13
52	n188	18.78	18.78	17.66	0	0.043	17.67	17.67	1.12
54	n191	19.28	19.28	18.17	0	0.043	18.17	18.17	1.12
55	n193	18.88	18.88	17.76	0.043	0.086	17.77	17.77	1.12
56	n194	17.9	17.9	16.78	0.086	0.129	16.79	16.79	1.12
57	n196	17.13	17.13	16.01	0.559	0.602	16.03	16.03	1.12
58	n198	16.74	16.74	15.62	0.602	0.645	15.65	15.65	1.12
59	n199	15.98	15.98	14.86	0.645	0.688	14.88	14.88	1.12
60	n200	15.27	15.27	14.15	0.688	0.731	14.17	14.17	1.12
61	n201	14.85	14.85	13.73	0.731	0.774	13.75	13.75	1.12
62	n203	14.64	14.64	13.52	0.774	0.817	13.54	13.54	1.12
63	n205	14.13	14.13	13.01	0.817	0.86	13.04	13.04	1.12
64	n206	13.08	13.08	11.97	0.86	0.903	11.99	11.99	1.12
65	n208	11.49	11.49	10.38	0.903	0.946	10.4	10.4	1.12
66	n209	9.59	9.59	8.47	0.946	0.989	8.49	8.49	1.12
67	n211	7.68	7.68	6.56	0.989	1.032	6.59	6.59	1.12
69	n214	4.55	4.55	3.43	1.032	1.075	3.46	3.46	1.12
70	n216	4.97	4.97	3.31	1.075	1.118	3.34	3.34	1.66
71	n218	4.4	4.4	3.19	1.118	1.161	3.22	3.22	1.21
72	n220	4.09	4.09	2.97	1.161	1.204	3	3	1.12
73	n222	4.16	4.16	2.85	1.204	1.247	2.88	2.88	1.31
74	n223	4.06	4.06	0.46	5.154	5.197	0.53	0.53	3.6
75	n225	3.89	3.89	0.67	3.864	3.907	0.73	0.73	3.23
76	n227	4.1	4.1	0.79	3.821	3.864	0.85	0.85	3.31
77	n228	4.15	4.15	0.91	3.778	3.821	0.97	0.97	3.24

78	n229	4.15	4.15	1.03	3.735	3.778	1.09	1.09	3.12
79	n230	4.1	4.1	1.15	3.692	3.735	1.21	1.21	2.95
81	n233	4.23	4.23	1.32	3.649	3.692	1.38	1.38	2.91
82	n235	4.28	4.28	1.39	3.606	3.649	1.45	1.45	2.89
83	n236	4.22	4.22	1.51	3.563	3.606	1.57	1.57	2.72
84	n237	4.06	4.06	1.63	3.52	3.563	1.69	1.69	2.43
85	n238	4.05	4.05	1.67	3.477	3.52	1.73	1.73	2.38
86	n240	4.07	4.07	2.03	2.015	2.058	2.07	2.07	2.04
87	n241	3.97	3.97	2.15	1.972	2.015	2.2	2.2	1.82
88	n242	4.47	4.47	2.27	1.929	1.972	2.32	2.32	2.2
89	n244	5.03	5.03	2.39	1.886	1.929	2.44	2.44	2.64
90	n246	6.17	6.17	2.51	1.843	1.886	2.56	2.56	3.65
91	n247	7.01	7.01	2.63	1.8	1.843	2.67	2.67	4.38
92	n248	7.2	7.2	2.71	1.757	1.8	2.75	2.75	4.49
94	n252	6.37	6.37	2.87	1.628	1.671	2.91	2.91	3.5
95	n253	5.85	5.85	2.99	1.585	1.628	3.03	3.03	2.86
96	n254	5.63	5.63	3.11	1.542	1.585	3.15	3.15	2.52
97	n255	5.51	5.51	3.31	1.499	1.542	3.35	3.35	2.2
98	n257	5.54	5.54	3.47	0.295	0.338	3.49	3.49	2.07
99	n258	5.78	5.78	3.59	0.252	0.295	3.61	3.61	2.18
100	n260	5.96	5.96	3.71	0.209	0.252	3.73	3.73	2.25
101	n262	6.04	6.04	3.79	0.086	0.209	3.8	3.8	2.25
102	n264	5.66	5.66	3.95	4.251	4.294	4.02	4.02	1.71
103	n266	5.19	5.19	4.07	0	4.251	4.14	4.14	1.12
105	n270	4.41	4.41	-0.37	4.165	4.208	-0.31	-0.31	4.79
106	n272	4.25	4.25	-0.25	4.122	4.165	-0.19	-0.19	4.5
107	n274	4.12	4.12	-0.13	4.079	4.122	-0.07	-0.07	4.25
108	n275	4.16	4.16	-0.01	4.036	4.079	0.05	0.05	4.18
109	n276	4.32	4.32	0.11	3.993	4.036	0.17	0.17	4.21
110	n278	4.61	4.61	0.23	3.95	3.993	0.29	0.29	4.38
111	n280	4.67	4.67	0.35	3.907	3.95	0.41	0.41	4.33
112	n282	4.3	4.3	0.47	3.864	3.907	0.53	0.53	3.83
113	n283	4.31	4.31	0.59	3.821	3.864	0.65	0.65	3.73
114	n285	4.31	4.31	0.7	3.778	3.821	0.75	0.75	3.62
115	n287	4.28	4.28	3.08	1.069	1.112	3.11	3.11	1.2
116	n289	4.32	4.32	3.2	1.026	1.069	3.23	3.23	1.12
117	n291	4.63	4.63	3.32	0.983	1.026	3.35	3.35	1.32
118	n293	4.75	4.75	3.44	0.94	0.983	3.47	3.47	1.31
119	n294	4.68	4.68	3.56	0.897	0.94	3.59	3.59	1.12
120	n295	4.91	4.91	3.79	0.854	0.897	3.81	3.81	1.12
121	n296	5.44	5.44	4.32	0.811	0.854	4.34	4.34	1.12
122	n298	6.31	6.31	5.2	0.688	0.811	5.22	5.22	1.12
123	n300	7.6	7.6	6.48	0.805	0.848	6.51	6.51	1.12
124	n302	9.51	9.51	8.4	0.762	0.805	8.42	8.42	1.12
125	n304	11	11	9.88	0.719	0.762	9.91	9.91	1.12
126	n305	14.22	14.22	11.09	0.676	0.719	11.12	11.12	3.12
127	n307	12.28	12.28	11.16	0.633	0.676	11.18	11.18	1.12

128	n310	17.19	17.19	16.07	0.59	0.633	16.09	16.09	1.12
129	n311	20.38	20.38	19.26	0.547	0.59	19.28	19.28	1.12
130	n312	23.65	23.65	22.53	0.461	0.504	22.55	22.55	1.12
131	n313	26.88	26.88	25.77	0.375	0.418	25.78	25.78	1.12
133	n316	34.83	34.83	33.71	0.043	0.246	33.72	33.72	1.12
134	n318	39.12	39.12	38	0	0.203	38.01	38.01	1.12
136	n485	7.94	7.94	6.82	0.258	0.301	6.84	6.84	1.12
137	n487	7.75	7.75	6.63	0.301	0.344	6.64	6.64	1.12
138	n491	7.32	7.32	6.2	0.387	0.43	6.22	6.22	1.12
139	n492	7.17	7.17	6.04	0.43	0.473	6.06	6.06	1.12
140	n495	7.17	7.17	5.8	0.473	0.516	5.82	5.82	1.36
141	n496	6.99	6.99	5.68	0.516	0.559	5.7	5.7	1.31
142	n499	7.05	7.05	2.45	4.943	4.986	2.51	2.51	4.6
143	n501	6.81	6.81	2.33	4.986	5.029	2.4	2.4	4.48
144	n502	6.68	6.68	2.21	5.029	5.072	2.28	2.28	4.47
145	n504	6.6	6.6	2.09	5.072	5.115	2.16	2.16	4.51
146	n506	6.46	6.46	1.97	5.158	5.201	2.04	2.04	4.49
147	n508	6.52	6.52	1.85	5.201	5.244	1.92	1.92	4.67
148	n510	6.63	6.63	1.73	5.244	5.287	1.8	1.8	4.91
149	n511	6.62	6.62	1.61	5.33	5.373	1.68	1.68	5.02
150	n512	6.65	6.65	1.49	5.373	5.416	1.56	1.56	5.16
151	n513	6.5	6.5	1.37	5.416	5.459	1.44	1.44	5.13
152	n515	6.35	6.35	1.25	5.459	5.502	1.32	1.32	5.11
153	n516	6.39	6.39	1.13	5.502	5.545	1.2	1.2	5.26
154	n517	6.48	6.48	1.01	5.545	5.588	1.08	1.08	5.47
155	n518	6.41	6.41	0.89	6.663	6.706	0.97	0.97	5.52
157	n520	6.19	6.19	5.07	6.792	6.835	5.15	5.15	1.12
158	n521	6.28	6.28	4.96	6.878	6.921	5.04	5.04	1.32
160	n524	6.14	6.14	4.81	6.964	7.007	4.89	4.89	1.33
161	n526	5.99	5.99	4.71	7.007	7.05	4.79	4.79	1.28
162	n527	5.88	5.88	3.45	9.2	9.243	3.55	3.55	2.43
164	n529	5.92	5.92	3.31	9.243	9.286	3.41	3.41	2.61
165	n531	5.94	5.94	3.19	9.286	9.329	3.29	3.29	2.75
166	n533	5.9	5.9	3.07	9.329	9.372	3.17	3.17	2.83
167	n534	5.86	5.86	2.98	10.06	10.103	3.08	3.08	2.89
169	n537	5.81	5.81	2.83	10.103	10.146	2.93	2.93	2.98
170	n538	5.85	5.85	2.71	10.146	10.189	2.81	2.81	3.14
171	n540	5.81	5.81	2.59	10.189	10.232	2.69	2.69	3.22
172	n541	5.86	5.86	2.47	10.232	10.275	2.58	2.58	3.39
173	n543	5.67	5.67	2.36	10.275	10.318	2.47	2.47	3.3
174	n545	5.64	5.64	2.24	10.318	10.361	2.35	2.35	3.39
175	n547	5.74	5.74	2.11	10.361	10.404	2.21	2.21	3.63
176	n549	5.73	5.73	2	10.404	10.447	2.11	2.11	3.72
177	n551	5.69	5.69	1.88	10.447	10.49	1.99	1.99	3.81
178	n553	5.69	5.69	1.76	10.49	10.533	1.87	1.87	3.92
179	n555	5.74	5.74	1.64	10.533	10.576	1.75	1.75	4.1
180	n556	5.79	5.79	1.52	10.576	10.619	1.63	1.63	4.26

182	n560	5.76	5.76	1.37	14.875	14.918	1.5	1.5	4.39
183	n561	5.78	5.78	1.31	14.918	14.961	1.44	1.44	4.47
184	n563	6.04	6.04	1.22	15.219	15.262	1.35	1.35	4.82
186	n566	8.28	8.28	7.06	0	27.55	7.23	7.23	1.22
187	n567	9.02	9.02	7.03	27.593	27.636	7.16	7.16	1.99
188	n568	9.62	9.62	8.51	0	0.043	8.51	8.51	1.12
189	n569	10.76	10.76	9.64	0	0.043	9.65	9.65	1.12
190	n571	10.67	10.67	9.55	0.043	0.086	9.56	9.56	1.12
191	n573	9.72	9.72	8.61	0.086	3.784	8.66	8.66	1.12
196	n579	5.58	5.58	-0.07	5.368	5.411	0	0	5.64
197	n581	5.5	5.5	0.05	5.325	5.368	0.12	0.12	5.45
198	n582	5.45	5.45	0.17	5.282	5.325	0.24	0.24	5.28
199	n583	5.42	5.42	0.29	5.239	5.282	0.36	0.36	5.13
200	n584	5.39	5.39	0.41	5.196	5.239	0.48	0.48	4.98
201	n586	5.47	5.47	0.53	5.153	5.196	0.6	0.6	4.94
202	n588	5.46	5.46	0.56	5.11	5.153	0.63	0.63	4.89
203	n590	5.47	5.47	1.82	2.641	2.684	1.87	1.87	3.65
204	n592	5.61	5.61	1.94	2.598	2.641	1.99	1.99	3.67
205	n593	5.68	5.68	2.06	2.365	2.598	2.11	2.11	3.61
206	n594	5.76	5.76	2.13	2.452	2.495	2.18	2.18	3.62
207	n595	5.7	5.7	2.18	2.366	2.409	2.23	2.23	3.51
208	n596	5.67	5.67	2.3	2.323	2.366	2.35	2.35	3.37
209	n597	5.77	5.77	2.42	2.28	2.323	2.47	2.47	3.35
210	n598	5.81	5.81	2.54	2.194	2.237	2.59	2.59	3.27
211	n600	5.88	5.88	2.66	2.065	2.108	2.71	2.71	3.22
212	n602	5.89	5.89	2.78	2.022	2.065	2.83	2.83	3.11
213	n604	5.87	5.87	2.9	1.849	2.022	2.95	2.95	2.97
214	n606	5.94	5.94	3.02	1.806	1.979	3.07	3.07	2.92
215	n610	6	6	3.18	1.873	1.916	3.22	3.22	2.82
216	n614	5.78	5.78	3.36	1.185	1.228	3.39	3.39	2.43
217	n616	5.47	5.47	3.5	1.142	1.185	3.53	3.53	1.97
218	n617	5.48	5.48	3.62	1.099	1.142	3.65	3.65	1.86
219	n618	5.24	5.24	3.74	0.946	1.099	3.77	3.77	1.5
220	n620	4.94	4.94	3.82	0.903	1.046	3.85	3.85	1.12
240	n647	8.62	8.62	7.5	0.344	0.387	7.52	7.52	1.12
241	n648	8.25	8.25	7.13	0.387	0.43	7.15	7.15	1.12
242	n650	8.61	8.61	7.04	0.43	0.473	7.06	7.06	1.56
243	n651	7.7	7.7	6.58	0.516	0.559	6.6	6.6	1.12
244	n654	7.06	7.06	5.79	0.602	0.645	5.81	5.81	1.27
245	n656	6.76	6.76	5.64	0.688	0.731	5.67	5.67	1.12
246	n657	6.79	6.79	5.52	0.731	0.774	5.55	5.55	1.27
247	n659	6.7	6.7	5.4	0.774	0.817	5.43	5.43	1.3
248	n660	6.79	6.79	5.28	0.86	0.903	5.31	5.31	1.51
249	n663	6.52	6.52	5.05	1.032	1.075	5.08	5.08	1.47
250	n664	6.41	6.41	4.93	1.075	1.118	4.96	4.96	1.48
251	n666	6.24	6.24	4.81	1.118	1.161	4.85	4.85	1.42
252	n667	6.18	6.18	4.68	1.161	1.204	4.72	4.72	1.49

253	n669	6.11	6.11	4.56	1.204	1.247	4.6	4.6	1.55
254	n671	5.97	5.97	4.45	1.72	1.763	4.49	4.49	1.53
255	n672	17.27	17.27	16.15	0.387	0.43	16.17	16.17	1.12
256	n674	18.79	18.79	17.67	0.344	0.387	17.69	17.69	1.12
258	n676	19.31	19.31	17.97	0.215	0.258	17.99	17.99	1.34
259	n678	19.53	19.53	18.09	0.172	0.215	18.11	18.11	1.44
260	n679	19.89	19.89	18.21	0.129	0.172	18.23	18.23	1.67
261	n680	19.38	19.38	18.26	0.086	0.129	18.27	18.27	1.12
262	n682	19.94	19.94	18.82	0.043	0.086	18.83	18.83	1.12
263	n683	20.52	20.52	19.4	0	0.043	19.41	19.41	1.12
264	n684	20.65	20.65	19.53	0	0.043	19.54	19.54	1.12
265	n686	20.34	20.34	19.22	0.043	0.086	19.23	19.23	1.12
266	n687	19.29	19.29	18.17	0.129	0.172	18.18	18.18	1.12
267	n689	16.84	16.84	15.72	0.172	0.215	15.73	15.73	1.12
268	n690	12.07	12.07	10.95	0.258	0.301	10.97	10.97	1.12
269	n691	8.38	8.38	7.27	0.301	0.344	7.28	7.28	1.12
270	n692	6.85	6.85	5.73	0.344	0.387	5.75	5.75	1.12
271	n694	6.22	6.22	5.1	0.387	0.43	5.11	5.11	1.12
272	n696	5.95	5.95	4.41	1.763	1.806	4.45	4.45	1.53
273	n698	5.83	5.83	4.29	1.806	1.849	4.33	4.33	1.54
274	n699	5.88	5.88	4.17	1.849	1.892	4.22	4.22	1.71
275	n700	5.89	5.89	4.05	1.892	1.935	4.1	4.1	1.84
276	n701	5.8	5.8	3.93	1.935	1.978	3.98	3.98	1.87
277	n703	5.8	5.8	3.81	1.978	2.021	3.86	3.86	1.99
278	n704	5.75	5.75	3.69	2.021	2.064	3.74	3.74	2.06
279	n706	5.71	5.71	3.58	2.064	2.107	3.62	3.62	2.13
322	n772	4.67	4.67	3.45	28.066	28.109	3.63	3.63	1.22
323	n773	4.07	4.07	0.37	5.197	5.24	0.44	0.44	3.7
324	n774	4.21	4.21	0.25	5.24	5.283	0.32	0.32	3.96
325	n775	4.27	4.27	0.13	5.283	5.326	0.2	0.2	4.13
326	n776	4.16	4.16	0.01	5.326	5.369	0.09	0.09	4.15
327	n780	4.21	4.21	-0.22	5.412	5.455	-0.15	-0.15	4.43
328	n782	4.22	4.22	-0.34	5.455	5.498	-0.26	-0.26	4.56
329	n783	4.19	4.19	-0.46	34.209	34.252	-0.28	-0.28	4.65
330	n784	4.21	4.21	2.62	28.668	28.711	2.75	2.75	1.59
331	n786	4.31	4.31	2.68	28.625	28.668	2.86	2.86	1.63
332	n787	4.53	4.53	2.74	28.582	28.625	2.93	2.93	1.79
333	n789	4.44	4.44	2.8	28.539	28.582	2.99	2.99	1.64
334	n790	4.42	4.42	2.86	28.496	28.539	3.05	3.05	1.56
335	n791	4.48	4.48	2.92	28.453	28.496	3.11	3.11	1.56
336	n794	4.53	4.53	3.04	28.367	28.41	3.23	3.23	1.49
337	n796	4.56	4.56	3.1	28.324	28.367	3.28	3.28	1.47
338	n798	4.76	4.76	3.16	28.281	28.324	3.34	3.34	1.61
339	n799	4.82	4.82	3.22	28.238	28.281	3.4	3.4	1.61
340	n800	4.74	4.74	3.28	28.195	28.238	3.46	3.46	1.46
341	n802	4.69	4.69	3.34	28.152	28.195	3.52	3.52	1.36
342	n804	4.66	4.66	3.4	28.109	28.152	3.58	3.58	1.26

343	n807	4.73	4.73	3.52	28.023	28.066	3.7	3.7	1.22
344	n808	4.98	4.98	3.77	27.98	28.023	3.9	3.9	1.22
346	n811	5.26	5.26	3.97	27.851	27.894	4.13	4.13	1.29
347	n812	5.27	5.27	4.03	27.808	27.851	4.21	4.21	1.23
348	n813	5.31	5.31	4.09	27.765	27.808	4.27	4.27	1.22
349	n815	5.41	5.41	4.2	27.722	27.765	4.35	4.35	1.22
350	n816	5.67	5.67	4.45	27.679	27.722	4.59	4.59	1.22
351	n817	6.45	6.45	5.23	27.636	27.679	5.37	5.37	1.22
385	n865	4.35	4.35	1.79	1.376	1.419	1.82	1.82	2.57
386	n866	4.66	4.66	1.91	1.333	1.376	1.94	1.94	2.75
387	n868	4.94	4.94	2.02	1.247	1.29	2.06	2.06	2.92
388	n870	5.15	5.15	2.14	1.204	1.247	2.18	2.18	3.01
389	n872	4.96	4.96	2.26	1.161	1.204	2.3	2.3	2.7
390	n873	5.16	5.16	2.38	1.118	1.161	2.41	2.41	2.77
391	n875	5.33	5.33	2.5	1.032	1.075	2.54	2.54	2.82
392	n877	5.61	5.61	2.62	0.989	1.032	2.65	2.65	2.99
393	n878	5.71	5.71	2.74	0.946	0.989	2.77	2.77	2.97
394	n880	5.74	5.74	2.86	0.903	0.946	2.89	2.89	2.88
395	n882	5.85	5.85	2.98	0.86	0.903	3	3	2.87
396	n884	6.11	6.11	3.08	0.731	0.774	3.1	3.1	3.04
397	n885	6.04	6.04	3.2	0.645	0.688	3.22	3.22	2.84
398	n886	6.59	6.59	3.32	0.602	0.645	3.34	3.34	3.27
399	n887	7.38	7.38	3.44	0.559	0.602	3.46	3.46	3.95
400	n888	8.93	8.93	3.52	0.473	0.516	3.54	3.54	5.41
401	n889	9.02	9.02	3.64	0.43	0.473	3.66	3.66	5.38
402	n891	8.34	8.34	3.76	0.258	0.301	3.77	3.77	4.58
403	n893	7.87	7.87	3.88	0.215	0.258	3.89	3.89	3.99
404	n894	6.7	6.7	3.98	0.129	0.172	3.99	3.99	2.72
405	n896	5.9	5.9	4.1	0.086	0.129	4.11	4.11	1.8
406	n899	12.63	12.63	11.51	0	0.043	11.52	11.52	1.12
407	n900	15.19	15.19	14.07	0	0.043	14.07	14.07	1.12
408	n901	9.28	9.28	8.17	0.086	0.129	8.18	8.18	1.12
409	n902	6.83	6.83	5.71	0.129	0.172	5.72	5.72	1.12
410	n903	6.18	6.18	5.06	0.172	0.215	5.07	5.07	1.12
412	n906	6.55	6.55	5.43	0	0.043	5.44	5.44	1.12
413	n907	6.42	6.42	5.13	0.043	0.086	5.14	5.14	1.29
414	n909	5.88	5.88	4.76	0.086	0.129	4.77	4.77	1.12
415	n910	5.36	5.36	4.19	0.473	0.516	4.21	4.21	1.17
416	n911	5.16	5.16	3.79	1.118	1.161	3.82	3.82	1.37
417	n912	5.15	5.15	3.91	1.075	1.118	3.94	3.94	1.24
419	n918	5.41	5.41	4.29	0.301	0.344	4.31	4.31	1.12
420	n919	5.89	5.89	4.77	0.258	0.301	4.79	4.79	1.12
421	n920	6.61	6.61	5.49	0.215	0.258	5.5	5.5	1.12
422	n921	7.23	7.23	6.11	0.172	0.215	6.12	6.12	1.12
423	n923	8.61	8.61	6.91	0.129	0.172	6.93	6.93	1.7
425	n926	13.98	13.98	12.86	0	0.043	12.87	12.87	1.12
427	n929	13.46	13.46	12.34	0	0.043	12.35	12.35	1.12

428	n931	11.74	11.74	10.62	0.086	0.129	10.63	10.63	1.12
441	n954	4.08	4.08	0.81	2.623	2.666	0.86	0.86	3.26
442	n956	4.21	4.21	0.93	2.58	2.623	0.98	0.98	3.27
443	n958	4.37	4.37	1.05	2.537	2.58	1.1	1.1	3.32
444	n959	4.45	4.45	1.17	2.494	2.537	1.22	1.22	3.28
445	n960	4.46	4.46	1.29	2.451	2.494	1.34	1.34	3.16
446	n962	4.37	4.37	1.41	2.408	2.451	1.46	1.46	2.95
448	n964	4.55	4.55	1.65	2.322	2.365	1.7	1.7	2.89
449	n966	4.52	4.52	1.77	2.279	2.322	1.82	1.82	2.74
450	n968	4.52	4.52	1.89	2.236	2.279	1.94	1.94	2.63
451	n969	4.42	4.42	2.01	2.15	2.193	2.06	2.06	2.41
452	n971	4.46	4.46	2.13	2.107	2.15	2.18	2.18	2.32
453	n973	4.43	4.43	2.25	1.978	2.021	2.3	2.3	2.18
454	n974	4.46	4.46	2.37	1.892	1.935	2.41	2.41	2.08
455	n976	4.39	4.39	2.48	1.806	1.849	2.52	2.52	1.91
456	n977	4.44	4.44	2.65	1.72	1.763	2.69	2.69	1.8
457	n978	4.45	4.45	2.77	1.677	1.72	2.81	2.81	1.68
458	n981	4.52	4.52	2.91	1.634	1.677	2.95	2.95	1.61
459	n983	4.73	4.73	3.16	0.688	0.731	3.18	3.18	1.57
460	n984	4.76	4.76	3.28	0.602	0.645	3.3	3.3	1.48
461	n985	4.82	4.82	3.4	0.559	0.602	3.42	3.42	1.42
462	n986	4.78	4.78	3.52	0.516	0.559	3.54	3.54	1.26
463	n987	4.77	4.77	3.64	0.473	0.516	3.66	3.66	1.13
464	n988	4.88	4.88	3.76	0.43	0.473	3.78	3.78	1.12
465	n990	5.01	5.01	3.89	0.344	0.387	3.91	3.91	1.12
466	n992	5.31	5.31	4.19	0.301	0.344	4.21	4.21	1.12
467	n994	5.72	5.72	4.61	0.258	0.301	4.62	4.62	1.12
468	n996	6.73	6.73	5.61	0.215	0.258	5.62	5.62	1.12
469	n997	8	8	6.88	0.172	0.215	6.9	6.9	1.12
470	n999	9.23	9.23	8.12	0.129	0.172	8.13	8.13	1.12
471	n1000	11.34	11.34	10.23	0.086	0.129	10.24	10.24	1.12
472	n1001	13.56	13.56	12.44	0.043	0.086	12.45	12.45	1.12
474	n1004	11.74	11.74	10.62	0	0.043	10.62	10.62	1.12
475	n1006	9.31	9.31	8.2	0.086	0.129	8.2	8.2	1.12
476	n1007	8.09	8.09	6.97	0.129	0.172	6.99	6.99	1.12
477	n1009	6.71	6.71	5.59	0.172	0.215	5.6	5.6	1.12
478	n1010	5.91	5.91	4.79	0.215	0.258	4.81	4.81	1.12
479	n1012	5.51	5.51	4.39	0.258	0.301	4.4	4.4	1.12
480	n1013	5.53	5.53	4.27	0.301	0.344	4.29	4.29	1.26
481	n1014	5.67	5.67	4.15	0.344	0.387	4.17	4.17	1.52
482	n1015	5.62	5.62	4.01	0.473	0.516	4.03	4.03	1.61
483	n1018	5.64	5.64	3.78	0.559	0.602	3.81	3.81	1.86
485	n1022	11.91	11.91	10.79	0	0.043	10.8	10.8	1.12
486	n1023	10.69	10.69	9.57	0.043	0.086	9.58	9.58	1.12
487	n1024	9.66	9.66	8.54	0.086	0.129	8.55	8.55	1.12
488	n1026	11.22	11.22	8.41	0.129	0.172	8.42	8.42	2.81
489	n1027	12.68	12.68	8.29	0.172	0.215	8.3	8.3	4.39

490	n1029	12.99	12.99	8.27	0.215	0.258	8.28	8.28	4.73
491	n1031	12.01	12.01	8.15	0.258	0.301	8.17	8.17	3.86
492	n1032	9.23	9.23	8.03	0.301	0.344	8.05	8.05	1.2
494	n1036	7.61	7.61	6.49	0.43	0.473	6.51	6.51	1.12
495	n1038	7.4	7.4	6.28	0.473	0.516	6.3	6.3	1.12
496	n1040	6.43	6.43	5.31	0.516	0.559	5.33	5.33	1.12
498	n1044	5.16	5.16	4.04	0.559	0.602	4.06	4.06	1.12
499	n1045	4.66	4.66	3.54	0.602	0.645	3.56	3.56	1.12
500	n1047	4.57	4.57	3.42	0.645	0.688	3.44	3.44	1.16
501	n1048	4.59	4.59	3.3	0.688	0.731	3.32	3.32	1.29
502	n1050	4.47	4.47	3.18	0.731	0.774	3.2	3.2	1.29
503	n1052	4.57	4.57	3.06	0.774	0.817	3.08	3.08	1.51
504	n1053	4.53	4.53	2.94	0.817	0.86	2.96	2.96	1.59
512	n1064	6.66	6.66	2.88	4.212	4.255	2.94	2.94	3.78
513	n1065	6.67	6.67	3	3.653	3.696	3.06	3.06	3.67
514	n1068	6.45	6.45	3.24	3.481	3.524	3.3	3.3	3.2
515	n1069	6.44	6.44	3.36	3.438	3.481	3.42	3.42	3.08
516	n1070	6.26	6.26	3.48	3.395	3.438	3.54	3.54	2.78
517	n1072	6.21	6.21	3.6	3.352	3.395	3.66	3.66	2.61
518	n1074	6.12	6.12	3.74	3.223	3.266	3.79	3.79	2.38
519	n1076	6.24	6.24	3.86	3.137	3.18	3.91	3.91	2.38
520	n1077	6.38	6.38	3.98	3.094	3.137	4.03	4.03	2.4
521	n1078	6.5	6.5	4.1	3.051	3.094	4.15	4.15	2.4
522	n1079	6.46	6.46	4.22	2.965	3.008	4.27	4.27	2.24
523	n1081	7.05	7.05	4.34	2.922	2.965	4.39	4.39	2.71
524	n1082	7.38	7.38	4.46	2.879	2.922	4.51	4.51	2.93
525	n1084	7.45	7.45	4.51	2.836	2.879	4.57	4.57	2.94
526	n1085	6.82	6.82	2.51	4.341	4.384	2.57	2.57	4.31
527	n1087	6.55	6.55	2.63	4.298	4.341	2.69	2.69	3.92
528	n1088	6.57	6.57	2.75	4.255	4.298	2.81	2.81	3.82
529	n1090	6.59	6.59	4.48	0.473	0.516	4.5	4.5	2.1
530	n1092	6.58	6.58	4.6	0.43	0.473	4.62	4.62	1.97
531	n1093	6.6	6.6	4.72	0.387	0.43	4.74	4.74	1.87
532	n1094	6.66	6.66	4.84	0.301	0.344	4.86	4.86	1.82
533	n1096	7.36	7.36	5.01	0.215	0.258	5.02	5.02	2.35
534	n1097	6.68	6.68	5.11	0.172	0.215	5.13	5.13	1.57
535	n1099	6.75	6.75	5.23	0.129	0.172	5.25	5.25	1.52
536	n1101	6.78	6.78	5.4	0.043	0.086	5.41	5.41	1.38
537	n1102	7.02	7.02	5.9	0	0.043	5.91	5.91	1.12
538	n1103	9.59	9.59	7.2	0.387	0.43	7.22	7.22	2.39
539	n1104	9.55	9.55	7.36	0.172	0.215	7.37	7.37	2.19
540	n1106	9.4	9.4	7.48	0.129	0.172	7.49	7.49	1.92
541	n1107	9.29	9.29	7.61	0.086	0.129	7.62	7.62	1.69
542	n1109	9.24	9.24	7.78	0.043	0.086	7.79	7.79	1.46
543	n1110	9.2	9.2	8.08	0	0.043	8.09	8.09	1.12
544	n1112	9.13	9.13	8.01	0	0.043	8.02	8.02	1.12
545	n1116	9.05	9.05	6.81	0.702	0.745	6.83	6.83	2.25

546	n1117	8.6	8.6	6.69	0.645	0.948	6.72	6.72	1.91
547	n1119	8.18	8.18	6.57	0.731	1.034	6.6	6.6	1.61
548	n1121	8.12	8.12	6.45	1.034	1.077	6.48	6.48	1.67
549	n1122	8.26	8.26	6.33	1.077	1.12	6.36	6.36	1.93
550	n1123	8.49	8.49	6.21	1.12	1.163	6.24	6.24	2.28
551	n1124	8.44	8.44	6.09	1.163	1.206	6.12	6.12	2.35
552	n1126	8.44	8.44	5.29	2.32	2.363	5.34	5.34	3.15
553	n1127	8.48	8.48	5.2	2.363	2.406	5.24	5.24	3.28
554	n1129	8.45	8.45	5.08	2.406	2.449	5.13	5.13	3.37
555	n1131	8.36	8.36	4.96	2.449	2.492	5.01	5.01	3.4
556	n1132	8.12	8.12	4.84	2.492	2.535	4.89	4.89	3.28
557	n1133	7.86	7.86	4.74	2.707	2.75	4.79	4.79	3.12
558	n1135	7.81	7.81	4.72	2.75	2.793	4.77	4.77	3.09
559	n1136	7.6	7.6	4.6	2.793	2.836	4.65	4.65	3
560	n1138	7.46	7.46	6.35	0	0.043	6.35	6.35	1.12
561	n1139	7.3	7.3	6.04	0.043	0.086	6.05	6.05	1.26
562	n1141	7.15	7.15	5.87	0.086	0.129	5.88	5.88	1.28
563	n1142	7.07	7.07	5.77	0.43	0.473	5.79	5.79	1.3
564	n1144	6.98	6.98	5.7	0.473	0.516	5.72	5.72	1.27
565	n1146	6.87	6.87	5.6	0.731	0.774	5.63	5.63	1.27
567	n1149	6.76	6.76	5.48	0.774	0.817	5.51	5.51	1.28
568	n1151	6.73	6.73	5.61	0	0.043	5.62	5.62	1.12
569	n1152	6.53	6.53	5.31	0.043	0.086	5.31	5.31	1.22
570	n1153	6.41	6.41	5.13	0.086	0.129	5.14	5.14	1.27
571	n1154	6.31	6.31	5.01	0.129	0.172	5.02	5.02	1.3
572	n1155	6.22	6.22	4.89	0.172	0.215	4.9	4.9	1.33
573	n1157	6.17	6.17	4.77	0.215	0.258	4.78	4.78	1.41
574	n1158	6.24	6.24	4.65	0.258	0.301	4.66	4.66	1.59
575	n1160	6.2	6.2	4.53	0.301	0.344	4.54	4.54	1.67
576	n1161	6.19	6.19	1.34	3.244	3.287	1.4	1.4	4.84
577	n1163	6.14	6.14	1.41	2.857	2.9	1.46	1.46	4.73
578	n1165	5.96	5.96	1.53	2.814	2.857	1.58	1.58	4.43
579	n1167	5.86	5.86	1.57	2.771	2.814	1.62	1.62	4.29
580	n1169	6.11	6.11	3.86	1.352	1.395	3.89	3.89	2.25
581	n1170	6.11	6.11	3.98	1.266	1.309	4.02	4.02	2.13
582	n1171	6.38	6.38	4.1	1.223	1.266	4.14	4.14	2.28
583	n1172	7.5	7.5	4.22	1.18	1.223	4.26	4.26	3.28
584	n1174	8.15	8.15	4.28	1.137	1.18	4.31	4.31	3.87
585	n1175	6.33	6.33	4.34	0.129	0.172	4.35	4.35	1.99
586	n1176	6.03	6.03	4.47	0.086	0.129	4.48	4.48	1.57
587	n1177	6.14	6.14	4.64	0.043	0.086	4.65	4.65	1.5
588	n1179	6.06	6.06	4.94	0	0.043	4.95	4.95	1.12
624	n1228	7.33	7.33	4.1	1.72	1.763	4.14	4.14	3.23
625	n1232	7.34	7.34	4.45	1.591	1.634	4.49	4.49	2.89
626	n1234	7.54	7.54	4.57	1.548	1.591	4.61	4.61	2.97
627	n1236	7.68	7.68	4.69	1.505	1.548	4.73	4.73	2.99
628	n1238	8.04	8.04	4.81	1.462	1.505	4.85	4.85	3.24

629	n1239	8.1	8.1	4.93	1.419	1.462	4.97	4.97	3.18
630	n1240	8.16	8.16	5.05	1.333	1.376	5.08	5.08	3.11
631	n1241	8.26	8.26	5.17	1.29	1.333	5.2	5.2	3.09
632	n1242	8.34	8.34	5.29	1.204	1.247	5.32	5.32	3.05
633	n1244	8.43	8.43	5.41	1.161	1.204	5.44	5.44	3.02
634	n1246	8.59	8.59	5.53	1.118	1.161	5.56	5.56	3.06
635	n1247	8.72	8.72	5.65	1.075	1.118	5.68	5.68	3.07
636	n1248	8.93	8.93	5.77	0.989	1.032	5.8	5.8	3.16
637	n1250	9.22	9.22	6.01	0.817	0.86	6.03	6.03	3.21
638	n1251	9.41	9.41	6.13	0.774	0.817	6.15	6.15	3.29
639	n1252	9.6	9.6	6.25	0.731	0.774	6.27	6.27	3.35
640	n1253	9.7	9.7	6.37	0.688	0.731	6.39	6.39	3.33
641	n1254	9.65	9.65	6.49	0.645	0.688	6.51	6.51	3.16
642	n1256	8.67	8.67	6.61	0.602	0.645	6.63	6.63	2.06
643	n1258	10.03	10.03	6.73	0.559	0.602	6.75	6.75	3.3
644	n1260	10.15	10.15	6.85	0.516	0.559	6.87	6.87	3.31
645	n1261	10.06	10.06	6.97	0.473	0.516	6.99	6.99	3.09
646	n1262	9.96	9.96	7.09	0.43	0.473	7.11	7.11	2.88
647	n1264	9.54	9.54	7.32	0.129	0.172	7.34	7.34	2.22
648	n1265	9.57	9.57	7.45	0.086	0.129	7.46	7.46	2.12
649	n1266	9.41	9.41	7.62	0.043	0.086	7.63	7.63	1.79
650	n1267	9.19	9.19	8.07	0	0.043	8.08	8.08	1.12
651	n1268	8.5	8.5	7.39	0.512	0.555	7.41	7.41	1.12
652	n1269	8.3	8.3	7.18	0.555	0.598	7.21	7.21	1.12
653	n1270	9.44	9.44	8.32	0.469	0.512	8.34	8.34	1.12
654	n1271	11	11	9.88	0.383	0.426	9.9	9.9	1.12
655	n1272	13.97	13.97	12.86	0.34	0.383	12.87	12.87	1.12
656	n1273	15.99	15.99	14.87	0.297	0.34	14.89	14.89	1.12
657	n1274	16.68	16.68	15.56	0.129	0.211	15.58	15.58	1.12
658	n1276	19.14	19.14	18.02	0.086	0.129	18.03	18.03	1.12
659	n1277	20.93	20.93	19.64	0.043	0.086	19.65	19.65	1.29
660	n1279	21.06	21.06	19.95	0	0.043	19.95	19.95	1.12
661	n1281	19.52	19.52	18.4	0	0.043	18.41	18.41	1.12
662	n1283	18.34	18.34	17.22	0.043	0.086	17.23	17.23	1.12
663	n1284	17.01	17.01	15.89	0.172	0.215	15.9	15.9	1.12
665	n1287	11.32	11.32	10.2	0.301	0.344	10.21	10.21	1.12
666	n1289	9	9	7.88	0.387	0.43	7.9	7.9	1.12
667	n1291	7.93	7.93	6.81	0.43	0.473	6.83	6.83	1.12
668	n1293	7.16	7.16	6.04	0.473	0.516	6.06	6.06	1.12
669	n1296	6.19	6.19	5.08	0.602	0.645	5.1	5.1	1.12
670	n1297	5.96	5.96	4.84	0.688	0.731	4.87	4.87	1.12
671	n1298	5.69	5.69	4.57	0.731	0.774	4.6	4.6	1.12
672	n1299	6.62	6.62	4.45	0.774	0.817	4.48	4.48	2.17
673	n1300	5.28	5.28	4.16	0.86	0.903	4.19	4.19	1.12
674	n1301	5.18	5.18	4.04	0.946	0.989	4.07	4.07	1.13
675	n1303	5.26	5.26	3.92	1.032	1.075	3.96	3.96	1.34
676	n1305	5.28	5.28	3.8	1.075	1.118	3.84	3.84	1.47

677	n1307	5.35	5.35	3.68	1.118	1.161	3.72	3.72	1.67
678	n1309	5.49	5.49	3.56	1.161	1.204	3.6	3.6	1.92
679	n1311	5.51	5.51	3.44	1.204	1.247	3.48	3.48	2.06
680	n1313	5.31	5.31	3.32	1.247	1.29	3.36	3.36	1.98
681	n1314	5.31	5.31	3.2	1.29	1.333	3.24	3.24	2.11
682	n1315	7.81	7.81	6.69	0.129	0.172	6.7	6.7	1.12
683	n1316	8.5	8.5	7.38	0.086	0.129	7.39	7.39	1.12
684	n1318	10.47	10.47	9.35	0.043	0.086	9.36	9.36	1.12
685	n1319	13.21	13.21	12.09	0	0.043	12.09	12.09	1.12
686	n1320	9.02	9.02	6.84	0.616	0.659	6.86	6.86	2.18
687	n1321	8.53	8.53	6.96	0.573	0.616	6.98	6.98	1.57
688	n1323	8.55	8.55	7.08	0.53	0.573	7.1	7.1	1.47
689	n1325	8.46	8.46	7.2	0.444	0.487	7.22	7.22	1.26
690	n1326	8.44	8.44	7.32	0.401	0.444	7.34	7.34	1.12
691	n1328	8.62	8.62	7.5	0.358	0.401	7.51	7.51	1.12
692	n1329	8.91	8.91	7.79	0.315	0.358	7.81	7.81	1.12
693	n1331	10.08	10.08	8.96	0.272	0.315	8.97	8.97	1.12
694	n1332	11.39	11.39	10.27	0.229	0.272	10.29	10.29	1.12
695	n1334	14.65	14.65	13.53	0.043	0.186	13.54	13.54	1.12
696	n1337	7.19	7.19	6.07	0.129	0.172	6.09	6.09	1.12
697	n1338	7.97	7.97	6.85	0.086	0.129	6.86	6.86	1.12
698	n1339	9.32	9.32	8.2	0.043	0.086	8.21	8.21	1.12
699	n1340	11.84	11.84	10.73	0	0.043	10.73	10.73	1.12
700	n1341	6.46	6.46	4.76	1.032	1.075	4.79	4.79	1.7
701	n1342	6.44	6.44	4.88	0.989	1.032	4.91	4.91	1.56
702	n1344	6.43	6.43	5	0.946	0.989	5.03	5.03	1.43
703	n1345	6.54	6.54	5.12	0.903	0.946	5.15	5.15	1.42
704	n1346	6.6	6.6	5.24	0.86	0.903	5.27	5.27	1.35
705	n1348	6.61	6.61	5.36	0.817	0.86	5.39	5.39	1.25
706	n1351	6.37	6.37	5.25	0	0.043	5.25	5.25	1.12
707	n1352	7.49	7.49	6.37	0	0.043	6.38	6.38	1.12
708	n1353	6.09	6.09	4.97	0.043	0.086	4.98	4.98	1.12
709	n1354	6.09	6.09	4.79	0.086	0.129	4.81	4.81	1.29
711	n1357	5.57	5.57	4.45	0.172	0.215	4.47	4.47	1.12
712	n1359	5.43	5.43	4.32	0.258	0.301	4.33	4.33	1.12
713	n1360	5.3	5.3	4.18	0.301	0.344	4.2	4.2	1.12
714	n1362	5.47	5.47	4.06	0.344	0.387	4.08	4.08	1.4
715	n1364	5.46	5.46	3.94	0.387	0.43	3.96	3.96	1.52
716	n1366	5.38	5.38	3.83	0.516	0.559	3.85	3.85	1.55
717	n1368	5.38	5.38	3.71	0.559	0.602	3.73	3.73	1.67
718	n1370	5.55	5.55	3.59	0.602	0.645	3.61	3.61	1.96
719	n1371	5.82	5.82	3.47	0.645	0.688	3.49	3.49	2.35
720	n1374	7.66	7.66	5.41	0.473	0.516	5.43	5.43	2.25
721	n1376	7.51	7.51	5.53	0.387	0.43	5.55	5.55	1.99
722	n1377	7.5	7.5	5.65	0.344	0.387	5.66	5.66	1.85
723	n1379	8.06	8.06	5.76	0.301	0.344	5.78	5.78	2.29
724	n1380	7.38	7.38	5.88	0.258	0.301	5.9	5.9	1.49

725	n1382	7.3	7.3	6	0.215	0.258	6.02	6.02	1.29
726	n1383	7.43	7.43	6.12	0.172	0.215	6.14	6.14	1.31
727	n1384	7.56	7.56	6.24	0.129	0.172	6.26	6.26	1.31
728	n1386	7.59	7.59	6.37	0.086	0.129	6.38	6.38	1.22
729	n1387	7.66	7.66	6.54	0.043	0.086	6.55	6.55	1.12
730	n1388	8.48	8.48	7.36	0	0.043	7.37	7.37	1.12
731	n1389	7.45	7.45	3.98	2.107	2.15	4.02	4.02	3.48
732	n1390	7.89	7.89	6.7	0.258	0.301	6.71	6.71	1.19
733	n1391	7.94	7.94	6.82	0.215	0.258	6.83	6.83	1.12
734	n1393	8.12	8.12	7	0.172	0.215	7.01	7.01	1.12
735	n1394	8.29	8.29	7.17	0.129	0.172	7.18	7.18	1.12
737	n1396	8.84	8.84	7.73	0	0.043	7.73	7.73	1.12
738	n1397	8.89	8.89	7.77	0	0.043	7.78	7.78	1.12
739	n1399	8.63	8.63	7.47	0.043	0.086	7.48	7.48	1.17
740	n1400	8.29	8.29	7.17	0.129	0.172	7.18	7.18	1.12
741	n1401	8.25	8.25	7.05	0.172	0.215	7.07	7.07	1.2
742	n1402	8.13	8.13	6.93	0.215	0.258	6.95	6.95	1.2
743	n1403	7.99	7.99	6.81	0.258	0.301	6.83	6.83	1.18
744	n1405	7.81	7.81	6.69	0.301	0.344	6.71	6.71	1.12
745	n1407	7.7	7.7	6.57	0.344	0.387	6.59	6.59	1.13
746	n1408	7.56	7.56	6.45	0.387	0.43	6.47	6.47	1.12
747	n1410	7.5	7.5	6.33	0.43	0.473	6.34	6.34	1.17
748	n1411	7.31	7.31	5.59	0.688	0.731	5.62	5.62	1.71
750	n1414	7.25	7.25	5.74	0.172	0.215	5.75	5.75	1.51
751	n1415	6.98	6.98	5.86	0.129	0.172	5.87	5.87	1.12
752	n1416	7.21	7.21	6.09	0.086	0.129	6.1	6.1	1.12
753	n1417	7.8	7.8	6.37	0.043	0.086	6.38	6.38	1.43
754	n1419	7.79	7.79	6.67	0	0.043	6.68	6.68	1.12
755	n1420	7.04	7.04	5.92	0	0.043	5.92	5.92	1.12
756	n1421	6.85	6.85	5.61	0.043	0.086	5.62	5.62	1.24
757	n1422	6.91	6.91	5.44	0.086	0.129	5.45	5.45	1.47
758	n1423	6.66	6.66	5.32	0.129	0.172	5.33	5.33	1.34
759	n1425	6.75	6.75	5.2	0.172	0.215	5.21	5.21	1.55
760	n1426	6.55	6.55	5.08	0.215	0.258	5.09	5.09	1.48
762	n1429	7.16	7.16	4.84	0.301	0.344	4.85	4.85	2.32
763	n1431	6.76	6.76	4.72	0.43	0.473	4.74	4.74	2.05
764	n1432	7.27	7.27	4.6	0.473	0.516	4.62	4.62	2.67
765	n1434	7.18	7.18	4.48	0.516	0.559	4.5	4.5	2.71
766	n1435	6.96	6.96	4.36	0.602	0.645	4.38	4.38	2.61
768	n1438	6.99	6.99	4.12	0.688	0.731	4.15	4.15	2.87
769	n1440	6.84	6.84	4	0.774	0.817	4.03	4.03	2.84
771	n1443	6.72	6.72	3.76	0.946	0.989	3.79	3.79	2.96
772	n1444	6.7	6.7	3.64	1.032	1.075	3.67	3.67	3.06
774	n1447	7.07	7.07	3.4	1.247	1.29	3.44	3.44	3.66
775	n1448	6.73	6.73	3.28	1.29	1.333	3.32	3.32	3.44
776	n1449	6.74	6.74	3.16	1.333	1.376	3.2	3.2	3.58
777	n1451	6.84	6.84	3.04	1.376	1.419	3.08	3.08	3.79

778	n1453	6.75	6.75	2.92	1.419	1.462	2.96	2.96	3.83
779	n1454	6.56	6.56	2.8	2.926	2.969	2.85	2.85	3.76
780	n1456	6.23	6.23	2.68	2.969	3.012	2.73	2.73	3.55
781	n1458	6.13	6.13	2.56	3.012	3.055	2.61	2.61	3.57
782	n1460	6.16	6.16	2.44	3.055	3.098	2.5	2.5	3.72
783	n1462	6.26	6.26	2.32	3.098	3.141	2.38	2.38	3.94
784	n1463	6.95	6.95	2.2	3.141	3.184	2.26	2.26	4.75
785	n1465	6.48	6.48	2.14	3.227	3.27	2.19	2.19	4.34
786	n1466	7.55	7.55	3.86	2.15	2.193	3.91	3.91	3.69
787	n1467	7.44	7.44	3.74	2.193	2.236	3.79	3.79	3.69
790	n1472	7.22	7.22	3.47	3.096	3.139	3.52	3.52	3.75
791	n1474	7.42	7.42	3.39	3.139	3.182	3.45	3.45	4.02
792	n1476	7.61	7.61	3.27	3.225	3.268	3.33	3.33	4.33
793	n1477	8.36	8.36	3.15	3.268	3.311	3.21	3.21	5.21
795	n1480	11.64	11.64	10.52	0	3.354	10.57	10.57	1.12
796	n1481	10.55	10.55	9.43	3.354	3.397	9.48	9.48	1.12
797	n1483	8.61	8.61	7.49	3.397	3.44	7.54	7.54	1.12
798	n1485	8	8	6.29	4.988	5.031	6.36	6.36	1.71
799	n1487	7.86	7.86	6.23	5.031	5.074	6.3	6.3	1.62
800	n1489	7.38	7.38	6.11	5.074	5.117	6.18	6.18	1.27
801	n1491	7.28	7.28	5.99	5.117	5.16	6.06	6.06	1.29
802	n1493	7.22	7.22	5.87	5.16	5.203	5.94	5.94	1.35
803	n1495	7.05	7.05	5.75	5.203	5.246	5.82	5.82	1.29
805	n1498	6.37	6.37	4.58	6.407	6.45	4.66	4.66	1.79
806	n1499	6.74	6.74	5.53	5.289	5.332	5.59	5.59	1.21
807	n1501	7.29	7.29	5.47	0.731	0.774	5.5	5.5	1.82
808	n1503	7.43	7.43	5.35	0.774	0.817	5.38	5.38	2.08
810	n1505	9.79	9.79	5.11	0.86	0.903	5.14	5.14	4.68
812	n1509	6.95	6.95	4.91	0.946	0.989	4.94	4.94	2.04
813	n1510	6.76	6.76	4.79	0.989	1.032	4.82	4.82	1.97
814	n1511	6.6	6.6	4.67	1.032	1.075	4.7	4.7	1.93
816	n1515	6.14	6.14	4.43	6.45	6.493	4.51	4.51	1.71
817	n1516	6.06	6.06	4.31	6.493	6.536	4.39	4.39	1.75
818	n1518	5.99	5.99	4.19	6.536	6.579	4.27	4.27	1.8
819	n1520	6.06	6.06	4.07	6.579	6.622	4.15	4.15	1.99
820	n1521	5.98	5.98	3.95	6.622	6.665	4.03	4.03	2.02
821	n1522	6.01	6.01	3.83	6.665	6.708	3.91	3.91	2.17
822	n1524	5.83	5.83	3.71	6.708	6.751	3.79	3.79	2.12
823	n1525	5.73	5.73	3.59	6.751	6.794	3.67	3.67	2.14
824	n1526	5.97	5.97	3.47	6.794	6.837	3.55	3.55	2.5
825	n1528	5.91	5.91	3.35	6.837	6.88	3.43	3.43	2.56
826	n1530	5.83	5.83	3.23	6.88	6.923	3.31	3.31	2.59
827	n1531	5.76	5.76	3.11	6.923	6.966	3.2	3.2	2.65
828	n1533	5.66	5.66	2.99	6.966	7.009	3.08	3.08	2.67
829	n1534	5.57	5.57	2.88	7.138	7.181	2.96	2.96	2.69
830	n1536	5.35	5.35	2.75	7.224	7.267	2.84	2.84	2.6
831	n1537	5.19	5.19	2.63	7.267	7.31	2.72	2.72	2.55

832	n1538	5.01	5.01	2.51	7.31	7.353	2.6	2.6	2.49
833	n1540	4.82	4.82	2.39	7.353	7.396	2.48	2.48	2.43
835	n1542	4.55	4.55	2.23	7.783	7.826	2.32	2.32	2.32
836	n1544	4.28	4.28	2.16	7.826	7.869	2.25	2.25	2.12
837	n1546	4.22	4.22	2.04	7.869	7.912	2.13	2.13	2.18
838	n1547	4.32	4.32	1.92	7.912	7.955	2.01	2.01	2.4
839	n1549	4.37	4.37	1.8	7.955	7.998	1.89	1.89	2.57
840	n1550	4.36	4.36	1.69	7.998	8.041	1.78	1.78	2.67
841	n1551	4.39	4.39	1.57	8.041	8.084	1.66	1.66	2.82
842	n1552	4.3	4.3	1.45	8.084	8.127	1.54	1.54	2.85
843	n1554	4.18	4.18	1.33	8.127	8.17	1.42	1.42	2.85
844	n1555	4.28	4.28	1.21	8.17	8.213	1.3	1.3	3.06
845	n1556	4.49	4.49	1.09	8.213	8.256	1.18	1.18	3.4
846	n1557	4.19	4.19	0.97	8.256	8.299	1.06	1.06	3.22
848	n1559	4.22	4.22	0.73	9.073	9.116	0.83	0.83	3.49
850	n1562	4.09	4.09	0.57	9.159	9.202	0.67	0.67	3.52
851	n1564	3.95	3.95	0.45	9.202	9.245	0.55	0.55	3.5
852	n1565	3.97	3.97	0.33	9.245	9.288	0.43	0.43	3.64
853	n1567	4.05	4.05	0.21	9.288	9.331	0.31	0.31	3.84
855	n1569	4.14	4.14	-2.09	17.171	17.214	-1.95	-1.95	6.23
857	n1571	3.86	3.86	2.7	0	18.618	2.82	2.82	1.16
858	n1572	3.69	3.69	2.53	18.618	18.661	2.66	2.66	1.16
859	n1574	3.62	3.62	2.4	18.661	18.704	2.54	2.54	1.22
860	n1575	3.7	3.7	2.34	18.704	18.747	2.48	2.48	1.36
861	n1576	3.7	3.7	2.28	18.747	18.79	2.42	2.42	1.42
862	n1578	3.69	3.69	2.22	18.79	18.833	2.36	2.36	1.47
863	n1579	3.72	3.72	2.16	18.833	18.876	2.3	2.3	1.56
864	n1581	3.64	3.64	2.1	18.876	18.919	2.24	2.24	1.54
865	n1582	3.6	3.6	2.04	18.919	18.962	2.18	2.18	1.56
866	n1583	3.56	3.56	1.98	18.962	19.005	2.12	2.12	1.58
867	n1584	3.53	3.53	1.92	19.005	19.048	2.06	2.06	1.61
868	n1585	3.5	3.5	1.86	19.048	19.091	2	2	1.64
869	n1587	3.51	3.51	1.8	19.091	19.134	1.94	1.94	1.71
870	n1588	3.48	3.48	1.74	19.134	19.177	1.88	1.88	1.74
871	n1590	3.38	3.38	1.68	19.177	19.22	1.82	1.82	1.7
872	n1592	3.3	3.3	1.62	19.22	19.263	1.76	1.76	1.68
873	n1593	3.35	3.35	1.56	19.263	19.306	1.7	1.7	1.79
874	n1594	3.23	3.23	1.5	19.306	19.349	1.64	1.64	1.73
875	n1595	3.11	3.11	1.44	19.349	19.392	1.58	1.58	1.67
876	n1597	3.12	3.12	1.38	19.392	19.435	1.52	1.52	1.74
877	n1599	3.13	3.13	1.32	19.435	19.478	1.46	1.46	1.81
878	n1600	2.98	2.98	1.26	19.478	19.521	1.4	1.4	1.72
879	n1602	2.91	2.91	1.2	19.521	19.564	1.34	1.34	1.71
880	n1603	2.88	2.88	1.14	19.564	19.607	1.28	1.28	1.74
881	n1604	2.89	2.89	1.08	19.607	19.65	1.23	1.23	1.81
882	n1605	2.97	2.97	1.02	19.65	19.693	1.17	1.17	1.95
883	n1607	3.07	3.07	0.96	19.693	19.736	1.13	1.13	2.11

885	n1609	2.8	2.8	0.9	36.712	36.755	1.1	1.1	1.9
886	n1610	6.64	6.64	5.52	0.774	0.817	5.55	5.55	1.12
887	n1611	7.59	7.59	6.47	0.688	0.731	6.5	6.5	1.12
888	n1613	9.62	9.62	7.38	0.645	0.688	7.4	7.4	2.25
889	n1615	8.61	8.61	7.49	0.602	0.645	7.52	7.52	1.12
890	n1617	10.4	10.4	9.28	0.559	0.602	9.3	9.3	1.12
892	n1619	15.75	15.75	14.63	0.473	0.516	14.65	14.65	1.12
893	n1621	18.78	18.78	17.66	0.43	0.473	17.68	17.68	1.12
895	n1624	27.22	27.22	26.1	0.344	0.387	26.11	26.11	1.12
896	n1626	31.6	31.6	30.49	0.258	0.301	30.5	30.5	1.12
897	n1627	34.39	34.39	33.2	0.172	0.215	33.21	33.21	1.2
898	n1628	36.2	36.2	33.32	0.086	0.129	33.33	33.33	2.88
899	n1629	35.87	35.87	33.49	0.043	0.086	33.5	33.5	2.37
900	n1631	34.97	34.97	33.85	0	0.043	33.86	33.86	1.12
901	n1632	9.73	9.73	6.7	0.559	0.922	6.73	6.73	3.03
902	n1633	10.18	10.18	6.73	0.516	1.029	6.76	6.76	3.45
903	n1635	11.07	11.07	9.81	0.043	0.406	9.83	9.83	1.26
904	n1636	11.05	11.05	9.93	0	0.363	9.95	9.95	1.12
905	n1637	10.19	10.19	9.07	0	0.043	9.08	9.08	1.12
906	n1639	8.85	8.85	7.73	0.043	0.086	7.74	7.74	1.12
907	n1641	7.77	7.77	6.65	0.086	0.129	6.66	6.66	1.12
908	n1643	7.2	7.2	6.08	0.129	0.172	6.09	6.09	1.12
909	n1644	7.09	7.09	5.97	1.423	1.466	6.01	6.01	1.12
911	n1648	6.39	6.39	1.66	1.122	1.165	1.69	1.69	4.73
912	n1650	6.45	6.45	1.77	0.993	1.036	1.8	1.8	4.68
913	n1651	6.4	6.4	1.89	0.95	0.993	1.92	1.92	4.51
914	n1652	6.27	6.27	2.01	0.907	0.95	2.04	2.04	4.26
915	n1653	6.37	6.37	2.13	0.864	0.907	2.16	2.16	4.24
916	n1655	6.3	6.3	2.25	0.821	0.864	2.28	2.28	4.05
917	n1657	6.18	6.18	2.37	0.778	0.821	2.4	2.4	3.8
918	n1659	6.05	6.05	2.45	0.735	0.778	2.47	2.47	3.6
919	n1660	6.01	6.01	4.89	0	0.043	4.89	4.89	1.12
920	n1662	6	6	4.58	0.043	0.086	4.59	4.59	1.41
921	n1664	5.86	5.86	4.41	0.086	0.129	4.42	4.42	1.45
922	n1666	5.35	5.35	1.93	1.892	1.935	1.97	1.97	3.43
923	n1668	5.49	5.49	1.98	1.72	1.763	2.02	2.02	3.51
924	n1670	5.34	5.34	2.1	1.677	1.72	2.14	2.14	3.24
925	n1672	5.31	5.31	2.18	1.634	1.677	2.22	2.22	3.12
926	n1674	5.29	5.29	2.3	1.591	1.634	2.34	2.34	2.99
927	n1675	5.29	5.29	2.42	1.548	1.591	2.46	2.46	2.86
928	n1677	5.27	5.27	2.52	1.505	1.548	2.55	2.55	2.75
929	n1682	5.43	5.43	2.78	1.376	1.419	2.82	2.82	2.65
931	n1686	5.34	5.34	3.02	1.29	1.333	3.05	3.05	2.33
932	n1688	5.31	5.31	3.1	1.247	1.29	3.14	3.14	2.21
933	n1690	5.28	5.28	3.22	1.204	1.247	3.26	3.26	2.06
934	n1692	5.32	5.32	3.34	1.161	1.204	3.37	3.37	1.98
935	n1694	5.42	5.42	3.46	1.075	1.118	3.49	3.49	1.96

936	n1695	5.56	5.56	3.58	1.032	1.075	3.61	3.61	1.98
937	n1697	5.66	5.66	3.7	0.989	1.032	3.73	3.73	1.96
938	n1699	5.57	5.57	3.82	0.946	0.989	3.85	3.85	1.75
939	n1701	5.48	5.48	3.94	0.903	0.946	3.97	3.97	1.53
940	n1703	5.45	5.45	4.06	0.86	0.903	4.09	4.09	1.38
941	n1706	5.42	5.42	4.3	0.774	0.817	4.32	4.32	1.12
942	n1708	6.01	6.01	4.89	0.731	0.774	4.91	4.91	1.12
943	n1711	6.43	6.43	5.31	0.645	0.688	5.33	5.33	1.12
944	n1712	6.78	6.78	5.66	0.602	0.645	5.68	5.68	1.12
945	n1714	7.73	7.73	6.61	0.559	0.602	6.63	6.63	1.12
946	n1715	9.5	9.5	8.38	0.516	0.559	8.4	8.4	1.12
947	n1716	12.29	12.29	10.24	0.43	0.473	10.26	10.26	2.05
948	n1717	12.07	12.07	10.36	0.387	0.43	10.38	10.38	1.7
950	n1720	11.77	11.77	10.65	0.301	0.344	10.67	10.67	1.12
956	n1728	14.87	14.87	13.75	0.258	0.301	13.76	13.76	1.12
957	n1729	16.43	16.43	15.31	0.215	0.258	15.32	15.32	1.12
958	n1731	17.17	17.17	16.05	0.172	0.215	16.06	16.06	1.12
959	n1733	18.12	18.12	17	0.129	0.172	17.01	17.01	1.12
960	n1735	18.55	18.55	17.44	0.086	0.129	17.44	17.44	1.12
961	n1736	19.57	19.57	18.45	0.043	0.086	18.46	18.46	1.12
962	n1739	19.03	19.03	17.91	0	0.043	17.92	17.92	1.12
963	n1740	17.64	17.64	16.5	0.086	0.129	16.51	16.51	1.14
964	n1741	17.72	17.72	16.6	0	0.043	16.61	16.61	1.12
965	n1742	18.24	18.24	17.12	0	0.043	17.13	17.13	1.12
966	n1743	19.01	19.01	16.82	0.043	0.086	16.83	16.83	2.19
967	n1746	14.53	14.53	13.41	0.129	0.362	13.43	13.43	1.12
968	n1747	10.26	10.26	9.14	0.362	0.405	9.16	9.16	1.12
969	n1748	7.35	7.35	6.23	0.835	0.878	6.26	6.26	1.12
970	n1749	6.69	6.69	5.57	0.878	0.921	5.6	5.6	1.12
971	n1751	9.13	9.13	5.46	0.921	0.964	5.48	5.48	3.68
972	n1752	6.91	6.91	5.34	0.964	1.007	5.37	5.37	1.57
973	n1755	5.03	5.03	3.91	1.05	1.093	3.94	3.94	1.12
974	n1756	7.86	7.86	6.74	0.387	0.43	6.76	6.76	1.12
975	n1757	8.68	8.68	7.56	0.344	0.387	7.58	7.58	1.12
976	n1758	10.09	10.09	8.97	0.301	0.344	8.99	8.99	1.12
977	n1759	11.88	11.88	10.76	0.258	0.301	10.78	10.78	1.12
978	n1761	12.48	12.48	11.36	0.215	0.258	11.37	11.37	1.12
979	n1763	14.08	14.08	12.96	0.172	0.215	12.97	12.97	1.12
980	n1766	15.41	15.41	14.29	0.129	0.172	14.3	14.3	1.12
981	n1769	5.84	5.84	0.98	2.279	2.322	1.02	1.02	4.87
982	n1770	5.73	5.73	0.86	2.322	2.365	0.9	0.9	4.87
983	n1771	5.78	5.78	1.09	2.193	2.236	1.13	1.13	4.7
984	n1772	6.11	6.11	1.21	2.15	2.193	1.25	1.25	4.9
985	n1773	8.51	8.51	1.33	2.107	2.15	1.37	1.37	7.18
986	n1774	6.83	6.83	1.45	2.064	2.107	1.49	1.49	5.38
987	n1776	6.22	6.22	1.57	2.021	2.064	1.61	1.61	4.65
988	n1778	5.96	5.96	1.69	1.978	2.021	1.73	1.73	4.27

989	n1780	5.82	5.82	1.81	1.935	1.978	1.85	1.85	4.01
990	n1782	5.65	5.65	0.74	2.494	2.537	0.79	0.79	4.91
991	n1784	5.64	5.64	0.72	2.752	2.795	0.77	0.77	4.93
992	n1786	5.61	5.61	0.62	2.838	2.881	0.67	0.67	4.99
993	n1788	5.57	5.57	0.52	2.881	2.924	0.57	0.57	5.05
1021	n1827	5.63	5.63	4.51	3.784	3.827	4.56	4.56	1.12
1022	n1828	5.43	5.43	4.31	3.827	3.87	4.37	4.37	1.12
1024	n1832	5.53	5.53	4.01	4.085	4.128	4.07	4.07	1.52
1025	n1833	5.48	5.48	3.89	4.214	4.257	3.95	3.95	1.59
1026	n1834	5.73	5.73	3.77	4.3	4.343	3.83	3.83	1.96
1027	n1835	5.59	5.59	3.65	0.688	3.784	3.7	3.7	1.94
1031	n1841	5.1	5.1	0.4	2.924	2.967	0.45	0.45	4.7
1032	n1842	5.8	5.8	4.68	0.086	0.129	4.69	4.69	1.12
1033	n1844	6.16	6.16	5.05	0.043	0.086	5.05	5.05	1.12
1034	n1846	5.39	5.39	3.66	0.172	0.215	3.67	3.67	1.74
1035	n1848	5.36	5.36	3.78	0.129	0.172	3.79	3.79	1.58
1036	n1849	5.38	5.38	3.9	0.086	0.129	3.91	3.91	1.48
1037	n1851	5.42	5.42	4.08	0.043	0.086	4.08	4.08	1.34
1038	n1853	5.38	5.38	4.26	0	0.043	4.27	4.27	1.12
1039	n1854	5.56	5.56	4.44	0	0.043	4.45	4.45	1.12
1042	n1857	5.43	5.43	1.22	3.287	3.33	1.28	1.28	4.21
1043	n1858	5.38	5.38	1.1	3.33	3.373	1.16	1.16	4.28
1044	n1861	5.35	5.35	0.87	3.459	3.502	0.92	0.92	4.49
1045	n1863	5.24	5.24	0.75	3.182	3.525	0.8	0.8	4.49
1046	n1864	5.31	5.31	0.63	3.525	3.568	0.68	0.68	4.69
1047	n1865	5.22	5.22	0.5	3.611	3.654	0.56	0.56	4.72
1048	n1867	5.23	5.23	0.38	3.654	3.697	0.44	0.44	4.85
1049	n1869	5.09	5.09	0.26	3.697	3.74	0.32	0.32	4.83
1050	n1871	5.17	5.17	0.14	3.74	3.783	0.2	0.2	5.03
1051	n1872	5.32	5.32	0.02	3.783	3.826	0.08	0.08	5.3
1052	n1874	5.23	5.23	-0.08	3.826	3.869	-0.02	-0.02	5.31
1053	n1877	5.4	5.4	4.28	0	3.912	4.34	4.34	1.12
1054	n1879	5.41	5.41	4.16	3.912	3.955	4.23	4.23	1.24
1055	n1881	5.32	5.32	4.04	3.955	3.998	4.11	4.11	1.28
1056	n1882	5.49	5.49	3.92	3.998	4.041	3.99	3.99	1.57
1057	n1884	5.47	5.47	3.8	4.041	4.084	3.87	3.87	1.66
1058	n1885	5.31	5.31	3.74	4.084	4.127	3.8	3.8	1.58
1059	n1887	5.46	5.46	4.34	0	0.043	4.34	4.34	1.12
1060	n1888	5.55	5.55	4.03	0.043	0.086	4.04	4.04	1.52
1062	n1891	4.97	4.97	3.77	0.129	0.172	3.78	3.78	1.2
1063	n1892	5.49	5.49	3.65	0.172	0.215	3.66	3.66	1.84
1064	n1893	5.71	5.71	3.53	0.215	0.258	3.54	3.54	2.18
1065	n1894	5.39	5.39	3.38	4.213	4.256	3.43	3.43	2.01
1066	n1895	5.03	5.03	3.5	4.17	4.213	3.56	3.56	1.54
1067	n1896	5.07	5.07	3.62	4.127	4.17	3.68	3.68	1.45
1068	n1897	7.97	7.97	6.85	0.344	0.387	6.87	6.87	1.12
1069	n1898	11.12	11.12	9.37	0.215	0.258	9.38	9.38	1.75

1070	n1900	11.26	11.26	9.49	0.172	0.215	9.5	9.5	1.77
1071	n1902	11.51	11.51	9.61	0.129	0.172	9.62	9.62	1.9
1072	n1903	11.61	11.61	9.73	0.086	0.129	9.74	9.74	1.88
1073	n1904	11.41	11.41	9.91	0.043	0.086	9.92	9.92	1.5
1074	n1906	11.23	11.23	10.11	0	0.043	10.12	10.12	1.12
1075	n1908	7.01	7.01	5.84	1.509	1.552	5.88	5.88	1.17
1076	n1910	6.99	6.99	5.72	1.638	1.681	5.76	5.76	1.27
1077	n1912	6.8	6.8	5.6	1.724	1.767	5.64	5.64	1.2
1078	n1913	6.86	6.86	5.48	1.767	1.81	5.52	5.52	1.38
1079	n1914	6.96	6.96	5.36	1.81	1.853	5.4	5.4	1.59
1080	n1915	6.99	6.99	5.28	2.068	2.111	5.32	5.32	1.71
1082	n1919	6.86	6.86	5.1	2.111	2.154	5.15	5.15	1.75
1083	n1920	6.83	6.83	4.98	2.154	2.197	5.02	5.02	1.85
1084	n1922	6.79	6.79	3.93	2.455	2.498	3.97	3.97	2.86
1086	n1925	6.63	6.63	3.77	2.498	2.541	3.82	3.82	2.86
1087	n1926	6.6	6.6	3.65	2.541	2.584	3.7	3.7	2.94
1088	n1928	6.61	6.61	3.53	2.584	2.627	3.58	3.58	3.08
1089	n1930	6.5	6.5	3.41	2.627	2.67	3.46	3.46	3.08
1090	n1931	6.36	6.36	3.29	1.462	1.655	3.33	3.33	3.07
1091	n1932	6.31	6.31	3.17	1.655	1.698	3.21	3.21	3.14
1093	n1936	6.37	6.37	3.02	2.343	2.386	3.06	3.06	3.35
1094	n1938	6.31	6.31	3.63	0.602	0.645	3.65	3.65	2.68
1095	n1939	6.19	6.19	3.75	0.559	0.602	3.78	3.78	2.44
1096	n1940	5.95	5.95	3.87	0.516	0.559	3.89	3.89	2.08
1097	n1941	5.69	5.69	3.99	0.473	0.516	4.01	4.01	1.69
1098	n1942	5.62	5.62	4.11	0.43	0.473	4.13	4.13	1.51
1099	n1943	5.49	5.49	4.23	0.387	0.43	4.25	4.25	1.26
1100	n1945	5.54	5.54	4.35	0.344	0.387	4.37	4.37	1.19
1101	n1946	5.68	5.68	4.47	0.301	0.344	4.49	4.49	1.21
1102	n1948	5.79	5.79	4.59	0.258	0.301	4.61	4.61	1.2
1103	n1949	5.83	5.83	4.71	0.215	0.258	4.73	4.73	1.12
1104	n1951	5.95	5.95	4.83	0.172	0.215	4.85	4.85	1.12
1105	n1952	6.15	6.15	5.03	0.129	0.172	5.05	5.05	1.12
1106	n1953	6.34	6.34	5.22	0.086	0.129	5.23	5.23	1.12
1107	n1954	6.63	6.63	5.51	0.043	0.086	5.52	5.52	1.12
1108	n1956	6.99	6.99	5.87	0	0.043	5.87	5.87	1.12
1109	n1957	5.4	5.4	2.9	2.386	2.429	2.95	2.95	2.5
1110	n1958	5.16	5.16	2.78	2.429	2.472	2.83	2.83	2.38
1111	n1960	5.05	5.05	2.66	2.472	2.515	2.71	2.71	2.4
1112	n1961	4.95	4.95	2.54	2.515	2.558	2.59	2.59	2.41
1113	n1963	4.82	4.82	2.42	2.558	2.601	2.47	2.47	2.4
1114	n1965	4.68	4.68	2.3	2.601	2.644	2.35	2.35	2.38
1115	n1966	4.57	4.57	2.18	2.644	2.687	2.23	2.23	2.4
1116	n1967	4.42	4.42	2.06	2.687	2.73	2.11	2.11	2.36
1117	n1968	4.17	4.17	1.94	2.73	2.773	1.99	1.99	2.23
1118	n1969	4.11	4.11	1.82	2.773	2.816	1.87	1.87	2.29
1119	n1971	3.97	3.97	1.7	2.816	2.859	1.75	1.75	2.27

1120	n1972	3.78	3.78	1.58	2.859	2.902	1.63	1.63	2.2
1121	n1973	3.6	3.6	1.46	2.902	2.945	1.51	1.51	2.14
1122	n1974	3.51	3.51	1.34	2.945	2.988	1.39	1.39	2.17
1123	n1975	3.29	3.29	1.22	2.988	3.031	1.27	1.27	2.08
1124	n1976	3.18	3.18	0.63	4.45	4.493	0.7	0.7	2.55
1125	n1977	2.99	2.99	0.47	4.493	4.536	0.54	0.54	2.51
1126	n1979	2.94	2.94	0.35	4.536	4.579	0.42	0.42	2.58
1127	n1980	2.92	2.92	0.23	4.579	4.622	0.29	0.29	2.68
1128	n1981	2.91	2.91	-0.11	5.353	5.396	-0.03	-0.03	3.01
1130	n1985	2.84	2.84	-0.25	5.396	5.439	-0.17	-0.17	3.09
1131	n1986	2.67	2.67	-0.37	5.439	5.482	-0.29	-0.29	3.04
1132	n1988	2.78	2.78	-0.49	5.482	5.525	-0.41	-0.41	3.27
1133	n1989	3.17	3.17	-0.61	5.525	5.568	-0.53	-0.53	3.78
1134	n1991	3.13	3.13	-0.73	5.568	5.611	-0.65	-0.65	3.86
1135	n1992	3.06	3.06	-0.85	5.611	5.654	-0.77	-0.77	3.9
1136	n1993	3.11	3.11	-0.97	5.654	5.697	-0.89	-0.89	4.08
1137	n1994	3.06	3.06	-1.09	5.697	5.74	-1.01	-1.01	4.15
1138	n1995	2.9	2.9	-1.21	5.74	5.783	-1.13	-1.13	4.11
1139	n1996	2.83	2.83	-1.33	5.783	5.826	-1.25	-1.25	4.16
1140	n1997	2.86	2.86	-1.45	5.826	5.869	-1.37	-1.37	4.31
1141	n1998	2.83	2.83	-1.57	5.869	5.912	-1.49	-1.49	4.39
1142	n2000	2.87	2.87	-1.69	5.912	5.955	-1.61	-1.61	4.56
1143	n2002	3	3	-1.81	5.955	5.998	-1.73	-1.73	4.8
1144	n2003	3.1	3.1	-1.93	5.998	6.041	-1.85	-1.85	5.03
1145	n2004	3.13	3.13	-2.05	6.041	6.084	-1.97	-1.97	5.17
1146	n2006	3.04	3.04	-2.17	6.084	6.127	-2.09	-2.09	5.2
1147	n2008	2.85	2.85	-2.29	6.127	6.17	-2.21	-2.21	5.14
1148	n2009	2.58	2.58	-2.41	6.17	6.213	-2.33	-2.33	4.99
1149	n2011	2.46	2.46	-2.53	6.213	6.256	-2.45	-2.45	4.98
1150	n2012	2.28	2.28	-2.65	6.256	6.299	-2.57	-2.57	4.92
1151	n2013	2.15	2.15	-2.77	6.299	6.342	-2.69	-2.69	4.92
1152	n2014	2.12	2.12	-2.89	6.342	6.385	-2.81	-2.81	5
1153	n2016	2.42	2.42	-3.01	6.385	6.428	-2.93	-2.93	5.43
1154	n2017	2.16	2.16	-3.13	6.428	6.471	-3.05	-3.05	5.28
1155	n2018	2.22	2.22	-3.25	6.471	6.514	-3.17	-3.17	5.47
1156	n2020	2.24	2.24	-3.37	6.514	6.557	-3.24	-3.24	5.61
1157	n2021	2.31	2.31	-3.49	43.957	44	-3.27	-3.27	5.8
1158	n2022	2.69	2.69	0.26	37.357	37.4	0.46	0.46	2.43
1159	n2024	2.51	2.51	0.3	37.314	37.357	0.51	0.51	2.2
1160	n2026	2.51	2.51	0.35	37.271	37.314	0.55	0.55	2.16
1161	n2028	2.32	2.32	0.39	37.228	37.271	0.59	0.59	1.93
1162	n2030	2.36	2.36	0.42	37.185	37.228	0.63	0.63	1.94
1163	n2032	3.5	3.5	0.46	37.142	37.185	0.67	0.67	3.04
1165	n2035	2.35	2.35	0.54	37.056	37.099	0.75	0.75	1.81
1169	n2041	2.16	2.16	0.71	36.927	36.97	0.91	0.91	1.45
1170	n2042	2.22	2.22	0.75	36.884	36.927	0.96	0.96	1.47
1171	n2044	2.34	2.34	0.79	36.841	36.884	1	1	1.55

1172	n2045	2.5	2.5	0.83	36.798	36.841	1.04	1.04	1.66
1173	n2047	2.88	2.88	0.88	36.755	36.798	1.08	1.08	2
1174	n2051	3.1	3.1	1	16.933	16.976	1.14	1.14	2.1
1175	n2053	3.22	3.22	1.09	16.89	16.933	1.23	1.23	2.13
1178	n2058	3.94	3.94	1.32	16.804	16.847	1.46	1.46	2.62
1179	n2059	4.32	4.32	1.41	16.761	16.804	1.55	1.55	2.92
1181	n2062	4.76	4.76	1.53	16.718	16.761	1.67	1.67	3.23
1182	n2063	5.16	5.16	1.62	16.675	16.718	1.76	1.76	3.54
1183	n2065	5.22	5.22	1.7	16.632	16.675	1.84	1.84	3.52
1184	n2067	5.51	5.51	1.77	16.589	16.632	1.91	1.91	3.73
1186	n2069	5.67	5.67	3.24	15.447	15.49	3.34	3.34	2.44
1187	n2071	6.48	6.48	3.32	15.404	15.447	3.45	3.45	3.16
1188	n2072	7.99	7.99	3.41	15.361	15.404	3.54	3.54	4.58
1189	n2074	7.54	7.54	3.49	15.318	15.361	3.62	3.62	4.05
1190	n2075	6.93	6.93	3.57	15.275	15.318	3.7	3.7	3.36
1191	n2076	6.71	6.71	3.66	15.232	15.275	3.79	3.79	3.06
1192	n2077	6.73	6.73	3.74	15.189	15.232	3.87	3.87	2.99
1193	n2078	6.78	6.78	3.82	15.146	15.189	3.95	3.95	2.96
1194	n2079	6.71	6.71	3.91	15.103	15.146	4.04	4.04	2.8
1195	n2080	6.62	6.62	3.99	15.06	15.103	4.12	4.12	2.62
1196	n2082	6.36	6.36	4.08	15.017	15.06	4.21	4.21	2.28
1197	n2083	6.26	6.26	4.17	14.974	15.017	4.3	4.3	2.09
1200	n2088	5.89	5.89	4.41	14.888	14.931	4.54	4.54	1.48
1201	n2089	7.57	7.57	4.49	14.845	14.888	4.62	4.62	3.07
1202	n2090	5.74	5.74	4.58	14.802	14.845	4.71	4.71	1.16
1203	n2092	5.93	5.93	4.77	14.759	14.802	4.87	4.87	1.16
1205	n2094	6.36	6.36	5.24	0	0.043	5.25	5.25	1.12
1206	n2095	5.99	5.99	2.02	3.27	3.313	2.08	2.08	3.97
1207	n2096	5.83	5.83	1.9	3.313	3.356	1.96	1.96	3.93
1208	n2097	5.73	5.73	1.78	3.356	3.399	1.84	1.84	3.95
1209	n2099	5.63	5.63	1.66	3.139	3.239	1.72	1.72	3.96
1210	n2101	5.51	5.51	1.54	3.239	3.282	1.6	1.6	3.96
1211	n2102	5.55	5.55	1.45	5.991	6.034	1.52	1.52	4.1
1213	n2106	5.65	5.65	1.98	2.666	2.709	2.02	2.02	3.67
1214	n2108	5.59	5.59	2.03	2.107	2.15	2.07	2.07	3.56
1215	n2110	5.45	5.45	2.15	2.064	2.107	2.19	2.19	3.31
1216	n2112	5.45	5.45	2.27	2.021	2.064	2.31	2.31	3.18
1217	n2113	5.58	5.58	2.39	1.978	2.021	2.43	2.43	3.19
1218	n2115	5.65	5.65	2.51	1.935	1.978	2.55	2.55	3.14
1219	n2116	5.61	5.61	2.63	1.892	1.935	2.67	2.67	2.99
1220	n2118	5.59	5.59	2.75	1.849	1.892	2.79	2.79	2.85
1221	n2120	5.77	5.77	2.87	1.806	1.849	2.91	2.91	2.9
1222	n2121	5.84	5.84	2.99	1.763	1.806	3.03	3.03	2.85
1223	n2123	6.01	6.01	3.11	1.72	1.763	3.15	3.15	2.91
1224	n2124	6	6	3.14	1.677	1.72	3.18	3.18	2.87
1225	n2126	6.4	6.4	5.28	0.129	0.172	5.29	5.29	1.12
1226	n2128	7.64	7.64	6.52	0.129	0.172	6.54	6.54	1.12

1227	n2129	7.89	7.89	6.77	0.086	0.129	6.78	6.78	1.12
1228	n2130	7.66	7.66	6.4	0.172	0.215	6.42	6.42	1.26
1229	n2132	7.46	7.46	6.29	0.215	0.258	6.3	6.3	1.17
1230	n2134	7.21	7.21	6.09	0.258	0.301	6.11	6.11	1.12
1231	n2135	7.12	7.12	3.3	0.903	0.946	3.33	3.33	3.82
1232	n2137	7.86	7.86	6.75	0.086	0.129	6.76	6.76	1.12
1233	n2139	9.36	9.36	8.24	0.043	0.086	8.25	8.25	1.12
1234	n2140	10.89	10.89	9.77	0	0.043	9.78	9.78	1.12
1235	n2142	10.11	10.11	8.99	0	0.043	9	9	1.12
1236	n2144	8.73	8.73	7.61	0.043	0.086	7.62	7.62	1.12
1237	n2148	7.08	7.08	3.17	0.946	0.989	3.2	3.2	3.92
1239	n2151	7.37	7.37	2.95	0.989	1.032	2.98	2.98	4.43
1241	n2154	7.35	7.35	2.74	13.985	14.028	2.86	2.86	4.61
1243	n2156	7.56	7.56	2.62	14.028	14.071	2.74	2.74	4.94
1244	n2157	7.48	7.48	2.54	14.071	14.114	2.66	2.66	4.94
1245	n2158	7.46	7.46	2.44	14.114	14.157	2.56	2.56	5.02
1246	n2159	7.54	7.54	2.37	14.157	14.2	2.49	2.49	5.17
1248	n2162	7.45	7.45	6.29	0	14.243	6.41	6.41	1.16
1249	n2163	7.43	7.43	6.2	14.243	14.286	6.33	6.33	1.23
1250	n2164	7.47	7.47	6.12	14.286	14.329	6.24	6.24	1.35
1251	n2166	7.44	7.44	6.04	14.329	14.372	6.16	6.16	1.41
1252	n2167	7.3	7.3	5.95	14.372	14.415	6.08	6.08	1.35
1253	n2169	7.16	7.16	5.87	14.415	14.458	5.99	5.99	1.29
1254	n2170	7.19	7.19	5.78	14.458	14.501	5.91	5.91	1.4
1255	n2172	7.12	7.12	5.7	14.501	14.544	5.83	5.83	1.42
1256	n2174	7.02	7.02	5.62	14.544	14.587	5.74	5.74	1.41
1257	n2175	6.86	6.86	5.53	14.587	14.63	5.65	5.65	1.32
1258	n2176	6.6	6.6	5.43	14.63	14.673	5.54	5.54	1.16
1260	n2181	6.75	6.75	3.38	0.559	0.602	3.41	3.41	3.37
1261	n2182	6.35	6.35	3.5	0.516	0.559	3.53	3.53	2.85
1262	n2184	6.11	6.11	3.62	0.473	0.516	3.64	3.64	2.48
1263	n2186	5.81	5.81	3.74	0.43	0.473	3.76	3.76	2.07
1264	n2187	5.59	5.59	3.86	0.387	0.43	3.88	3.88	1.73
1267	n2193	5.61	5.61	4.39	0.258	0.301	4.4	4.4	1.22
1268	n2195	6.15	6.15	4.51	0.215	0.258	4.53	4.53	1.64
1269	n2196	5.75	5.75	4.63	0.172	0.215	4.65	4.65	1.12
1272	n2201	6.18	6.18	5.06	0.043	0.086	5.07	5.07	1.12
1273	n2203	6.98	6.98	5.87	0	0.043	5.87	5.87	1.12
1274	n2204	8.31	8.31	7.2	0	0.043	7.2	7.2	1.12
1275	n2205	7.7	7.7	6.59	0.043	0.086	6.59	6.59	1.12
1276	n2207	6.32	6.32	5.21	0.086	0.129	5.22	5.22	1.12
1277	n2209	5.85	5.85	4.73	0.129	0.172	4.74	4.74	1.12
1278	n2210	5.52	5.52	4.4	0.172	0.215	4.41	4.41	1.12
1279	n2212	5.26	5.26	4.15	0.215	0.258	4.16	4.16	1.12
1282	n2216	4.92	4.92	3.63	0.344	0.387	3.65	3.65	1.29
1285	n2220	4.52	4.52	3.19	0.516	0.559	3.22	3.22	1.33
1286	n2221	4.49	4.49	3.07	0.559	0.602	3.1	3.1	1.42

1287	n2222	4.31	4.31	2.97	0.602	0.645	2.99	2.99	1.34
1289	n2225	4.71	4.71	2.73	0.688	0.731	2.75	2.75	1.98
1290	n2226	4.94	4.94	2.61	0.731	0.774	2.63	2.63	2.33
1291	n2228	5.04	5.04	2.49	0.774	0.927	2.52	2.52	2.55
1292	n2229	5.28	5.28	2.37	0.927	0.97	2.4	2.4	2.91
1293	n2231	5.23	5.23	2.25	0.97	1.013	2.28	2.28	2.98
1294	n2233	5.57	5.57	2.13	1.013	1.056	2.16	2.16	3.44
1297	n2239	5.64	5.64	4.52	0.473	0.516	4.54	4.54	1.12
1299	n2242	7.87	7.87	6.75	0.344	0.387	6.77	6.77	1.12
1300	n2243	11.62	11.62	10.5	0.301	0.344	10.52	10.52	1.12
1301	n2244	16.53	16.53	15.41	0.258	0.301	15.42	15.42	1.12
1302	n2248	21.14	21.14	20.02	0.086	0.129	20.03	20.03	1.12
1305	n2254	22.71	22.71	21.59	0	0.043	21.6	21.6	1.12
1306	n2255	21.28	21.28	20.17	0.086	0.129	20.17	20.17	1.12
1307	n2257	20.72	20.72	19.61	0.129	0.172	19.62	19.62	1.12
1308	n2258	20.67	20.67	19.49	0.215	0.258	19.5	19.5	1.18
1309	n2259	19.56	19.56	18.44	0.301	0.344	18.46	18.46	1.12
1310	n2260	15.94	15.94	14.82	0.344	0.387	14.84	14.84	1.12
1311	n2262	11.81	11.81	10.69	0.387	0.43	10.71	10.71	1.12
1312	n2264	9.37	9.37	8.25	0.43	0.473	8.27	8.27	1.12
1313	n2265	8.17	8.17	7.05	0.473	0.516	7.07	7.07	1.12
1314	n2267	7.49	7.49	6.37	0.559	0.602	6.39	6.39	1.12
1315	n2269	7.47	7.47	6.25	0.602	0.645	6.27	6.27	1.22
1317	n2271	7.09	7.09	5.97	0.688	0.731	5.99	5.99	1.12
1318	n2272	6.92	6.92	5.8	0.731	0.774	5.83	5.83	1.12
1319	n2274	6.89	6.89	5.68	0.774	0.817	5.7	5.7	1.21
1320	n2275	6.21	6.21	5.09	0.817	0.86	5.11	5.11	1.12
1321	n2276	5.57	5.57	4.45	0.86	0.903	4.48	4.48	1.12
1322	n2277	6.63	6.63	4.33	0.903	0.946	4.36	4.36	2.3
1323	n2278	6.71	6.71	4.21	0.946	0.989	4.24	4.24	2.49
1324	n2280	6.66	6.66	4.09	0.989	1.032	4.13	4.13	2.56
1325	n2281	6.5	6.5	3.97	1.075	1.118	4.01	4.01	2.52
1326	n2282	6.16	6.16	3.85	1.204	1.247	3.89	3.89	2.31
1327	n2283	5.99	5.99	3.73	1.247	1.29	3.77	3.77	2.26
1328	n2285	5.57	5.57	3.61	1.29	1.333	3.65	3.65	1.96
1329	n2287	5.73	5.73	3.49	1.333	1.376	3.53	3.53	2.23
1330	n2288	5.85	5.85	3.37	1.376	1.419	3.41	3.41	2.48
1331	n2289	5.85	5.85	3.25	1.419	1.462	3.29	3.29	2.6
1332	n2291	5.43	5.43	1.39	6.034	6.077	1.47	1.47	4.03
1333	n2292	6.89	6.89	1.27	6.077	6.12	1.35	1.35	5.62
1334	n2294	5.49	5.49	1.16	6.12	6.163	1.23	1.23	4.33
1335	n2296	5.15	5.15	1.04	6.206	6.249	1.11	1.11	4.12
1336	n2298	5.13	5.13	0.92	6.249	6.292	0.99	0.99	4.22
1337	n2299	5.03	5.03	0.8	6.292	6.335	0.87	0.87	4.24
1338	n2301	5.08	5.08	0.68	6.335	6.378	0.75	0.75	4.41
1339	n2303	5.03	5.03	0.56	6.378	6.421	0.63	0.63	4.47
1340	n2304	4.97	4.97	0.44	6.421	6.464	0.51	0.51	4.53

1341	n2306	5.12	5.12	0.32	6.464	6.507	0.4	0.4	4.8
1342	n2308	4.64	4.64	0.2	6.507	6.55	0.28	0.28	4.45
1343	n2310	4.77	4.77	0.08	6.55	6.593	0.16	0.16	4.69
1344	n2311	4.96	4.96	-0.04	6.593	6.636	0.04	0.04	5
1345	n2312	4.93	4.93	-0.16	6.636	6.679	-0.08	-0.08	5.09
1346	n2314	4.86	4.86	-0.28	6.679	6.722	-0.2	-0.2	5.14
1347	n2315	4.72	4.72	-0.4	6.722	6.765	-0.32	-0.32	5.12
1348	n2316	4.53	4.53	-0.52	6.765	6.808	-0.44	-0.44	5.06
1349	n2317	4.64	4.64	-0.64	6.808	6.851	-0.56	-0.56	5.28
1350	n2319	4.63	4.63	-0.76	6.851	6.894	-0.68	-0.68	5.39
1351	n2320	4.43	4.43	-0.88	6.894	6.937	-0.8	-0.8	5.31
1352	n2322	4.46	4.46	-1	6.937	6.98	-0.92	-0.92	5.47
1353	n2323	4.29	4.29	-1.13	7.324	7.367	-1.04	-1.04	5.42
1354	n2325	4.19	4.19	-1.24	7.367	7.41	-1.16	-1.16	5.44
1355	n2327	4.17	4.17	-1.37	7.453	7.496	-1.28	-1.28	5.54
1356	n2328	4.17	4.17	-1.49	7.496	7.539	-1.4	-1.4	5.66
1357	n2330	3.92	3.92	-1.61	7.582	7.625	-1.52	-1.52	5.53
1358	n2332	3.87	3.87	-1.73	7.625	7.668	-1.64	-1.64	5.59
1359	n2334	3.53	3.53	-1.85	7.711	7.754	-1.76	-1.76	5.38
1360	n2336	3.74	3.74	-1.97	7.754	7.797	-1.88	-1.88	5.7
1361	n2338	4.58	4.58	2.66	0.301	0.344	2.68	2.68	1.92
1362	n2339	4.49	4.49	2.78	0.258	0.301	2.8	2.8	1.71
1363	n2340	4.6	4.6	2.9	0.215	0.258	2.92	2.92	1.7
1364	n2341	4.47	4.47	3.02	0.172	0.215	3.04	3.04	1.45
1366	n2344	4.68	4.68	3.29	0.043	0.086	3.3	3.3	1.39
1367	n2345	4.71	4.71	3.59	0	0.043	3.6	3.6	1.12
1368	n2347	4.55	4.55	3.44	0	0.043	3.44	3.44	1.12
1369	n2348	4.43	4.43	3.13	0.043	0.086	3.14	3.14	1.3
1370	n2350	4.33	4.33	2.96	0.086	0.129	2.97	2.97	1.37
1371	n2352	4.29	4.29	2.83	0.129	0.172	2.85	2.85	1.45
1372	n2354	4.37	4.37	2.71	0.172	0.215	2.73	2.73	1.65
1373	n2355	4.41	4.41	2.59	0.215	0.258	2.61	2.61	1.82
1374	n2356	4.64	4.64	2.47	0.258	0.301	2.49	2.49	2.17
1375	n2358	4.79	4.79	2.35	0.301	0.344	2.37	2.37	2.44
1376	n2359	7.17	7.17	6.05	1.378	1.421	6.08	6.08	1.12
1377	n2360	7.91	7.91	6.79	1.335	1.378	6.82	6.82	1.12
1378	n2362	9.15	9.15	8.03	1.249	1.292	8.06	8.06	1.12
1379	n2364	12.07	12.07	10.95	1.163	1.206	10.98	10.98	1.12
1380	n2366	15.24	15.24	14.12	1.12	1.163	14.15	14.15	1.12
1381	n2368	17.17	17.17	16.06	1.077	1.12	16.08	16.08	1.12
1383	n2370	19.23	19.23	18.11	0.991	1.034	18.14	18.14	1.12
1384	n2372	21.98	21.98	20.86	0.948	0.991	20.89	20.89	1.12
1385	n2373	24.99	24.99	23.87	0.905	0.948	23.9	23.9	1.12
1386	n2374	28.22	28.22	27.1	0.862	0.905	27.13	27.13	1.12
1387	n2376	31.73	31.73	30.61	0.819	0.862	30.63	30.63	1.12
1388	n2378	35.55	35.55	34.43	0.776	0.819	34.45	34.45	1.12
1389	n2379	38.67	38.67	37.55	0.733	0.776	37.57	37.57	1.12

1390	n2381	42.46	42.46	41.34	0.387	0.69	41.36	41.36	1.12
1391	n2382	45.31	45.31	44.19	0.344	0.637	44.21	44.21	1.12
1392	n2384	46.23	46.23	45.11	0.258	0.551	45.13	45.13	1.12
1393	n2385	47.76	47.76	46.64	0.172	0.215	46.66	46.66	1.12
1414	n2415	52.84	52.84	51.72	0	0.043	51.72	51.72	1.12
1415	n2416	49.23	49.23	48.11	0.043	0.086	48.12	48.12	1.12
1416	n2418	48.47	48.47	47.08	0.129	0.172	47.1	47.1	1.38
1417	n2422	9.64	9.64	8.11	0.086	0.129	8.12	8.12	1.52
1418	n2424	9.39	9.39	8.28	0.043	0.086	8.28	8.28	1.12
1419	n2425	12.66	12.66	11.54	0	0.043	11.55	11.55	1.12
1431	n2442	8.2	8.2	6.41	1.462	1.505	6.45	6.45	1.79
1432	n2443	7.65	7.65	6.53	0	1.462	6.57	6.57	1.12
1434	n2446	6.92	6.92	1.42	1.376	1.419	1.46	1.46	5.49
1435	n2448	6.3	6.3	1.54	1.29	1.333	1.58	1.58	4.75
1437	n2450	6.08	6.08	1.78	1.204	1.247	1.81	1.81	4.29
1438	n2452	5.93	5.93	1.9	1.118	1.161	1.93	1.93	4.03
1439	n2454	6.65	6.65	2.02	1.075	1.118	2.05	2.05	4.63
1440	n2456	5.3	5.3	2.14	0.989	1.032	2.17	2.17	3.16
1441	n2458	4.97	4.97	2.26	0.946	0.989	2.29	2.29	2.71
1442	n2459	7.46	7.46	2.38	0.903	0.946	2.41	2.41	5.09
1443	n2461	4.73	4.73	2.5	0.86	0.903	2.53	2.53	2.23
1444	n2463	4.68	4.68	2.62	0.817	0.86	2.64	2.64	2.06
1445	n2464	4.64	4.64	2.74	0.774	0.817	2.76	2.76	1.9
1446	n2466	4.68	4.68	2.86	0.731	0.774	2.88	2.88	1.82
1447	n2468	4.82	4.82	2.98	0.688	0.731	3	3	1.85
1448	n2469	4.83	4.83	3.1	0.559	0.602	3.12	3.12	1.73
1449	n2471	4.7	4.7	3.22	0.516	0.559	3.24	3.24	1.49
1450	n2472	4.61	4.61	3.34	0.473	0.516	3.36	3.36	1.27
1451	n2473	4.75	4.75	3.46	0.43	0.473	3.48	3.48	1.29
1452	n2474	4.77	4.77	3.58	0.387	0.43	3.6	3.6	1.2
1453	n2476	4.81	4.81	3.7	0.301	0.344	3.71	3.71	1.12
1454	n2477	5.15	5.15	4.03	0.258	0.301	4.04	4.04	1.12
1455	n2478	5.57	5.57	4.45	0.215	0.258	4.46	4.46	1.12
1456	n2480	6.05	6.05	4.93	0.172	0.215	4.95	4.95	1.12
1457	n2481	6.57	6.57	5.45	0.129	0.172	5.46	5.46	1.12
1458	n2483	8.43	8.43	7.31	0.086	0.129	7.32	7.32	1.12
1460	n2487	12.73	12.73	11.5	0.043	0.086	11.51	11.51	1.23
1461	n2488	12.92	12.92	11.81	0	0.043	11.81	11.81	1.12
1462	n2489	12.92	12.92	11.8	0	0.043	11.8	11.8	1.12
1463	n2490	12.87	12.87	11.6	0.129	0.172	11.61	11.61	1.27
1464	n2491	9	9	7.88	0.172	0.215	7.89	7.89	1.12
1465	n2493	6.32	6.32	5.2	0.215	0.258	5.21	5.21	1.12
1466	n2495	5.53	5.53	4.41	0.258	0.301	4.43	4.43	1.12
1467	n2496	4.68	4.68	3.56	0.301	0.344	3.58	3.58	1.12
1468	n2497	4.56	4.56	3.44	0.387	0.43	3.46	3.46	1.12
1469	n2499	4.38	4.38	3.26	0.473	0.516	3.28	3.28	1.12
1470	n2500	3.92	3.92	2.8	0.516	0.559	2.82	2.82	1.12

1471	n2502	3.82	3.82	2.68	0.602	0.645	2.7	2.7	1.14
1473	n2504	3.51	3.51	2.39	0.731	0.774	2.42	2.42	1.12
1474	n2506	3.45	3.45	2.27	0.774	0.817	2.3	2.3	1.17
1476	n2508	3.24	3.24	1.67	0.946	0.989	1.7	1.7	1.57
1477	n2509	3.28	3.28	1.59	0.989	1.032	1.63	1.63	1.69
1478	n2511	3.43	3.43	1.47	1.032	1.075	1.51	1.51	1.95
1480	n2514	3.43	3.43	1.23	1.204	1.247	1.27	1.27	2.19
1481	n2516	3.25	3.25	1.11	1.247	1.29	1.15	1.15	2.13
1482	n2517	3.25	3.25	1	1.29	1.333	1.03	1.03	2.25
1483	n2518	3.23	3.23	0.88	1.333	1.376	0.91	0.91	2.35
1484	n2519	3.31	3.31	0.76	1.376	1.419	0.79	0.79	2.55
1485	n2521	3.18	3.18	1.8	0.086	0.129	1.81	1.81	1.39
1486	n2522	3.12	3.12	2	0	0.043	2	2	1.12
1488	n2525	3.36	3.36	1.66	0.043	0.086	1.67	1.67	1.69
1489	n2526	3.23	3.23	1.49	0.086	0.129	1.5	1.5	1.74
1490	n2527	3.28	3.28	1.36	0.129	0.172	1.38	1.38	1.92
1491	n2528	3.27	3.27	1.24	0.172	0.215	1.26	1.26	2.02
1492	n2529	3.09	3.09	1.12	0.215	0.258	1.14	1.14	1.96
1493	n2530	3.14	3.14	0.99	0.301	0.344	1	1	2.15
1494	n2531	3.26	3.26	0.83	0.344	0.387	0.84	0.84	2.44
1495	n2532	3.27	3.27	0.71	0.387	0.43	0.73	0.73	2.56
1496	n2534	3.29	3.29	0.59	0.43	0.473	0.61	0.61	2.71
1497	n2535	3.43	3.43	0.47	0.473	0.516	0.49	0.49	2.96
1501	n2539	3.28	3.28	-0.04	0.688	0.731	-0.01	-0.01	3.32
1502	n2542	5.02	5.02	3.9	0.688	0.731	3.93	3.93	1.12
1503	n2544	6.21	6.21	5.09	0.645	0.688	5.11	5.11	1.12
1504	n2546	7.83	7.83	6.72	0.602	0.645	6.74	6.74	1.12
1505	n2548	11.16	11.16	10.04	0.559	0.602	10.06	10.06	1.12
1506	n2549	12.51	12.51	11.39	0.516	0.559	11.41	11.41	1.12
1507	n2551	16.93	16.93	15.81	0.473	0.516	15.83	15.83	1.12
1509	n2553	21.89	21.89	20.77	0.387	0.43	20.78	20.78	1.12
1510	n2555	22.77	22.77	21.65	0.344	0.387	21.67	21.67	1.12
1511	n2556	24.02	24.02	22.9	0.301	0.344	22.92	22.92	1.12
1512	n2557	26.98	26.98	25.86	0.258	0.301	25.87	25.87	1.12
1513	n2559	30.06	30.06	28.94	0.172	0.215	28.95	28.95	1.12
1514	n2561	36.12	36.12	35	0.129	0.172	35.01	35.01	1.12
1515	n2562	40.22	40.22	39.1	0.086	0.129	39.11	39.11	1.12
1516	n2563	41.48	41.48	39.7	0.043	0.086	39.71	39.71	1.78
1517	n2564	41.03	41.03	39.91	0	0.043	39.91	39.91	1.12
1519	n2566	7.48	7.48	3.93	12.91	12.953	4.03	4.03	3.55
1521	n2569	7.51	7.51	4.09	12.609	12.652	4.21	4.21	3.43
1522	n2570	7.54	7.54	4.21	12.566	12.609	4.33	4.33	3.33
1524	n2573	7.28	7.28	4.38	12.523	12.566	4.51	4.51	2.9
1525	n2575	7.3	7.3	4.41	12.136	12.179	4.53	4.53	2.89
1527	n2578	7.55	7.55	6.05	11.792	11.835	6.15	6.15	1.5
1528	n2580	7.6	7.6	6.17	11.749	11.792	6.29	6.29	1.43
1529	n2581	7.55	7.55	6.29	11.706	11.749	6.41	6.41	1.25

1530	n2582	7.53	7.53	6.41	0	11.706	6.53	6.53	1.12
1531	n2584	7.57	7.57	1.24	11.62	11.663	1.35	1.35	6.33
1533	n2588	7.59	7.59	2.13	9.384	9.427	2.23	2.23	5.46
1534	n2590	7.64	7.64	2.25	9.341	9.384	2.35	2.35	5.39
1535	n2592	7.76	7.76	2.37	9.298	9.341	2.47	2.47	5.39
1536	n2594	7.87	7.87	2.46	9.255	9.298	2.56	2.56	5.41
1538	n2597	7.96	7.96	2.61	2.151	2.194	2.65	2.65	5.35
1539	n2599	8.07	8.07	2.73	2.108	2.151	2.77	2.77	5.34
1540	n2600	8.14	8.14	2.85	2.065	2.108	2.89	2.89	5.29
1541	n2602	8.19	8.19	2.97	2.022	2.065	3.01	3.01	5.22
1542	n2603	8.17	8.17	3.09	1.979	2.022	3.13	3.13	5.08
1543	n2605	8.1	8.1	3.21	1.893	1.936	3.25	3.25	4.89
1544	n2607	8.13	8.13	3.33	1.85	1.893	3.37	3.37	4.81
1545	n2609	7.98	7.98	3.45	1.764	1.807	3.49	3.49	4.53
1546	n2610	7.94	7.94	3.57	1.721	1.764	3.61	3.61	4.37
1547	n2611	7.67	7.67	3.69	1.678	1.721	3.73	3.73	3.98
1548	n2612	7.63	7.63	3.81	1.635	1.678	3.85	3.85	3.82
1549	n2613	7.6	7.6	3.93	1.592	1.635	3.97	3.97	3.67
1550	n2615	7.51	7.51	4.05	1.549	1.592	4.09	4.09	3.46
1551	n2617	7.43	7.43	4.17	1.506	1.549	4.21	4.21	3.26
1552	n2619	7.44	7.44	4.29	1.463	1.506	4.33	4.33	3.16
1553	n2620	7.45	7.45	4.41	1.42	1.463	4.44	4.44	3.04
1554	n2621	7.36	7.36	4.53	1.377	1.42	4.56	4.56	2.83
1555	n2622	7.18	7.18	4.65	1.334	1.377	4.68	4.68	2.53
1556	n2623	7.1	7.1	4.7	1.291	1.334	4.73	4.73	2.4
1557	n2624	7.26	7.26	1.36	2.107	2.15	1.4	1.4	5.9
1558	n2625	6.99	6.99	1.48	2.064	2.107	1.52	1.52	5.51
1559	n2626	6.84	6.84	1.6	2.021	2.064	1.64	1.64	5.24
1560	n2628	6.86	6.86	1.72	1.978	2.021	1.76	1.76	5.14
1561	n2629	6.87	6.87	1.84	1.935	1.978	1.88	1.88	5.04
1562	n2631	6.94	6.94	1.96	1.849	1.892	2	2	4.98
1563	n2633	6.95	6.95	2.08	1.763	1.806	2.12	2.12	4.88
1564	n2635	6.85	6.85	2.2	1.677	1.72	2.24	2.24	4.66
1565	n2637	6.88	6.88	2.32	1.634	1.677	2.36	2.36	4.57
1566	n2639	6.83	6.83	2.44	1.548	1.591	2.47	2.47	4.39
1568	n2641	6.7	6.7	2.68	1.462	1.505	2.71	2.71	4.02
1569	n2643	6.79	6.79	2.8	1.376	1.419	2.83	2.83	4
1571	n2646	7.29	7.29	3.03	1.29	1.333	3.06	3.06	4.26
1573	n2649	7.63	7.63	3.27	1.204	1.247	3.3	3.3	4.36
1574	n2651	7.58	7.58	3.51	1.161	1.204	3.54	3.54	4.08
1575	n2653	7.6	7.6	3.63	1.118	1.161	3.66	3.66	3.97
1576	n2655	7.68	7.68	3.75	1.075	1.118	3.78	3.78	3.93
1577	n2657	7.72	7.72	3.87	1.032	1.075	3.9	3.9	3.85
1578	n2659	7.63	7.63	3.99	0.989	1.032	4.02	4.02	3.64
1579	n2661	7.69	7.69	4.11	0.946	0.989	4.14	4.14	3.58
1580	n2663	8.07	8.07	4.23	0.86	0.903	4.26	4.26	3.84
1581	n2665	7.71	7.71	4.35	0.817	0.86	4.38	4.38	3.37

1582	n2666	7.72	7.72	4.47	0.774	0.817	4.5	4.5	3.25
1583	n2667	7.78	7.78	4.59	0.731	0.774	4.62	4.62	3.19
1584	n2669	7.76	7.76	4.71	0.688	0.731	4.73	4.73	3.05
1585	n2671	7.77	7.77	4.83	0.645	0.688	4.85	4.85	2.94
1586	n2673	7.82	7.82	4.95	0.602	0.645	4.97	4.97	2.87
1587	n2674	7.68	7.68	5.07	0.559	0.602	5.09	5.09	2.61
1588	n2675	7.65	7.65	5.11	0.516	0.559	5.13	5.13	2.54
1589	n2677	7.42	7.42	5.19	0.301	0.344	5.21	5.21	2.23
1590	n2678	7.23	7.23	5.31	0.258	0.301	5.33	5.33	1.92
1591	n2680	7.19	7.19	5.43	0.215	0.258	5.44	5.44	1.76
1592	n2682	7.06	7.06	5.55	0.172	0.215	5.56	5.56	1.51
1593	n2684	7.34	7.34	5.67	0.129	0.172	5.68	5.68	1.67
1594	n2685	7.05	7.05	5.79	0.086	0.129	5.8	5.8	1.25
1595	n2687	7.09	7.09	5.97	0.043	0.086	5.98	5.98	1.12
1596	n2689	7.65	7.65	6.53	0	0.043	6.54	6.54	1.12
1597	n2690	7.77	7.77	6.15	0.129	0.172	6.16	6.16	1.62
1598	n2691	7.82	7.82	6.27	0.086	0.129	6.29	6.29	1.55
1599	n2693	7.87	7.87	6.45	0.043	0.086	6.46	6.46	1.42
1600	n2695	7.87	7.87	6.75	0	0.043	6.76	6.76	1.12
1601	n2696	8.03	8.03	6.79	6.201	6.244	6.87	6.87	1.24
1603	n2700	7.98	7.98	6.64	6.244	6.287	6.72	6.72	1.34
1604	n2701	7.89	7.89	6.52	6.287	6.33	6.6	6.6	1.38
1605	n2702	7.89	7.89	6.4	6.33	6.373	6.48	6.48	1.49
1606	n2704	7.88	7.88	6.28	6.373	6.416	6.36	6.36	1.6
1607	n2705	7.81	7.81	6.16	6.416	6.459	6.24	6.24	1.65
1608	n2706	7.31	7.31	6.04	6.459	6.502	6.12	6.12	1.27
1609	n2707	7.7	7.7	5.92	6.545	6.588	6	6	1.78
1610	n2708	7.62	7.62	5.8	6.631	6.674	5.88	5.88	1.82
1611	n2710	7.73	7.73	5.68	6.717	6.76	5.76	5.76	2.05
1612	n2711	7.69	7.69	5.56	6.803	6.846	5.64	5.64	2.14
1613	n2713	7.7	7.7	5.44	6.846	6.889	5.52	5.52	2.26
1614	n2714	7.68	7.68	5.32	6.889	6.932	5.4	5.4	2.36
1615	n2715	7.68	7.68	5.2	6.932	6.975	5.28	5.28	2.48
1616	n2717	7.58	7.58	5.08	6.975	7.018	5.16	5.16	2.51
1617	n2719	7.63	7.63	4.96	7.018	7.061	5.03	5.03	2.67
1619	n2721	8.03	8.03	6.91	6.158	6.201	6.99	6.99	1.12
1620	n2722	8.2	8.2	7.08	6.115	6.158	7.15	7.15	1.12
1621	n2724	8.38	8.38	7.26	6.072	6.115	7.33	7.33	1.12
1622	n2725	8.69	8.69	7.57	6.029	6.072	7.64	7.64	1.12
1623	n2726	10.42	10.42	9.3	0	5.986	9.37	9.37	1.12
1628	n2733	9.58	9.58	8.46	0	0.043	8.47	8.47	1.12
1629	n2735	9.15	9.15	8.03	0.043	0.086	8.04	8.04	1.12
1630	n2737	9.2	9.2	7.86	0.086	0.129	7.87	7.87	1.34
1631	n2739	7.71	7.71	6.59	0.172	0.215	6.6	6.6	1.12
1632	n2740	7.74	7.74	6.47	0.215	0.258	6.48	6.48	1.28
1634	n2744	6.22	6.22	5.1	0.301	0.344	5.11	5.11	1.12
1635	n2745	5.4	5.4	4.29	0.387	0.43	4.3	4.3	1.12

1636	n2746	5.01	5.01	3.89	0.43	0.473	3.91	3.91	1.12
1637	n2748	4.92	4.92	3.77	0.473	0.516	3.79	3.79	1.15
1638	n2750	4.8	4.8	3.65	0.516	0.559	3.67	3.67	1.15
1639	n2752	4.71	4.71	3.54	0.559	0.602	3.56	3.56	1.16
1641	n2755	4.71	4.71	2.47	5.126	5.169	2.54	2.54	2.24
1642	n2757	4.79	4.79	2.54	4.481	4.524	2.6	2.6	2.25
1643	n2758	4.79	4.79	2.66	4.438	4.481	2.72	2.72	2.13
1644	n2760	4.8	4.8	2.78	4.395	4.438	2.84	2.84	2.02
1645	n2762	5.1	5.1	2.9	4.352	4.395	2.96	2.96	2.21
1646	n2763	5.59	5.59	3.02	4.309	4.352	3.09	3.09	2.56
1647	n2765	5.85	5.85	3.15	4.266	4.309	3.21	3.21	2.71
1648	n2767	5.43	5.43	3.26	0.817	0.86	3.28	3.28	2.18
1649	n2769	5.6	5.6	3.37	0.774	0.817	3.4	3.4	2.23
1650	n2771	5.4	5.4	3.49	0.731	0.774	3.52	3.52	1.91
1652	n2775	5.44	5.44	3.73	0.645	0.688	3.75	3.75	1.72
1653	n2776	5.53	5.53	3.85	0.602	0.645	3.87	3.87	1.68
1654	n2778	5.67	5.67	3.97	0.559	0.602	3.99	3.99	1.7
1655	n2780	5.8	5.8	4.09	0.516	0.559	4.11	4.11	1.71
1656	n2782	6.1	6.1	4.21	0.473	0.516	4.23	4.23	1.89
1658	n2785	6.41	6.41	4.45	0.344	0.387	4.47	4.47	1.96
1659	n2787	6.44	6.44	4.56	0.301	0.344	4.58	4.58	1.88
1661	n2790	6.52	6.52	4.8	0.172	0.215	4.81	4.81	1.72
1662	n2792	6.41	6.41	4.92	0.129	0.172	4.93	4.93	1.49
1663	n2794	6.52	6.52	5.04	0.086	0.129	5.05	5.05	1.48
1664	n2795	6.7	6.7	5.21	0.043	0.086	5.22	5.22	1.5
1665	n2796	6.59	6.59	5.47	0	0.043	5.47	5.47	1.12
1667	n2800	6.72	6.72	4.74	1.248	1.291	4.78	4.78	1.97
1669	n2804	7.07	7.07	4.93	1.205	1.248	4.96	4.96	2.14
1671	n2808	7.05	7.05	5.16	1.076	1.119	5.2	5.2	1.89
1672	n2809	7.29	7.29	5.28	1.033	1.076	5.31	5.31	2.01
1674	n2811	7.32	7.32	5.53	0.904	0.947	5.56	5.56	1.79
1675	n2812	7.44	7.44	5.65	0.861	0.904	5.68	5.68	1.79
1676	n2813	7.43	7.43	5.77	0.818	0.861	5.8	5.8	1.66
1677	n2815	7.48	7.48	5.89	0.775	0.818	5.92	5.92	1.59
1678	n2817	7.14	7.14	6.01	0.732	0.775	6.03	6.03	1.14
1679	n2818	7.44	7.44	6.13	0.559	0.732	6.15	6.15	1.31
1680	n2820	7.4	7.4	6.25	0.516	0.689	6.27	6.27	1.16
1681	n2821	7.94	7.94	6.37	0.512	0.555	6.39	6.39	1.57
1682	n2823	7.93	7.93	6.49	0.469	0.512	6.51	6.51	1.44
1683	n2825	7.94	7.94	6.61	0.426	0.469	6.63	6.63	1.33
1684	n2826	7.87	7.87	6.73	0.383	0.426	6.75	6.75	1.14
1686	n2829	8.35	8.35	7.23	0.297	0.34	7.25	7.25	1.12
1687	n2830	9.09	9.09	7.98	0.254	0.297	7.99	7.99	1.12
1689	n2832	9.77	9.77	8.62	0.211	0.254	8.63	8.63	1.15
1690	n2833	9.98	9.98	8.86	0	0.043	8.87	8.87	1.12
1696	n2840	7.77	7.77	6.65	0.301	0.344	6.67	6.67	1.12
1697	n2842	8.67	8.67	7.55	0.258	0.301	7.56	7.56	1.12

1698	n2844	9.42	9.42	8.31	0.215	0.258	8.32	8.32	1.12
1699	n2846	11.07	11.07	9.95	0.172	0.215	9.96	9.96	1.12
1700	n2848	13.55	13.55	12.43	0.129	0.172	12.44	12.44	1.12
1701	n2850	16.18	16.18	15.06	0.086	0.129	15.07	15.07	1.12
1702	n2852	17.9	17.9	16.6	0.043	0.086	16.6	16.6	1.3
1705	n2856	13.47	13.47	12.35	0.043	0.086	12.36	12.36	1.12
1706	n2858	10.97	10.97	9.86	0.086	0.168	9.87	9.87	1.12
1734	n2901	4.48	4.48	2.19	5.169	5.212	2.26	2.26	2.29
1735	n2903	4.38	4.38	2.07	5.212	5.255	2.14	2.14	2.32
1736	n2905	4.35	4.35	1.95	5.255	5.298	2.02	2.02	2.4
1737	n2907	4.3	4.3	1.83	5.298	5.341	1.9	1.9	2.47
1738	n2909	4.38	4.38	1.71	5.341	5.384	1.78	1.78	2.67
1739	n2910	4.46	4.46	1.59	5.384	5.427	1.66	1.66	2.87
1740	n2912	4.2	4.2	1.47	5.427	5.47	1.54	1.54	2.73
1741	n2913	3.95	3.95	1.35	5.47	5.513	1.42	1.42	2.6
1742	n2915	4.04	4.04	1.23	5.513	5.556	1.3	1.3	2.81
1743	n2916	4.03	4.03	1.11	5.556	5.599	1.18	1.18	2.92
1744	n2917	3.96	3.96	0.99	5.599	5.642	1.06	1.06	2.97
1745	n2919	3.87	3.87	0.87	5.642	5.685	0.94	0.94	3
1746	n2921	3.81	3.81	0.75	5.685	5.728	0.82	0.82	3.06
1747	n2922	3.78	3.78	0.63	5.728	5.771	0.7	0.7	3.15
1748	n2924	3.72	3.72	0.51	5.9	5.943	0.59	0.59	3.22
1751	n2930	3.64	3.64	1.99	0.043	0.086	2	2	1.65
1752	n2931	3.46	3.46	2.34	0	0.043	2.35	2.35	1.12
1765	n2950	7.19	7.19	6.08	0	0.043	6.08	6.08	1.12
1766	n2952	7.23	7.23	5.77	0.043	0.476	5.79	5.79	1.46
1768	n2955	7.09	7.09	5.59	0.476	0.519	5.61	5.61	1.5
1769	n2957	7.09	7.09	5.97	0	0.043	5.98	5.98	1.12
1770	n2959	6.98	6.98	5.67	0.043	0.086	5.68	5.68	1.31
1772	n2962	5.81	5.81	4.69	0.129	0.172	4.7	4.7	1.12
1775	n2965	5.23	5.23	4.11	0.215	0.258	4.13	4.13	1.12
1776	n2967	5.09	5.09	3.97	0.258	0.301	3.99	3.99	1.12
1777	n2968	5.12	5.12	3.85	0.301	0.344	3.87	3.87	1.26
1778	n2969	4.96	4.96	3.76	0.344	0.387	3.78	3.78	1.2
1780	n2971	4.56	4.56	3.44	0.43	0.473	3.46	3.46	1.12
1781	n2972	4.63	4.63	3.32	0.473	0.516	3.34	3.34	1.3
1782	n2973	4.78	4.78	3.2	0.516	0.559	3.23	3.23	1.57
1783	n2974	4.58	4.58	3.08	0.559	0.602	3.1	3.1	1.5
1785	n2977	5.01	5.01	2.97	0.602	0.645	2.99	2.99	2.04
1786	n2978	5.25	5.25	2.85	0.645	0.688	2.87	2.87	2.4
1787	n2980	5.41	5.41	2.77	1.981	2.024	2.81	2.81	2.64
1789	n2982	5.06	5.06	2.61	2.024	2.067	2.65	2.65	2.46
1792	n2987	4.89	4.89	2.25	2.11	2.153	2.29	2.29	2.64
1794	n2991	4.71	4.71	2.03	2.196	2.239	2.07	2.07	2.68
1795	n2992	4.76	4.76	1.9	2.239	2.282	1.94	1.94	2.86
1797	n2995	4.42	4.42	1.66	2.368	2.411	1.7	1.7	2.77
1798	n2997	4.37	4.37	1.54	2.411	2.454	1.58	1.58	2.84

1799	n2998	4.32	4.32	1.42	2.454	2.497	1.47	1.47	2.9
1800	n2999	4.25	4.25	1.3	2.497	2.54	1.34	1.34	2.96
1801	n3000	4.31	4.31	1.2	2.54	2.583	1.25	1.25	3.11
1802	n3001	5.63	5.63	4.22	3.363	3.406	4.27	4.27	1.4
1803	n3003	5.46	5.46	4.34	0	3.363	4.4	4.4	1.12
1805	n3006	5.25	5.25	0.17	2.97	3.013	0.22	0.22	5.09
1806	n3007	5.24	5.24	0.29	2.927	2.97	0.34	0.34	4.95
1807	n3008	5.28	5.28	0.41	2.841	2.884	0.46	0.46	4.88
1808	n3010	4.88	4.88	0.53	2.798	2.841	0.58	0.58	4.35
1809	n3011	4.91	4.91	0.65	2.755	2.798	0.7	0.7	4.27
1810	n3013	4.85	4.85	0.77	2.712	2.755	0.82	0.82	4.08
1811	n3015	4.62	4.62	0.89	2.669	2.712	0.93	0.93	3.73
1812	n3017	4.56	4.56	1.01	2.626	2.669	1.05	1.05	3.56
1813	n3019	4.58	4.58	1.13	2.583	2.626	1.17	1.17	3.45
1880	n3117	8.71	8.71	6.88	0.215	0.258	6.9	6.9	1.82
1881	n3119	8.12	8.12	7	0.172	0.215	7.02	7.02	1.12
1882	n3120	8.42	8.42	7.3	0.129	0.172	7.31	7.31	1.12
1886	n3126	10.47	10.47	9.35	0.086	0.129	9.36	9.36	1.12
1887	n3128	14.41	14.41	13.3	0.043	0.086	13.3	13.3	1.12
1888	n3129	15.95	15.95	14.83	0	0.043	14.83	14.83	1.12
1889	n3130	6.94	6.94	4.53	0.258	0.301	4.54	4.54	2.41
1890	n3132	6.92	6.92	4.65	0.215	0.258	4.66	4.66	2.27
1891	n3134	6.66	6.66	4.77	0.129	0.172	4.78	4.78	1.89
1893	n3137	6.35	6.35	5.06	0.043	0.086	5.07	5.07	1.29
1894	n3138	6.58	6.58	5.46	0	0.043	5.46	5.46	1.12
1895	n3139	5.89	5.89	4.77	0.215	0.258	4.78	4.78	1.12
1896	n3140	5.92	5.92	4.67	0.258	0.301	4.69	4.69	1.25
1897	n3141	5.78	5.78	4.55	0.301	0.344	4.57	4.57	1.22
1898	n3143	5.64	5.64	4.43	0.344	0.387	4.45	4.45	1.21
1899	n3145	5.67	5.67	4.31	0.387	0.43	4.33	4.33	1.36
1900	n3146	5.68	5.68	4.21	0.559	0.602	4.23	4.23	1.47
1901	n3148	5.58	5.58	4.09	0.645	0.688	4.12	4.12	1.49
1902	n3149	5.44	5.44	3.96	0.688	0.731	3.99	3.99	1.48
1903	n3150	5.39	5.39	3.84	0.731	0.774	3.87	3.87	1.55
1904	n3151	5.34	5.34	3.73	0.774	0.817	3.75	3.75	1.62
1905	n3153	5.33	5.33	3.6	0.817	0.86	3.63	3.63	1.73
1906	n3154	5.21	5.21	3.48	0.86	0.903	3.51	3.51	1.73
1907	n3155	5.08	5.08	3.37	0.903	0.946	3.4	3.4	1.71
1908	n3157	5.75	5.75	4.64	0.344	0.387	4.65	4.65	1.12
1909	n3158	6.78	6.78	5.66	0.301	0.344	5.68	5.68	1.12
1910	n3160	8.24	8.24	7.12	0.258	0.301	7.14	7.14	1.12
1911	n3161	9.65	9.65	8.53	0.215	0.258	8.54	8.54	1.12
1912	n3163	11.08	11.08	9.96	0.172	0.215	9.98	9.98	1.12
1913	n3166	5.2	5.2	3.25	0.946	0.989	3.28	3.28	1.95
1914	n3167	5.19	5.19	3.13	0.989	1.032	3.16	3.16	2.06
1915	n3168	5.2	5.2	3	1.032	1.075	3.03	3.03	2.2
1916	n3169	5.14	5.14	2.89	1.075	1.308	2.92	2.92	2.25

1917	n3170	5.08	5.08	2.77	1.308	1.351	2.8	2.8	2.31
1918	n3171	5.04	5.04	2.65	1.351	1.394	2.68	2.68	2.39
1919	n3172	5	5	2.53	1.394	1.437	2.57	2.57	2.47
1920	n3173	4.93	4.93	2.4	1.437	1.48	2.44	2.44	2.52
1921	n3174	4.85	4.85	2.29	1.48	1.523	2.33	2.33	2.56
1922	n3176	4.92	4.92	2.05	1.652	1.695	2.09	2.09	2.87
1923	n3177	4.93	4.93	1.94	1.695	1.738	1.98	1.98	2.99
1924	n3178	4.91	4.91	1.8	1.738	1.781	1.84	1.84	3.11
1925	n3179	4.81	4.81	1.68	1.781	1.824	1.72	1.72	3.13
1926	n3180	4.77	4.77	1.59	1.867	1.91	1.63	1.63	3.18
1927	n3181	4.77	4.77	1.45	1.953	1.996	1.49	1.49	3.32
1928	n3182	4.76	4.76	1.33	1.996	2.039	1.37	1.37	3.44
1929	n3183	4.84	4.84	1.2	2.039	2.082	1.25	1.25	3.64
1930	n3184	4.92	4.92	1.08	2.125	2.168	1.13	1.13	3.84
1931	n3185	5.03	5.03	0.96	2.168	2.211	1	1	4.07
1932	n3186	5.08	5.08	0.85	2.211	2.254	0.89	0.89	4.23
1933	n3187	5.07	5.07	0.72	2.297	2.34	0.77	0.77	4.35
1934	n3189	5.31	5.31	0.61	2.383	2.426	0.66	0.66	4.7
1935	n3191	6.03	6.03	2.54	0.692	0.735	2.57	2.57	3.49
1936	n3192	6.02	6.02	2.66	0.649	0.692	2.69	2.69	3.35
1937	n3193	5.91	5.91	2.78	0.606	0.649	2.81	2.81	3.13
1938	n3195	5.86	5.86	2.9	0.563	0.606	2.93	2.93	2.95
1939	n3197	5.97	5.97	3.02	0.52	0.563	3.05	3.05	2.94
1940	n3199	5.93	5.93	3.14	0.477	0.52	3.17	3.17	2.78
1941	n3200	5.97	5.97	3.21	0.434	0.477	3.23	3.23	2.76
1942	n3202	8.19	8.19	3.26	0.391	0.434	3.28	3.28	4.92
1943	n3204	5.43	5.43	3.37	0.305	0.348	3.39	3.39	2.05
1944	n3205	5.46	5.46	3.5	0.129	0.272	3.51	3.51	1.96
1946	n3210	5.24	5.24	4.12	0	0.043	4.13	4.13	1.12
1956	n3234	6.73	6.73	5.47	0.519	0.562	5.49	5.49	1.25
1958	n3238	6.66	6.66	5.23	0.648	0.691	5.26	5.26	1.43
1959	n3240	6.09	6.09	4.97	0.691	0.734	4.99	4.99	1.12
1962	n3245	5.83	5.83	4.57	0.82	0.863	4.6	4.6	1.26
1964	n3249	5.86	5.86	4.34	0.906	0.949	4.36	4.36	1.53
1965	n3250	5.82	5.82	4.22	0.949	0.992	4.25	4.25	1.6
1967	n3252	5.51	5.51	4.07	1.121	1.164	4.1	4.1	1.45
1968	n3253	5.53	5.53	3.78	1.25	1.293	3.81	3.81	1.76
1969	n3255	5.68	5.68	3.9	1.207	1.25	3.93	3.93	1.78
1971	n3258	5.55	5.55	4.22	0.086	0.129	4.23	4.23	1.33
1972	n3259	5.56	5.56	4.4	0.043	0.086	4.41	4.41	1.16
1973	n3261	5.71	5.71	4.59	0	0.043	4.59	4.59	1.12
1980	n3269	7.81	7.81	6.69	0	0.043	6.7	6.7	1.12
1981	n3270	6.59	6.59	5.47	0.043	0.086	5.48	5.48	1.12
1982	n3272	5.99	5.99	4.87	0.086	0.129	4.88	4.88	1.12
1983	n3275	7.22	7.22	6.1	0.172	0.215	6.12	6.12	1.12
1984	n3277	7.59	7.59	6.48	0.129	0.172	6.49	6.49	1.12
1985	n3278	8.36	8.36	7.25	0.086	0.129	7.26	7.26	1.12

1986	n3279	10.72	10.72	9.6	0.043	0.086	9.61	9.61	1.12
1987	n3281	11.28	11.28	10.16	0	0.043	10.17	10.17	1.12
1988	n3282	5.75	5.75	4.63	0	0.043	4.64	4.64	1.12
1989	n3283	5.67	5.67	4.33	0.043	0.086	4.34	4.34	1.34
1990	n3285	5.74	5.74	4.15	0.086	0.129	4.17	4.17	1.59
1991	n3287	5.89	5.89	4.05	0.172	0.215	4.06	4.06	1.85
1992	n3288	6.9	6.9	5.78	0.172	0.215	5.79	5.79	1.12
1993	n3289	7.21	7.21	6.1	0.129	0.172	6.11	6.11	1.12
1994	n3291	7.77	7.77	6.65	0.086	0.129	6.66	6.66	1.12
1995	n3293	9.71	9.71	8.59	0.043	0.086	8.6	8.6	1.12
1996	n3295	10.78	10.78	9.66	0	0.043	9.67	9.67	1.12
1998	MH-2	3.78	3.78	1.72	0.086	0.129	1.73	1.73	2.06
2007	MH-12	4.65	4.65	1.81	2.282	2.325	1.85	1.85	2.84
2008	MH-14	4.9	4.9	2.44	2.067	2.11	2.48	2.48	2.46
2010	MH-16	4.92	4.92	2.16	2.153	2.196	2.21	2.21	2.76
2040	MH-48	4.73	4.73	3.61	0.387	0.43	3.63	3.63	1.12
2045	MH-55	5.52	5.52	4.4	0.172	0.215	4.41	4.41	1.12
2047	MH-57	6.44	6.44	5.32	0.086	0.129	5.33	5.33	1.12
2048	MH-58	6.64	6.64	5.39	0.562	0.605	5.41	5.41	1.25
2049	MH-59	6.6	6.6	5.34	0.605	0.648	5.36	5.36	1.26
2051	MH-61	5.97	5.97	4.85	0.734	0.777	4.88	4.88	1.12
2052	MH-62	5.86	5.86	4.66	0.777	0.82	4.69	4.69	1.21
2054	MH-64	5.75	5.75	4.42	0.863	0.906	4.45	4.45	1.33
2057	MH-67	5.67	5.67	3.98	1.164	1.207	4.02	4.02	1.69
2065	MH-75	6.67	6.67	4.66	0.215	0.258	4.68	4.68	2.01
2066	MH-76	6.59	6.59	4.62	0.258	0.301	4.64	4.64	1.97
2069	MH-80	6.29	6.29	4.37	0.387	0.43	4.39	4.39	1.92
2070	MH-81	6.2	6.2	4.31	0.43	0.473	4.33	4.33	1.89
2071	MH-82	5.4	5.4	3.55	0.688	0.731	3.58	3.58	1.85
2076	MH-88	7.01	7.01	4.98	1.162	1.205	5.02	5.02	2.02
2078	MH-95	6.96	6.96	5.06	1.119	1.162	5.09	5.09	1.9
2079	MH-98	7.32	7.32	5.47	0.947	0.99	5.5	5.5	1.85
2086	MH-105	7.94	7.94	6.83	0.34	0.383	6.84	6.84	1.12
2089	MH-109	16.02	16.02	14.91	0	0.043	14.91	14.91	1.12
2090	MH-110	18.12	18.12	17	0	0.043	17	17	1.12
2097	MH-118	6.14	6.14	4.98	14.716	14.759	5.09	5.09	1.16
2098	MH-119	6.42	6.42	5.26	14.673	14.716	5.37	5.37	1.16
2099	MH-120	6.42	6.42	4.29	14.931	14.974	4.42	4.42	2.13
2106	MH-127	5.31	5.31	4.03	0.344	0.387	4.05	4.05	1.28
2107	MH-128	5.24	5.24	4.12	0.301	0.344	4.14	4.14	1.12
2109	MH-131	6	6	4.77	0.129	0.172	4.78	4.78	1.23
2111	MH-133	5.98	5.98	4.86	0.086	0.129	4.88	4.88	1.12
2115	MH-137	5.01	5.01	3.89	0.258	0.301	3.91	3.91	1.12
2118	MH-140	4.9	4.9	3.77	0.301	0.344	3.79	3.79	1.13
2119	MH-141	4.6	4.6	3.49	0.387	0.43	3.5	3.5	1.12
2122	MH-145	4.48	4.48	3.37	0.43	0.473	3.39	3.39	1.12
2123	MH-146	4.46	4.46	3.29	0.473	0.516	3.31	3.31	1.18

2128	MH-151	4.6	4.6	2.81	0.645	0.688	2.83	2.83	1.79
2129	MH-152	5.71	5.71	1.96	1.056	1.099	1.99	1.99	3.75
2131	MH-154	3.38	3.38	1.19	16.847	16.89	1.33	1.33	2.18
2135	MH-158	3.69	3.69	-1.79	7.668	7.711	-1.7	-1.7	5.48
2136	MH-159	4.01	4.01	-1.56	7.539	7.582	-1.48	-1.48	5.58
2138	MH-161	4.18	4.18	-1.33	7.41	7.453	-1.24	-1.24	5.51
2140	MH-163	4.54	4.54	3.2	0.086	0.129	3.21	3.21	1.34
2141	MH-166	4.43	4.43	3.11	0.129	0.172	3.12	3.12	1.33
2143	MH-168	4.26	4.26	0.79	8.299	8.342	0.88	0.88	3.47
2144	MH-169	4.77	4.77	2.34	7.396	7.439	2.42	2.42	2.43
2145	MH-170	5.49	5.49	2.83	7.181	7.224	2.92	2.92	2.65
2149	MH-174	6.76	6.76	4.72	0.172	0.215	4.73	4.73	2.04
2151	MH-176	6.48	6.48	4.86	0.086	0.129	4.87	4.87	1.62
2155	MH-180	5.92	5.92	3.2	1.462	1.505	3.24	3.24	2.73
2156	MH-181	6.33	6.33	3.92	1.161	1.204	3.95	3.95	2.42
2157	MH-182	6.39	6.39	3.94	1.118	1.161	3.97	3.97	2.45
2158	MH-183	6.56	6.56	4.02	1.032	1.075	4.06	4.06	2.54
2159	MH-184	7.24	7.24	6.11	0.645	0.688	6.13	6.13	1.14
2160	MH-185	7.6	7.6	6.49	0.516	0.559	6.51	6.51	1.12
2161	MH-186	19.74	19.74	18.62	0.258	0.301	18.64	18.64	1.12
2162	MH-189	20.7	20.7	19.55	0.172	0.215	19.56	19.56	1.15
2163	MH-190	21.85	21.85	20.74	0.043	0.086	20.74	20.74	1.12
2164	MH-191	23.96	23.96	22.84	0	0.043	22.85	22.85	1.12
2165	MH-192	23.91	23.91	22.79	0.043	0.086	22.8	22.8	1.12
2166	MH-193	20.26	20.26	19.14	0.129	0.172	19.15	19.15	1.12
2167	MH-194	19.9	19.9	18.79	0.172	0.215	18.8	18.8	1.12
2168	MH-195	17.63	17.63	16.51	0.215	0.258	16.53	16.53	1.12
2169	MH-197	6.5	6.5	5.38	0.387	0.43	5.4	5.4	1.12
2171	MH-199	5.93	5.93	4.81	0.43	0.473	4.83	4.83	1.12
2173	MH-201	5.28	5.28	1.08	6.163	6.206	1.16	1.16	4.2
2182	MH-211	48.26	48.26	47.14	0	0.043	47.14	47.14	1.12
2183	MH-212	46.78	46.78	45.67	0.215	0.258	45.68	45.68	1.12
2185	MH-214	45.76	45.76	44.64	0.301	0.594	44.66	44.66	1.12
2187	MH-216	40.51	40.51	39.39	0.69	0.733	39.42	39.42	1.12
2188	MH-217	17.72	17.72	16.6	1.034	1.077	16.62	16.62	1.12
2189	MH-218	10.61	10.61	9.49	1.206	1.249	9.52	9.52	1.12
2190	MH-219	8.56	8.56	7.44	1.292	1.335	7.47	7.47	1.12
2193	MH-222	6.82	6.82	2.84	1.462	1.505	2.87	2.87	3.99
2194	MH-223	6.93	6.93	3.45	1.204	1.247	3.48	3.48	3.49
2195	MH-225	6.7	6.7	3.56	1.118	1.161	3.59	3.59	3.14
2196	MH-226	6.7	6.7	3.59	1.075	1.118	3.62	3.62	3.11
2197	MH-227	6.71	6.71	3.69	0.989	1.032	3.72	3.72	3.01
2198	MH-228	6.88	6.88	3.87	0.903	0.946	3.9	3.9	3.01
2199	MH-229	6.89	6.89	3.89	0.86	0.903	3.92	3.92	3
2200	MH-230	6.87	6.87	3.93	0.817	0.86	3.96	3.96	2.94
2202	MH-232	6.92	6.92	4.07	0.731	0.774	4.09	4.09	2.86
2204	MH-235	6.86	6.86	4.22	0.645	0.688	4.24	4.24	2.64

2205	MH-236	7.05	7.05	4.41	0.559	0.602	4.43	4.43	2.64
2207	MH-238	6.87	6.87	4.75	0.387	0.43	4.77	4.77	2.12
2208	MH-239	6.97	6.97	4.78	0.344	0.387	4.8	4.8	2.19
2209	MH-240	7.09	7.09	4.92	0.258	0.301	4.93	4.93	2.17
2211	MH-243	8.24	8.24	5.2	0.817	0.86	5.22	5.22	3.04
2212	MH-244	9.35	9.35	5	0.903	0.946	5.03	5.03	4.35
2213	MH-245	6.88	6.88	5.67	5.246	5.289	5.74	5.74	1.21
2214	MH-246	7.54	7.54	3.32	3.182	3.225	3.37	3.37	4.22
2217	MH-249	7.15	7.15	6.03	0.731	0.774	6.05	6.05	1.12
2218	MH-250	12.42	12.42	11.31	0.516	0.559	11.33	11.33	1.12
2220	MH-252	21.03	21.03	19.91	0.387	0.43	19.93	19.93	1.12
2221	MH-253	30.32	30.32	29.2	0.301	0.344	29.22	29.22	1.12
2222	MH-254	33.23	33.23	32.11	0.215	0.258	32.12	32.12	1.12
2223	MH-255	35.47	35.47	33.27	0.129	0.172	33.28	33.28	2.2
2225	MH-257	7.33	7.33	3.58	2.236	2.279	3.63	3.63	3.74
2227	MH-260	8.47	8.47	7.36	0.086	0.129	7.37	7.37	1.12
2228	MH-262	8.68	8.68	7.51	0.043	0.086	7.52	7.52	1.17
2229	MH-263	8.47	8.47	7.35	0.086	0.129	7.36	7.36	1.12
2230	MH-265	7.57	7.57	4.35	1.634	1.677	4.39	4.39	3.22
2231	MH-266	7.47	7.47	4.26	1.677	1.72	4.3	4.3	3.2
2232	MH-267	8.12	8.12	4.97	1.376	1.419	5.01	5.01	3.15
2233	MH-268	8.3	8.3	5.24	1.247	1.29	5.27	5.27	3.07
2234	MH-269	8.97	8.97	5.79	0.946	0.989	5.82	5.82	3.18
2235	MH-270	8.81	8.81	5.7	1.032	1.075	5.73	5.73	3.11
2236	MH-271	9.09	9.09	5.87	0.903	0.946	5.9	5.9	3.22
2237	MH-272	9.13	9.13	5.91	0.86	0.903	5.94	5.94	3.23
2238	MH-276	8.49	8.49	7.16	0.487	0.53	7.18	7.18	1.33
2239	MH-278	12.48	12.48	11.36	0.186	0.229	11.37	11.37	1.12
2240	MH-279	18.3	18.3	17.18	0	0.043	17.18	17.18	1.12
2241	MH-280	17.36	17.36	16.24	0.129	0.172	16.25	16.25	1.12
2242	MH-281	17.7	17.7	16.58	0.086	0.129	16.59	16.59	1.12
2243	MH-282	13.4	13.4	12.28	0.258	0.301	12.29	12.29	1.12
2244	MH-283	14.05	14.05	12.93	0.215	0.258	12.95	12.95	1.12
2245	MH-284	10.85	10.85	9.73	0.344	0.387	9.75	9.75	1.12
2246	MH-285	6.83	6.83	5.71	0.516	0.559	5.73	5.73	1.12
2247	MH-286	6.62	6.62	5.5	0.559	0.602	5.52	5.52	1.12
2249	MH-288	6.15	6.15	5.03	0.645	0.688	5.05	5.05	1.12
2250	MH-290	5.75	5.75	4.37	0.817	0.86	4.4	4.4	1.37
2252	MH-293	5.21	5.21	4.08	0.903	0.946	4.11	4.11	1.13
2253	MH-294	5.2	5.2	4.02	0.989	1.032	4.05	4.05	1.18
2254	MH-295	2.75	2.75	1.63	1.333	1.376	1.67	1.67	1.12
2263	MH-306	8.61	8.61	6.61	0.922	0.965	6.64	6.64	1.99
2264	MH-307	9.32	9.32	6.78	0.387	0.43	6.8	6.8	2.54
2265	MH-308	8.64	8.64	7.52	0.301	0.344	7.54	7.54	1.12
2266	MH-309	9.45	9.45	8.33	0.258	0.301	8.35	8.35	1.12
2267	MH-310	6.11	6.11	3.93	1.309	1.352	3.96	3.96	2.18
2277	MH-321	8.2	8.2	6.35	1.505	1.548	6.38	6.38	1.85

2278	MH-323	6.51	6.51	1.5	1.333	1.376	1.54	1.54	5.01
2279	MH-324	7.41	7.41	1.62	1.247	1.29	1.65	1.65	5.79
2280	MH-325	5.96	5.96	1.88	1.161	1.204	1.91	1.91	4.08
2281	MH-326	5.82	5.82	2.09	1.032	1.075	2.13	2.13	3.73
2282	MH-327	4.82	4.82	3	0.645	0.688	3.03	3.03	1.82
2283	MH-328	4.82	4.82	3.02	0.602	0.645	3.05	3.05	1.8
2284	MH-329	4.78	4.78	3.59	0.344	0.387	3.61	3.61	1.18
2285	MH-330	12.9	12.9	11.69	0.043	0.086	11.7	11.7	1.21
2286	MH-331	12.89	12.89	11.65	0.086	0.129	11.67	11.67	1.24
2287	MH-332	4.64	4.64	3.52	0.344	0.387	3.54	3.54	1.12
2288	MH-333	4.53	4.53	3.41	0.43	0.473	3.43	3.43	1.12
2289	MH-334	3.9	3.9	2.78	0.559	0.602	2.8	2.8	1.12
2290	MH-335	3.73	3.73	2.59	0.645	0.688	2.61	2.61	1.14
2292	MH-337	3.64	3.64	2.52	0.688	0.731	2.54	2.54	1.12
2293	MH-338	3.46	3.46	1.44	1.075	1.118	1.47	1.47	2.02
2294	MH-339	3.51	3.51	1.38	1.118	1.161	1.41	1.41	2.13
2295	MH-340	3.44	3.44	1.25	1.161	1.204	1.28	1.28	2.19
2299	MH-344	6.65	6.65	3.94	0.215	0.258	3.97	3.97	2.71
2300	MH-345	5.81	5.81	4.11	0.129	0.172	4.12	4.12	1.7
2302	MH-350	6.61	6.61	3.33	0.348	0.391	3.35	3.35	3.28
2303	MH-354	5.44	5.44	3.43	0.172	0.305	3.45	3.45	2.01
2304	MH-355	5.34	5.34	3.64	0.086	0.129	3.65	3.65	1.7
2305	MH-356	5.27	5.27	3.74	0.043	0.086	3.75	3.75	1.53
2317	MH-378	5.4	5.4	2.58	1.462	1.505	2.62	2.62	2.81
2318	MH-379	5.39	5.39	2.68	1.419	1.462	2.71	2.71	2.71
2319	MH-380	5.32	5.32	2.93	1.333	1.376	2.97	2.97	2.39
2320	MH-383	5.38	5.38	3.41	1.118	1.161	3.45	3.45	1.97
2321	MH-386	5.35	5.35	4.14	0.817	0.86	4.17	4.17	1.21
2322	MH-387	6.49	6.49	5.21	0.688	0.731	5.24	5.24	1.28
2323	MH-389	10.94	10.94	9.82	0.473	0.516	9.84	9.84	1.12
2324	MH-392	13.67	13.67	10.47	0.344	0.387	10.49	10.49	3.2
2325	MH-393	20.43	20.43	19.31	0	0.043	19.32	19.32	1.12
2326	MH-395	18.01	18.01	16.63	0.086	0.129	16.64	16.64	1.38
2327	MH-400	6.49	6.49	5.18	1.007	1.05	5.21	5.21	1.3
2343	MH-424	5.39	5.39	0.3	2.967	3.01	0.36	0.36	5.09
2344	MH-425	5.37	5.37	0.19	3.01	3.053	0.24	0.24	5.19
2346	MH-427	5.54	5.54	3.86	4.257	4.3	3.92	3.92	1.68
2347	MH-429	5.51	5.51	3.95	4.171	4.214	4.01	4.01	1.56
2348	MH-430	5.51	5.51	3.97	4.128	4.171	4.03	4.03	1.55
2349	MH-431	5.51	5.51	4.05	4.042	4.085	4.11	4.11	1.46
2350	MH-432	5.46	5.46	4.11	3.956	3.999	4.17	4.17	1.36
2351	MH-433	5.47	5.47	4.09	3.999	4.042	4.15	4.15	1.38
2352	MH-434	5.44	5.44	4.19	3.913	3.956	4.25	4.25	1.25
2353	MH-435	5.43	5.43	4.2	3.87	3.913	4.26	4.26	1.23
2355	MH-438	5.21	5.21	0.66	2.34	2.383	0.7	0.7	4.55
2356	MH-440	4.89	4.89	1.13	2.082	2.125	1.17	1.17	3.76
2357	MH-442	4.77	4.77	1.51	1.91	1.953	1.56	1.56	3.26

2358	MH-444	4.78	4.78	1.62	1.824	1.867	1.66	1.66	3.16
2359	MH-445	4.88	4.88	2.15	1.609	1.652	2.19	2.19	2.72
2360	MH-447	4.87	4.87	2.2	1.566	1.609	2.24	2.24	2.67
2361	MH-448	4.86	4.86	2.25	1.523	1.566	2.29	2.29	2.6
2362	MH-450	5.58	5.58	4.13	0.602	0.645	4.15	4.15	1.45
2363	MH-453	8.16	8.16	7.04	0.043	0.086	7.05	7.05	1.12
2367	MH-457	12.13	12.13	11.01	0.043	0.086	11.02	11.02	1.12
2372	MH-465	11.75	11.75	10.59	0.129	0.172	10.6	10.6	1.16
2378	MH-473	12.49	12.49	11.37	0.043	0.086	11.38	11.38	1.12
2379	MH-474	8.95	8.95	7.83	0.043	0.086	7.84	7.84	1.12
2381	MH-477	4.82	4.82	1.97	1.29	1.333	2.01	2.01	2.84
2383	MH-479	5.22	5.22	2.43	1.075	1.118	2.46	2.46	2.79
2385	MH-482	5.92	5.92	3.01	0.817	0.86	3.04	3.04	2.92
2386	MH-485	6	6	3.04	0.774	0.817	3.07	3.07	2.96
2387	MH-487	6.06	6.06	3.16	0.688	0.731	3.19	3.19	2.89
2388	MH-489	8.13	8.13	3.5	0.516	0.559	3.52	3.52	4.64
2389	MH-490	8.88	8.88	3.67	0.387	0.43	3.69	3.69	5.22
2390	MH-492	8.53	8.53	3.72	0.301	0.344	3.74	3.74	4.8
2391	MH-493	8.75	8.75	3.69	0.344	0.387	3.71	3.71	5.06
2392	MH-495	7.39	7.39	3.91	0.172	0.215	3.92	3.92	3.48
2393	MH-498	5.73	5.73	4.18	0.043	0.086	4.19	4.19	1.55
2394	MH-499	5.49	5.49	4.37	0	0.043	4.37	4.37	1.12
2395	MH-500	4.4	4.4	2.5	1.763	1.806	2.54	2.54	1.9
2396	MH-504	4.44	4.44	2.41	1.849	1.892	2.45	2.45	2.03
2398	MH-507	4.43	4.43	2.28	1.935	1.978	2.32	2.32	2.16
2399	MH-508	4.44	4.44	2.21	2.021	2.064	2.26	2.26	2.22
2400	MH-509	4.44	4.44	2.18	2.064	2.107	2.23	2.23	2.26
2401	MH-510	4.46	4.46	1.96	2.193	2.236	2.01	2.01	2.5
2402	MH-571	8.36	8.36	7.01	0.473	0.516	7.03	7.03	1.35
2403	MH-575	6.99	6.99	5.87	0.559	0.602	5.89	5.89	1.12
2404	MH-576	6.89	6.89	5.73	0.645	0.688	5.75	5.75	1.16
2405	MH-579	6.76	6.76	5.32	0.817	0.86	5.35	5.35	1.44
2406	MH-580	6.67	6.67	5.17	0.903	0.946	5.2	5.2	1.5
2407	MH-581	6.65	6.65	5.15	0.946	0.989	5.18	5.18	1.5
2408	MH-582	6.59	6.59	5.1	0.989	1.032	5.13	5.13	1.49
2409	MH-588	6.1	6.1	4.98	0.43	0.473	5	5	1.12
2412	MH-591	14.26	14.26	13.15	0.215	0.258	13.16	13.16	1.12
2413	MH-592	19.63	19.63	18.51	0.086	0.129	18.52	18.52	1.12
2416	MH-596	5.78	5.78	3.52	2.107	2.15	3.56	3.56	2.26
2417	MH-598	6.22	6.22	5.02	6.835	6.878	5.1	5.1	1.2
2418	MH-602	6.25	6.25	5.13	0	6.792	5.21	5.21	1.12
2419	MH-604	6.38	6.38	0.85	6.706	6.749	0.93	0.93	5.53
2420	MH-612	7.68	7.68	6.56	0.344	0.387	6.58	6.58	1.12
2421	MH-638	19.46	19.46	17.83	0.258	0.301	17.84	17.84	1.63
2422	MH-639	19.11	19.11	17.77	0.301	0.344	17.79	17.79	1.34
2438	MH-666	5.06	5.06	3.85	27.894	27.937	3.99	3.99	1.22
2439	MH-667	5.03	5.03	3.81	27.937	27.98	3.95	3.95	1.22

2441	MH-670	4.51	4.51	2.96	28.41	28.453	3.14	3.14	1.55
2447	MH-677	8.37	8.37	7.25	0.344	0.387	7.27	7.27	1.12
2448	MH-678	7.9	7.9	6.78	0.387	0.43	6.8	6.8	1.12
2451	MH-682	4.96	4.96	3.84	0.387	0.43	3.86	3.86	1.12
2452	MH-685	13.71	13.71	12.59	0	0.043	12.6	12.6	1.12
2453	MH-686	10.12	10.12	9	0.043	0.086	9.01	9.01	1.12
2454	MH-688	5.65	5.65	4.1	0.43	0.473	4.12	4.12	1.55
2455	MH-689	5.66	5.66	4.12	0.387	0.43	4.15	4.15	1.54
2456	MH-690	5.37	5.37	3.94	0.516	0.559	3.96	3.96	1.43
2457	MH-692	5.94	5.94	3.22	1.228	1.271	3.26	3.26	2.72
2458	MH-694	5.8	5.8	2.51	2.237	2.28	2.56	2.56	3.29
2459	MH-695	5.86	5.86	2.63	2.108	2.151	2.68	2.68	3.23
2460	MH-696	5.86	5.86	2.62	2.151	2.194	2.66	2.66	3.24
2461	MH-697	5.64	5.64	0.7	2.795	2.838	0.75	0.75	4.94
2462	MH-700	5.81	5.81	1.04	2.236	2.279	1.09	1.09	4.77
2463	MH-703	8.26	8.26	7.14	0	0.043	7.15	7.15	1.12
2465	MH-707	6.42	6.42	1.72	1.036	1.079	1.75	1.75	4.7
2466	MH-709	6.4	6.4	1.69	1.079	1.122	1.72	1.72	4.72
2467	MH-711	6.35	6.35	1.62	1.165	1.208	1.65	1.65	4.73
2468	MH-714	7.25	7.25	6.13	0	1.251	6.16	6.16	1.12
2470	MH-717	7.07	7.07	5.93	1.466	1.509	5.96	5.96	1.14
2471	MH-719	7	7	5.8	1.552	1.595	5.84	5.84	1.2
2472	MH-720	7	7	5.77	1.595	1.638	5.81	5.81	1.22
2473	MH-721	6.95	6.95	5.7	1.681	1.724	5.73	5.73	1.25
2477	MH-729	3.12	3.12	1.04	0.258	0.301	1.06	1.06	2.08
2478	MH-730	3.4	3.4	0.3	0.516	0.559	0.32	0.32	3.1
2480	MH-732	3.37	3.37	0.21	0.559	0.602	0.23	0.23	3.16
2483	MH-735	3.3	3.3	0.13	0.602	0.645	0.15	0.15	3.18
2486	MH-738	3.29	3.29	0.06	0.645	0.688	0.09	0.09	3.22
2490	MH-743	2.28	2.28	0.51	37.099	37.142	0.72	0.72	1.76
2493	MH-747	2.31	2.31	0.6	37.013	37.056	0.8	0.8	1.71
2495	MH-749	2.24	2.24	0.65	36.97	37.013	0.85	0.85	1.59
2496	MH-750	29.6	29.6	28.49	0.215	0.258	28.5	28.5	1.12
2497	MH-751	20.65	20.65	19.53	0.43	0.473	19.55	19.55	1.12
2500	MH-755	4.15	4.15	0.65	9.116	9.159	0.75	0.75	3.5
2501	MH-756	4.18	4.18	0.12	9.331	9.374	0.2	0.2	4.07
2506	MH-766	5.53	5.53	3.94	0.086	0.129	3.95	3.95	1.59
2507	MH-769	5.45	5.45	0.99	3.373	3.416	1.05	1.05	4.46
2508	MH-771	5.4	5.4	0.92	3.416	3.459	0.97	0.97	4.48
2509	MH-774	5.28	5.28	0.57	3.568	3.611	0.63	0.63	4.7
2512	MH-778	5.43	5.43	3.9	0.43	0.473	3.93	3.93	1.53
2513	MH-780	5.41	5.41	3.88	0.473	0.516	3.9	3.9	1.54
2514	MH-783	5.51	5.51	4.39	0.215	0.258	4.4	4.4	1.12
2515	MH-784	5.76	5.76	4.62	0.129	0.172	4.63	4.63	1.14
2516	MH-785	4.18	4.18	-0.06	5.369	5.412	0.01	0.01	4.24
2518	MH-791	6.55	6.55	3.09	3.61	3.653	3.15	3.15	3.46
2519	MH-792	6.5	6.5	3.15	3.567	3.61	3.21	3.21	3.35

2520	MH-794	6.47	6.47	3.21	3.524	3.567	3.27	3.27	3.25
2521	MH-795	6.16	6.16	3.66	3.309	3.352	3.72	3.72	2.5
2522	MH-796	6.15	6.15	3.68	3.266	3.309	3.73	3.73	2.48
2523	MH-800	6.16	6.16	3.78	3.18	3.223	3.83	3.83	2.38
2524	MH-801	6.48	6.48	4.15	3.008	3.051	4.21	4.21	2.32
2525	MH-802	6.63	6.63	1.69	5.287	5.33	1.76	1.76	4.94
2526	MH-804	6.53	6.53	2.03	5.115	5.158	2.1	2.1	4.5
2527	MH-807	7.04	7.04	5.85	0.258	0.301	5.87	5.87	1.19
2528	MH-809	7.04	7.04	5.92	0.215	0.258	5.94	5.94	1.12
2529	MH-810	7.08	7.08	5.96	0.172	0.215	5.97	5.97	1.12
2530	MH-811	16.48	16.48	15.36	0.211	0.254	15.38	15.38	1.12
2531	MH-813	16.28	16.28	15.16	0.254	0.297	15.18	15.18	1.12
2532	MH-815	10.68	10.68	9.56	0.426	0.469	9.58	9.58	1.12
2533	MH-817	7.37	7.37	4.06	1.763	1.806	4.1	4.1	3.32
2534	MH-819	8.4	8.4	6.63	0.688	0.991	6.66	6.66	1.77
2535	MH-822	7.57	7.57	5.48	0.43	0.473	5.5	5.5	2.08
2536	MH-825	6.61	6.61	4.75	0.344	0.387	4.77	4.77	1.86
2537	MH-826	6.97	6.97	4.92	0.258	0.301	4.93	4.93	2.06
2538	MH-828	6.75	6.75	5.25	0.086	0.129	5.26	5.26	1.5
2539	MH-837	22.1	22.1	20.98	0.504	0.547	21	21	1.12
2540	MH-838	27.94	27.94	26.82	0.332	0.375	26.84	26.84	1.12
2541	MH-839	28.7	28.7	27.58	0.289	0.332	27.59	27.59	1.12
2542	MH-848	30.38	30.38	29.26	0.246	0.289	29.27	29.27	1.12
2543	MH-850	25.4	25.4	24.28	0.418	0.461	24.3	24.3	1.12
2544	MH-851	5.34	5.34	4.21	0.43	0.473	4.23	4.23	1.14
2545	MH-852	5.24	5.24	4.08	0.473	0.516	4.11	4.11	1.15
5182	MH-12	7.72	7.72	2.07	9.427	9.47	2.15	2.15	5.65
5429	MH-23	8.1	8.1	6.98	0.086	0.129	6.99	6.99	1.12
5433	MH-25	4.36	4.36	1.51	2.365	2.408	1.56	1.56	2.85
5437	MH-26	4.66	4.66	3.13	0.731	0.774	3.16	3.16	1.53
5440	MH-27	4.74	4.74	3.18	0.645	0.688	3.21	3.21	1.55
5445	MH-28	5.07	5.07	0.75	2.254	2.297	0.8	0.8	4.32
5454	MH-29	3.13	3.13	1.93	0.043	0.086	1.94	1.94	1.2
5457	MH-30	3.25	3.25	2.13	0	0.043	2.14	2.14	1.12
5461	MH-31	6.87	6.87	3.46	1.161	1.204	3.5	3.5	3.41
5465	MH-32	8.01	8.01	4.21	0.903	0.946	4.24	4.24	3.8
5494	MH-47	7.41	7.41	6.29	0.258	0.301	6.31	6.31	1.12
5499	MH-49	5.68	5.68	4.56	0.344	0.387	4.58	4.58	1.12
5502	MH-50	8.41	8.41	7.29	0.129	0.172	7.3	7.3	1.12
5505	MH-51	6.91	6.91	2.86	1.333	1.376	2.89	2.89	4.06
5508	MH-52	6.73	6.73	2.58	1.505	1.548	2.62	2.62	4.15
5511	MH-53	6.77	6.77	2.77	1.419	1.462	2.8	2.8	4
5516	MH-54	7.45	7.45	3.1	1.247	1.29	3.13	3.13	4.36
5520	MH-55	7.49	7.49	5.98	6.502	6.545	6.06	6.06	1.5
5523	MH-56	7.68	7.68	5.88	6.588	6.631	5.96	5.96	1.79
5526	MH-57	7.71	7.71	5.7	6.674	6.717	5.78	5.78	2
5529	MH-58	7.72	7.72	5.63	6.76	6.803	5.71	5.71	2.09

5533	MH-60	9.67	9.67	8.55	5.986	6.029	8.62	8.62	1.12
5536	MH-61	8.13	8.13	3.15	1.936	1.979	3.19	3.19	4.98
5541	MH-64	8.07	8.07	3.38	1.807	1.85	3.42	3.42	4.7
5544	MH-65	7.31	7.31	5.39	0.99	1.033	5.42	5.42	1.93
5547	MH-66	5.26	5.26	0.35	2.884	2.927	0.4	0.4	4.91
5550	MH-67	4.57	4.57	1.75	2.325	2.368	1.79	1.79	2.82
5554	MH-68	6.92	6.92	1.92	1.892	1.935	1.96	1.96	5
5557	MH-69	6.95	6.95	2.01	1.806	1.849	2.06	2.06	4.93
5560	MH-70	6.89	6.89	2.15	1.72	1.763	2.19	2.19	4.74
5563	MH-71	6.86	6.86	2.36	1.591	1.634	2.4	2.4	4.5
5626	MH-73	4.71	4.71	2.35	5.169	5.169	2.42	2.42	2.36
5630	MH-74	7.13	7.13	6.01	3.784	3.784	6.07	6.07	1.12
5631	MH-75	5.38	5.38	-0.01	6.837	6.837	0.07	0.07	5.39

കൊയിലാണ്ടി മുനിസിപ്പാലിറ്റി

25.08.2021 തീയതി നടന്ന അടിയന്തിരയോഗത്തിലെ

2 - നമ്പർ തീരുമാനം.

അജണ്ട :

2 : PW1/6202/21: കൊയിലാണ്ടി നഗരസഭയിൽ മലിന ജല ശുദ്ധീകരണ ശാല സ്ഥാപിക്കുന്നതിന് സ്ഥലം ഏറ്റെടുക്കുന്ന വിഷയം കൗൺസിൽ മുൻപാകെ. :-

വിവരണം :

1. റെയിൽവേ ലൈനിന്റെ പാടിഞ്ഞാറ് ഭാഗത്ത് ഹൈവേക്കടുത്തുള്ള ഗുരുകുലം ബീച്ച് റോഡിൽ വശ്യത്ത് കണ്ടി പറമ്പിൽ കുഞ്ഞമ്മദ് എന്നയാളിന്റെ ഉടമസ്ഥതയിലുള്ള (സർവേ നമ്പർ 119/12, റീസർവേ നമ്പർ 8/4) 42 സെന്റ് സ്ഥലവും, കിഴക്ക് ഭാഗത്ത് പെരുവട്ടൂർ ദേശം പന്തലായനി വില്ലേജിലെ (സർവേ നമ്പർ 4/5) 126 സെന്റ് സ്ഥലവും പ്രസ്തുത പദ്ധതിയുടെ ട്രീറ്റ്മെന്റ് പ്ലാന്റ് സ്ഥാപിക്കുന്നതിനുള്ള ഉചിതമായ സ്ഥലങ്ങളായി കണ്ടെത്തിയിട്ടുണ്ട് എന്ന് KWA 29/07/2021 ന് കത്ത് മുഖേന അറിയിച്ചിട്ടുണ്ട്.
2. മേൽ സ്ഥലങ്ങൾ ഏറ്റെടുത്ത് നൽകുന്നതിന് 10/08/2021 തീയതിയിലെ മരാമത്ത് സ്റ്റാൻഡിംഗ് കമ്മറ്റിയുടെ 08-ാം നമ്പർ തീരുമാനമായി, വിഷയം കൗൺസിലിലേക്ക് ശുപാർശ ചെയ്തിട്ടുണ്ട്.

ഫയൽ നമ്പർ : PW1/6202/21

തീരുമാന നമ്പർ : 2 തീയതി : 25.08.2021

തീരുമാനം :

10/08/2021 തീയതിയിലെ മരാമത്ത് സ്റ്റാൻഡിംഗ് കമ്മറ്റിയുടെ 08-ാം നമ്പർ തീരുമാനപ്രകാരമുള്ള ശുപാർശയുടെ അടിസ്ഥാനത്തിൽ കേരള വാട്ടർ അതോറിറ്റി സൂപ്രണ്ടിങ് എഞ്ചിനീയറുടെ 29/7/21 ലെ NO.KWA/PPD/KKD/D3/SEWERAGE/2020 കത്ത് പ്രകാരം മലിന ജല ശുദ്ധീകരണ പ്ലാന്റ് സ്ഥാപിക്കുന്നതിനുള്ള ഉചിതമായ സ്ഥലങ്ങളായി കണ്ടെത്തിയ പന്തലായനി വില്ലേജ് പന്തലായനി ദേശത്ത് സർവേ നമ്പർ 119/12 (റീസർവേ നമ്പർ 8/4) ഉൾപ്പെട്ട 42 സെന്റ് സ്ഥലവും പന്തലായനി വില്ലേജ് പെരുവട്ടൂർ ദേശം സർവേ നമ്പർ 4/5 ൽ ഉൾപ്പെട്ട 126 സെന്റ് സ്ഥലവും കേന്ദ്രാവിഷ്കൃത പദ്ധതിയായ സ്വച്ഛ്ഭാരത് മിഷനിലുൾപ്പെടുത്തി ഏറ്റെടുക്കുന്നതിന് കൗൺസിൽ തീരുമാനിച്ചു.

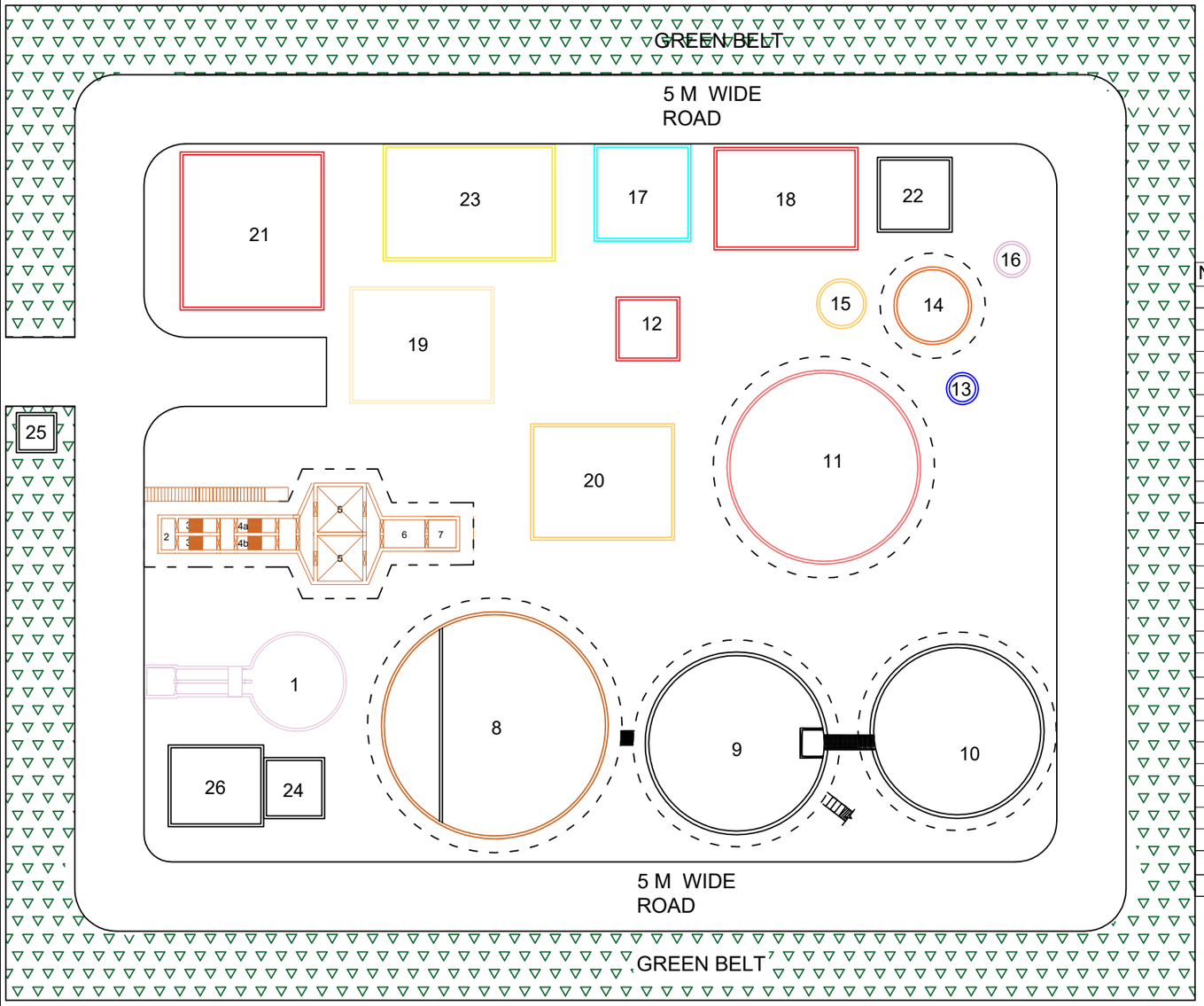
ശരിപകർപ്പ്

സെക്രട്ടറി

KOYILANDY MUNICIPALITY OFFICE Date..... KOYILANDY

(ഒപ്പ്)

ചെയർമാൻ/
ചെയർപേർസൺ



NO	DESCRIPTION	L/DIA	B
1	RAW SEWAGE WELL		
2	RECEIVING CHAMBER	2.25	1
3 a	COARSE SCREEN CHANNEL-MECHANICAL	2.75	1
3b	COARSE SCREEN CHANNEL-MANUAL	2.75	1
4 a	FINE SCREEN CHANNEL-MECHANICAL	2.75	1
4 b	FINE SCREEN CHANNEL-MANUAL	2.75	1
5	GRIT CHAMBER	3	3
6	PARSHALL FLUME	3	2
7	DISTRIBUTION CHAMBER	2	2
8	EQUALISATION TANK	16	DIA
9	MBBR 1	14.8	DIA
10	MBBR 2	13.8	DIA
11	SECONDARY SETTING TANK	13.6	DIA
12	FILTER FEED TANK	4.2	4.2
13	SLUDGE SUMP	1.9	DIA
14	SLUDGE THICKNER	5.2	DIA
15	THICKNED SLUDGE SUMP	3.2	DIA
16	CENTRATE SUMP	2.2	DIA
17	TREATED WATER TANK	6.6	6.6
18	CENTRIFUGE STRUCTURE	10	7
19	CHLORINATOR ROOM	10	8
20	BLOWER ROOM	10	8
21	ADMINISTRATIVE BUILDING	10	8
22	SLUDGE STORAGE SHED	5	5
23	ASF/PSF	12	8
24	DG ROOM	4	4
25	SECURITY ROOM	2.5	2.5
26	TRANSFORMER YARD	6.5	5.5

GENERAL NOTES

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

No.	Rivision/ Issue	Date

PPD & SEWERAGE CIRCLE,
KERALA WATER AUTHORITY,
KOZHIKODE

PROJECT NAME

Sewerage scheme to Koyilandy Municipality Phase 2- Construction of 3 MLD capacity sewage treatment plant and laying Sewerage network to zone 2 of Koyilandy Municipality

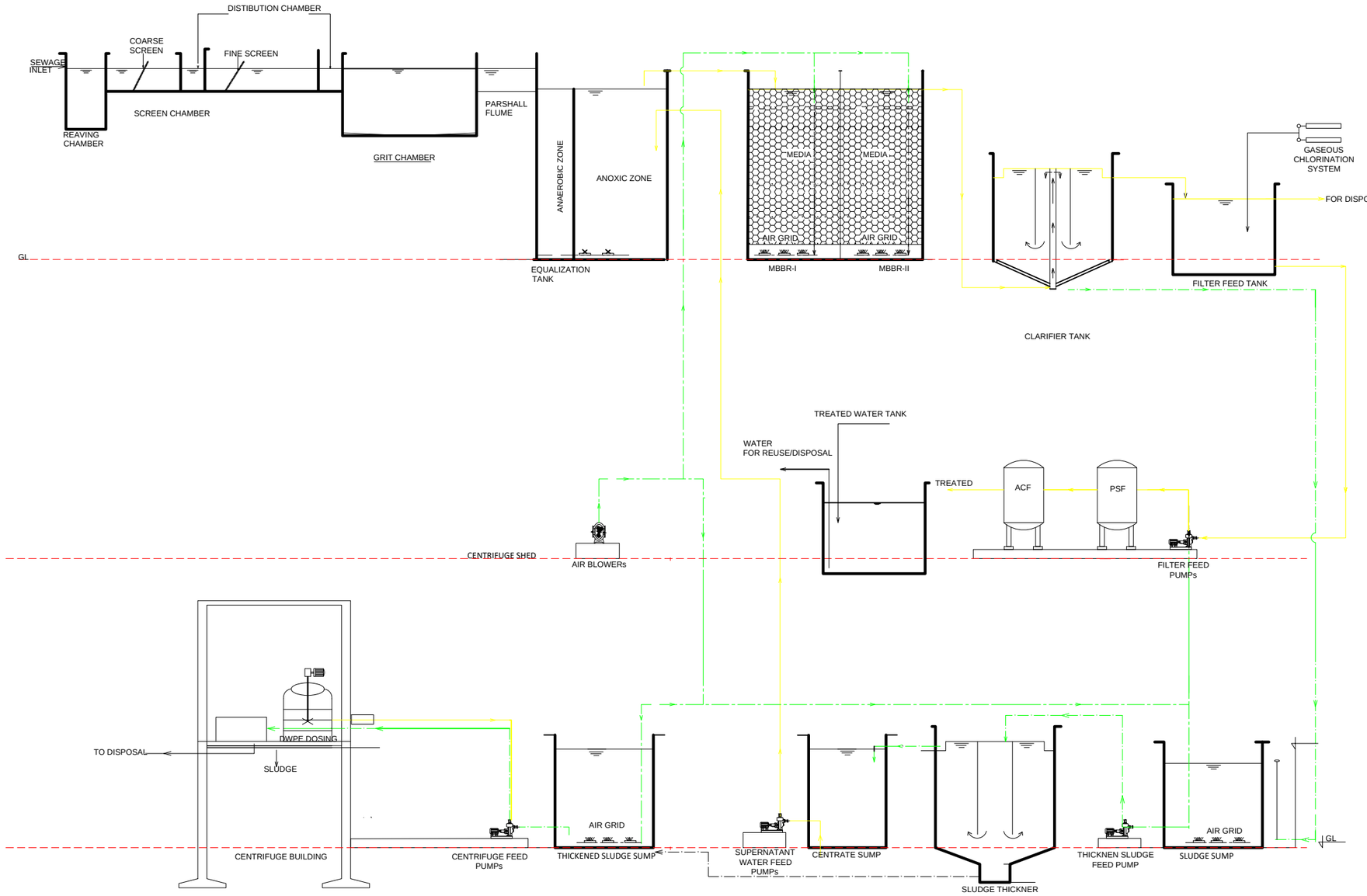
DRAWING TITLE

LAYOUT

1/KOYILANDY/ZONE 2

Not in scale

AE	AEE	EE	SE	CE



GENERAL NOTES

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

No.	Rivision/ Issue	Date

PPD & SEWERAGE CIRCLE, KERALA WATER AUTHORITY, KOZHIKODE

PROJECT NAME

Sewerage scheme to Koyilandy Municipality Phase 2- Construction of 3 MLD capacity sewage treatment plant and laying Sewerage network to zone 2 of Koyilandy Municipality

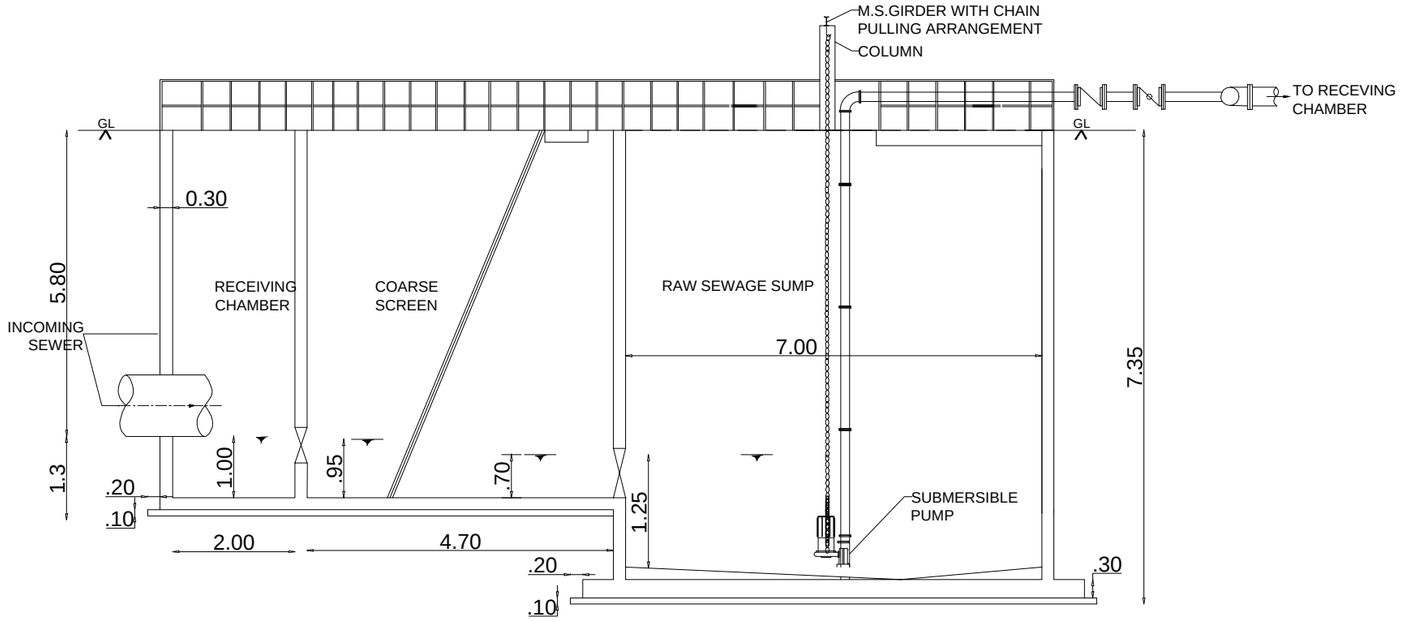
DRAWING TITLE

HYDRAULIC FLOW DIAGRAM

2/KOYILANDY/ZONE 2

Not in scale

AE	AEE	EE	SE	CE



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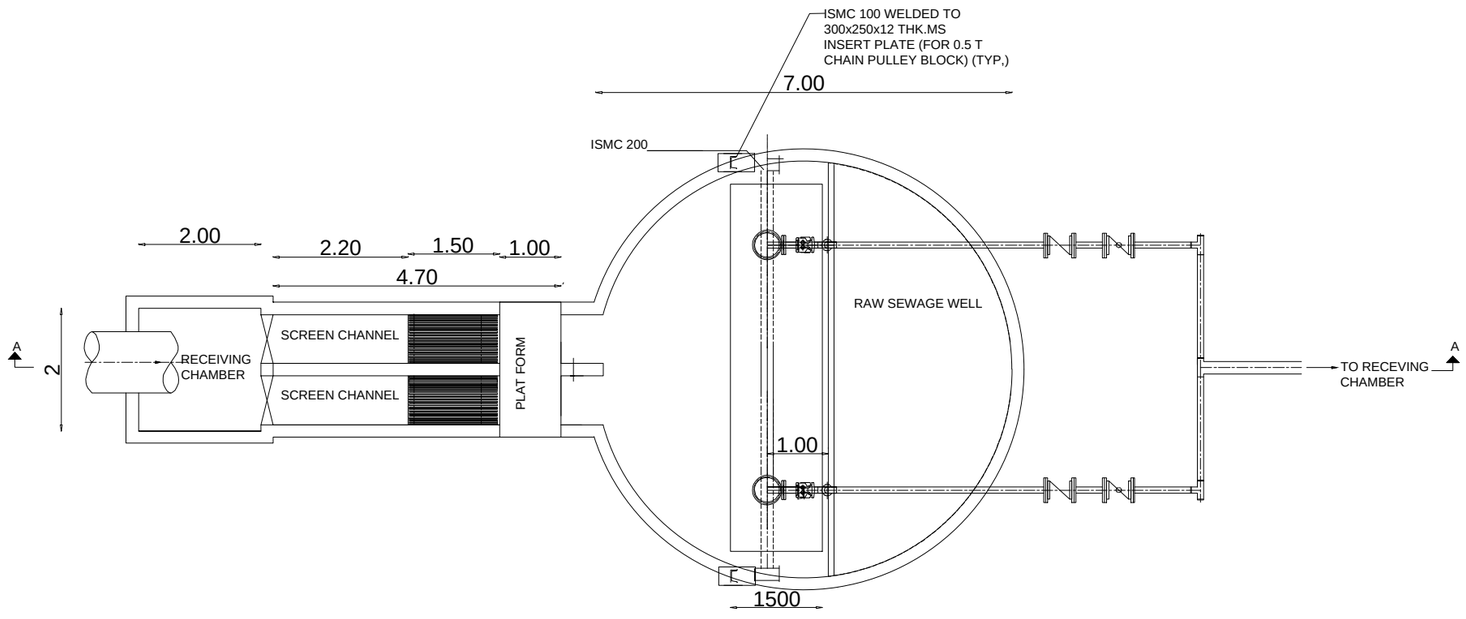


PLAN

GENERAL NOTES

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

No.	Rivision/ Issue	Date

PPD & SEWERAGE CIRCLE,
KERALA WATER AUTHORITY,
KOZHIKODE

PROJECT NAME

Sewerage scheme to Koyilandy Municipality Phase 2- Construction of 3 MLD capacity sewage treatment plant and laying Sewerage network to zone 2 of Koyilandy Municipality

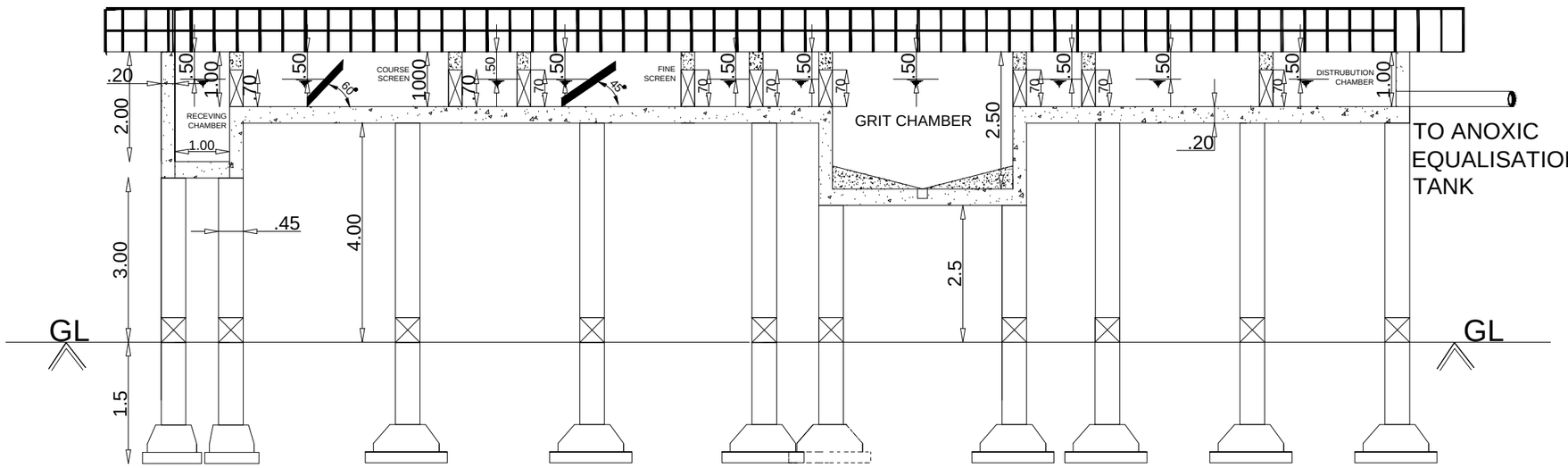
DRAWING TITLE

RAW SEWAGE PUMP WELL

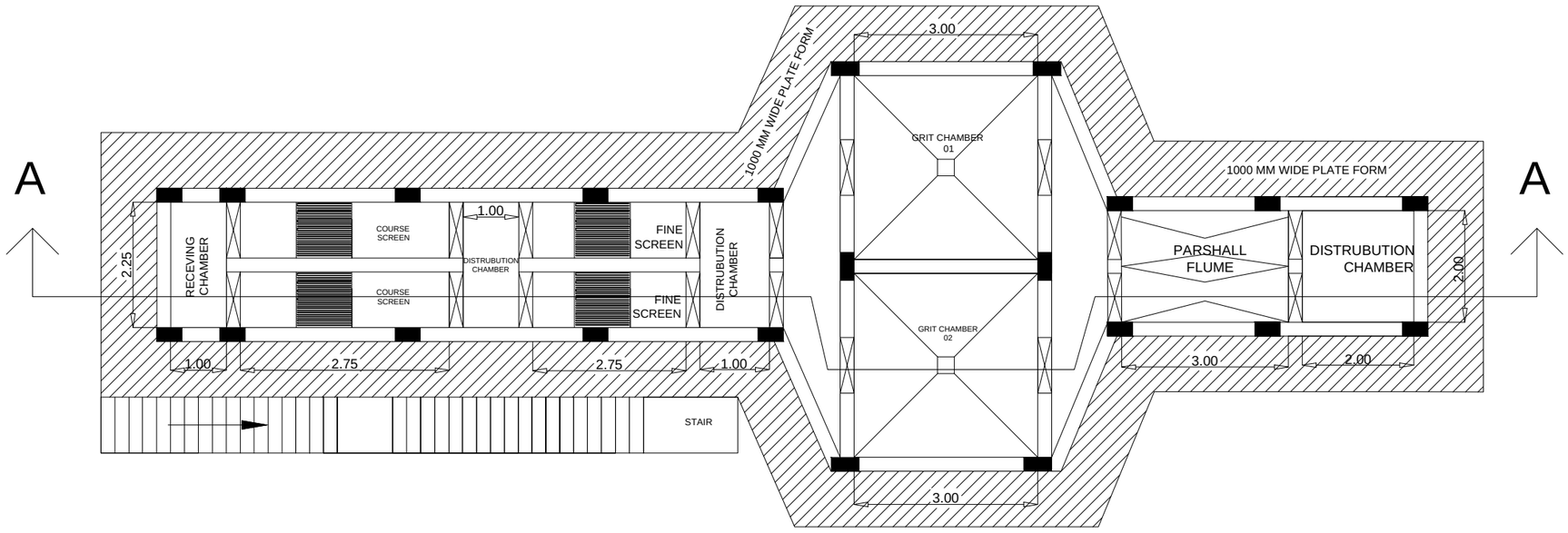
3/KOYILANDY/ZONE 2

Not in scale

AE	AEE	EE	SE	CE



SECTION: A-A



PLAN

GENERAL NOTES

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

No.	Rivision/ Issue	Date

PPD & SEWERAGE CIRCLE,
KERALA WATER AUTHORITY,
KOZHIKODE

PROJECT NAME

Sewerage scheme to Koyilandy Municipality Phase 2- Construction of 3 MLD capacity sewage treatment plant and laying Sewerage network to zone 2 of Koyilandy Municipality

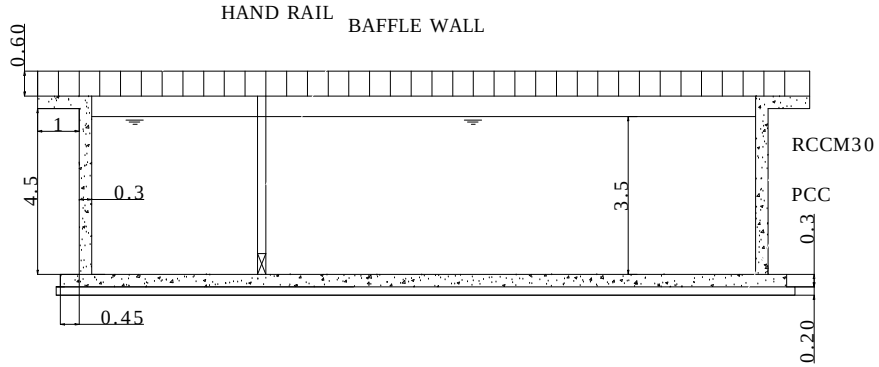
DRAWING TITLE

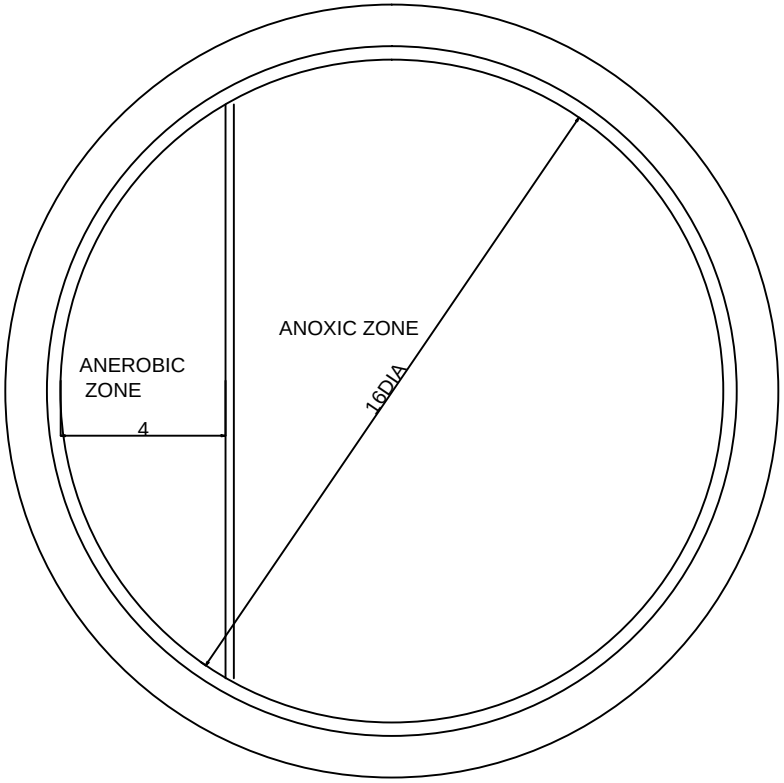
DETAILS OF RECEIVING CHAMBER SCREEN RAW SEWAGE WELL

4/KOYILANDY/ZONE 2

Not in scale

AE	AEE	EE	SE	CE





GENERAL NOTES

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

No.	Rivision/ Issue	Date

PPD & SEWERAGE CIRCLE, KERALA WATER AUTHORITY, KOZHIKODE

PROJECT NAME

Sewerage scheme to Koyilandy Municipality Phase-2 Construction of 3MLD capacity sewage Treatment plant and laying sewerage network to zone 2 of Koyilandy Municipality

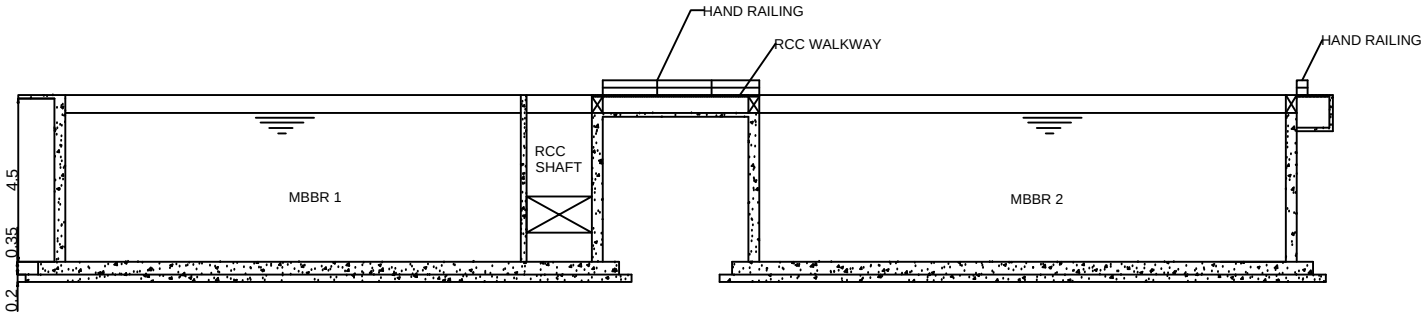
DRAWING TITLE

EQUALISATION TANK

5/KOYILANDI/ZONE2

Not in scale

AE	AEE	EE	SE	CE



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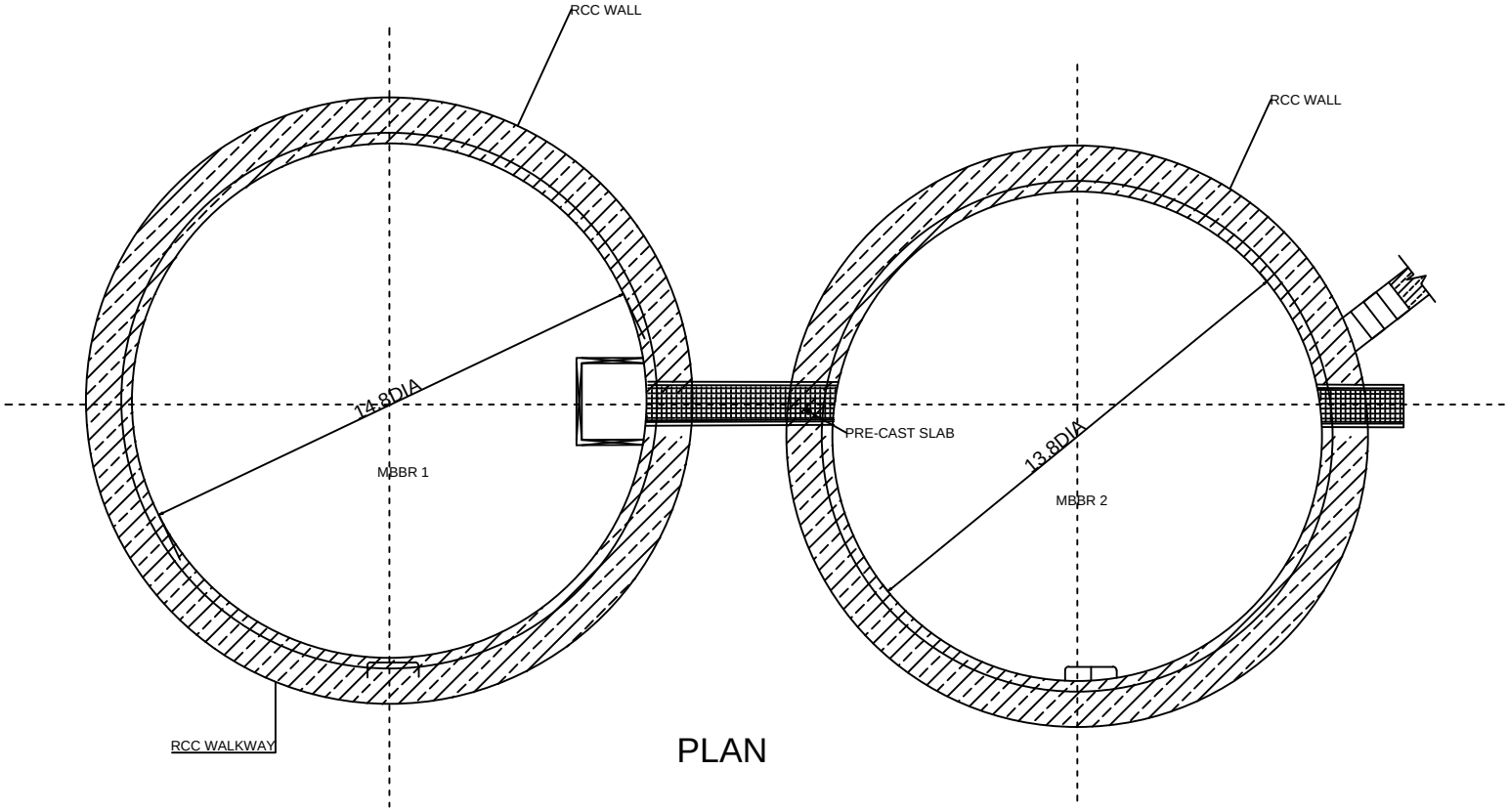


PLAN

GENERAL NOTES

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

No.	Rivision/ Issue	Date

PPD & SEWERAGE CIRCLE, KERALA WATER AUTHORITY, KOZHIKODE

PROJECT NAME

Sewerage scheme to Koyilandi Muncipality Phase 2- Construction of 3 MLD capacity sewage Treatment plant and laying sewerage network to zone 2 of Koyilandi Muncipality

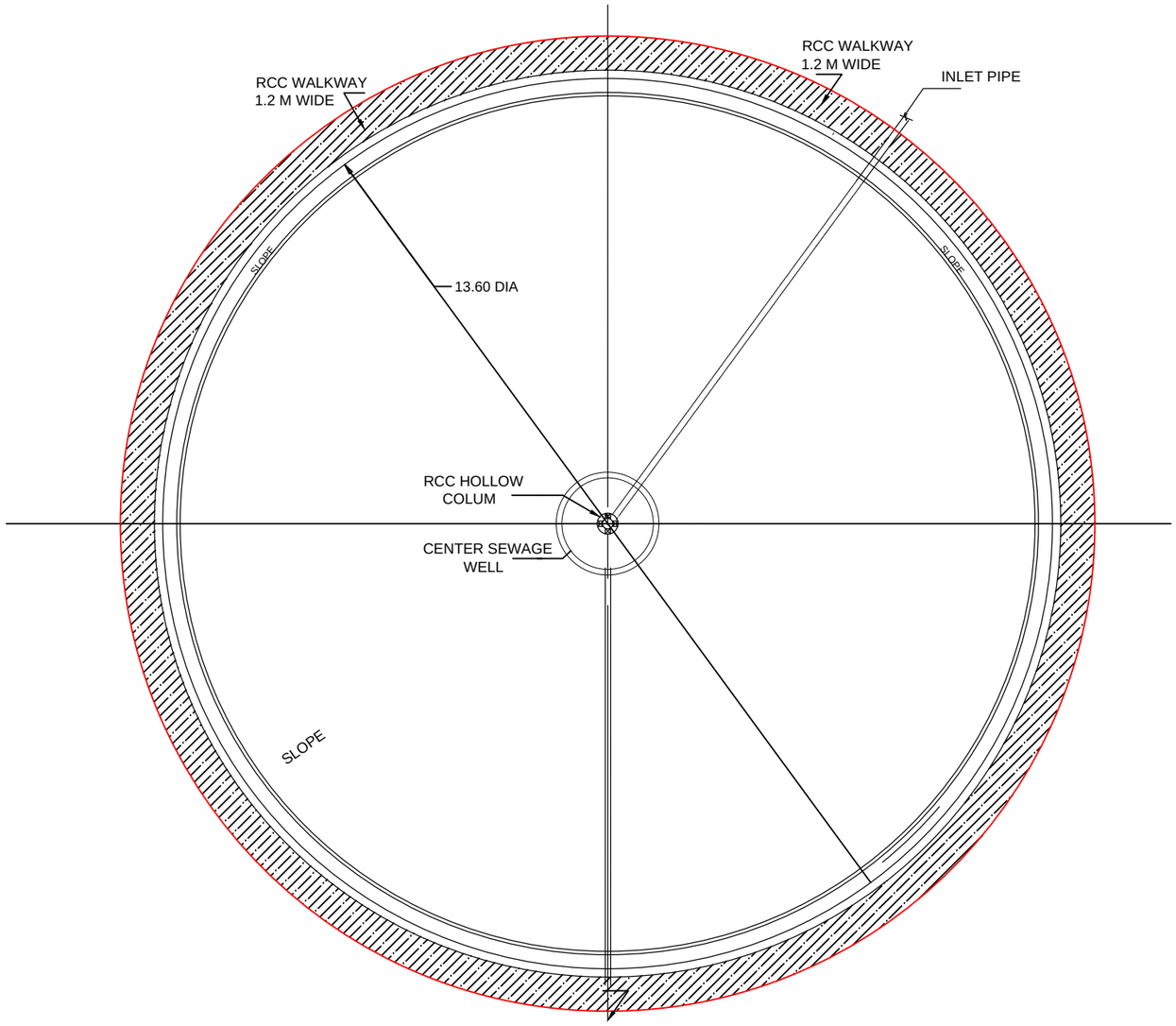
DRAWING TITLE

MBBR TANK

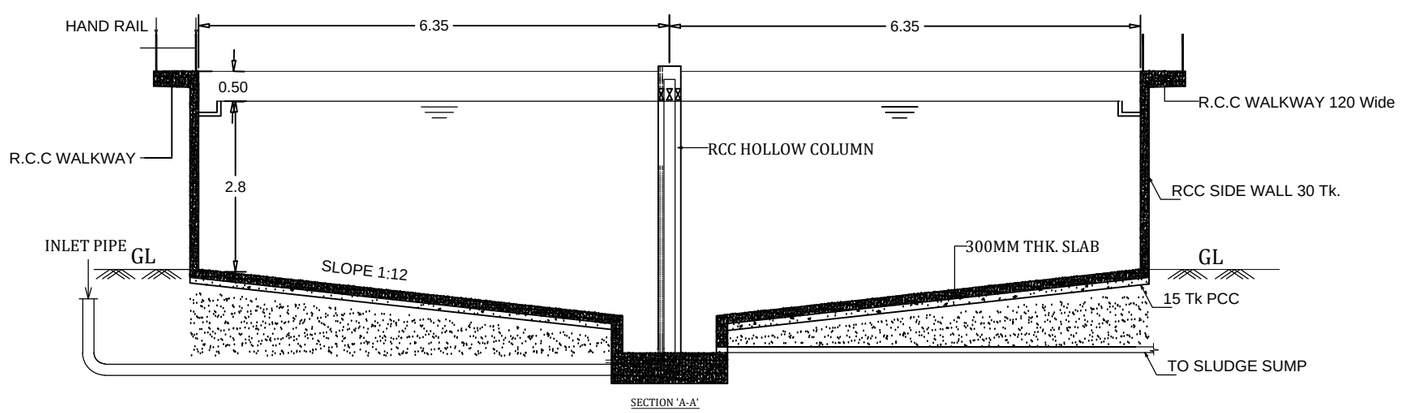
7 KOYILANDI ZONE2

Not in scale

AE	AEE	EE	SE	CE



PLAN



SECTION 'A-A'

GENERAL NOTES

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

No.	Rivision/ Issue	Date

PPD & SEWERAGE CIRCLE,
KERALA WATER AUTHORITY,
KOZHIKODE

PROJECT NAME

Sewerage scheme to Koyilandy Municipality Phase 2- Construction of 3 MLD capacity sewage treatment plant and laying Sewerage network to zone 2 of Koyilandy Municipality

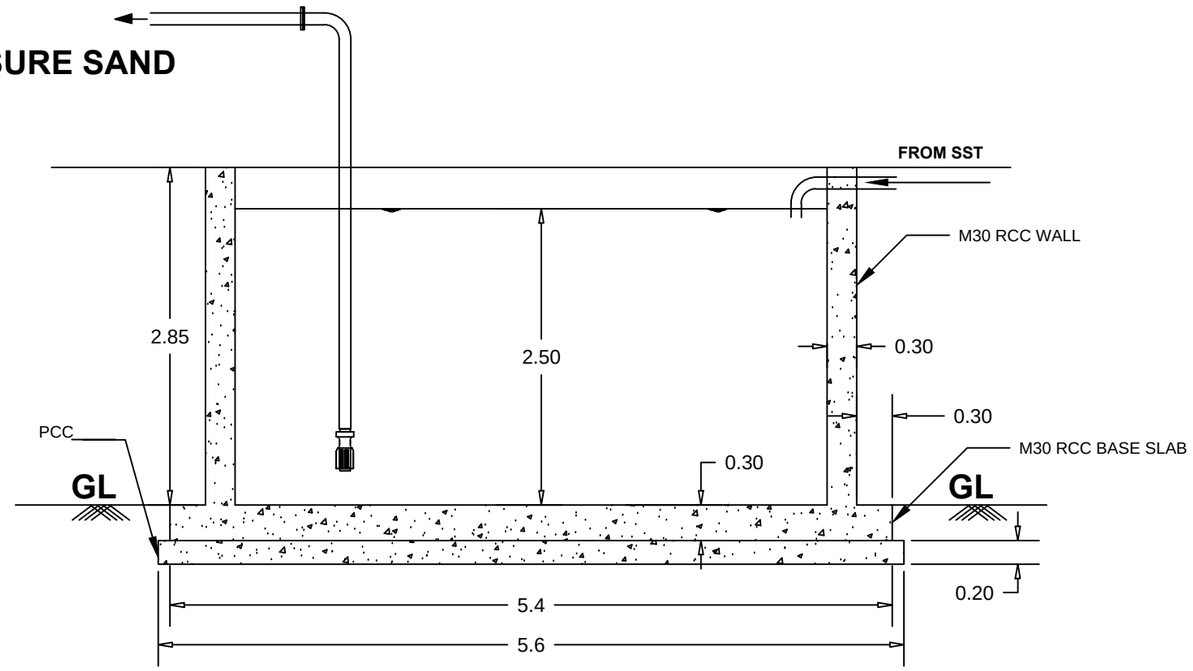
DRAWING TITLE

SECONDARY CLARIFIER TANK

8/KOYILANDY/ZONE 2

Not in scale

AE	AEE	EE	SE	CE



SECTION AA

PLAN

GENERAL NOTES

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

No.	Rivision/ Issue	Date

PPD & SEWERAGE CIRCLE,
KERALA WATER AUTHORITY,
KOZHIKODE

PROJECT NAME

Sewerage scheme to Koyilandy Municipality Phase 2- Construction of 3 MLD capacity sewage treatment plant and laying Sewerage network to zone 2 of Koyilandy Municipality

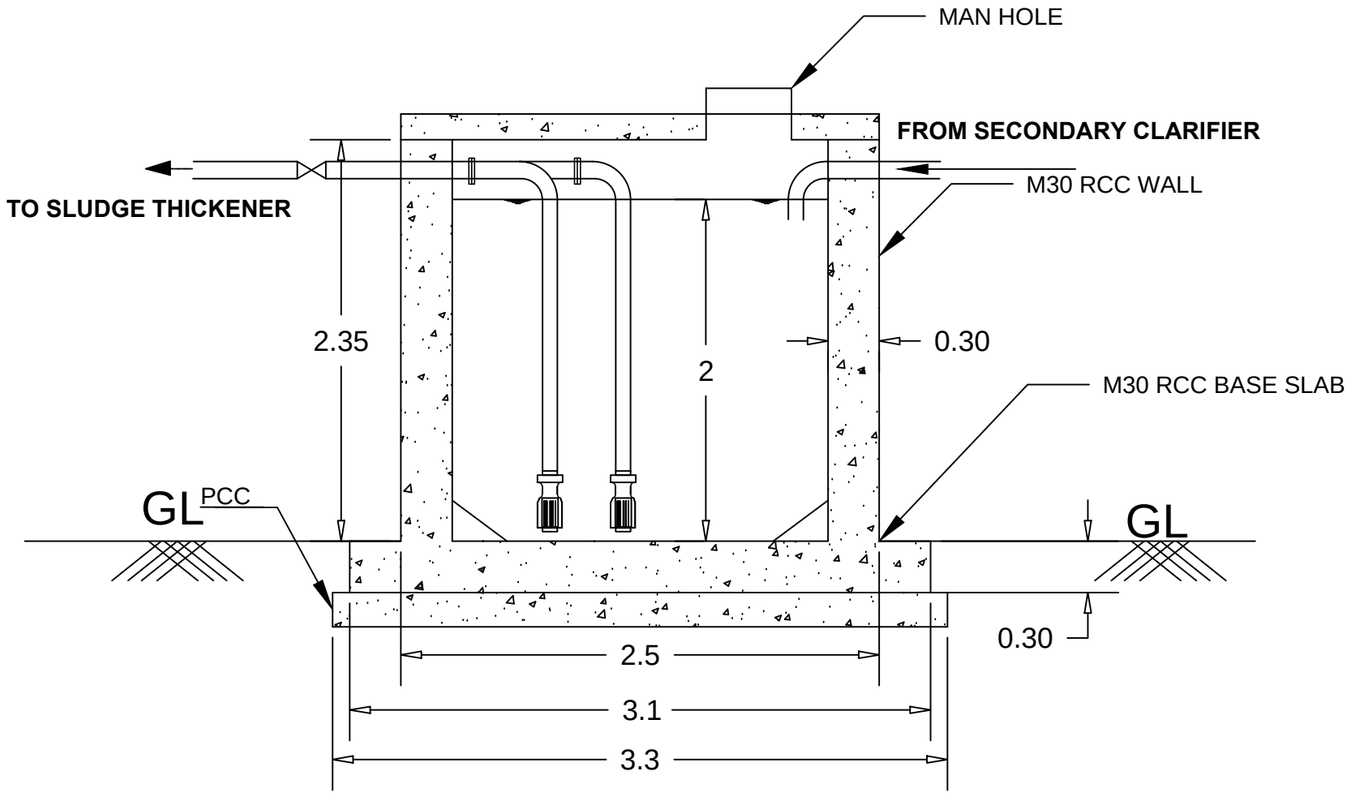
DRAWING TITLE

FILTER FEED TANK

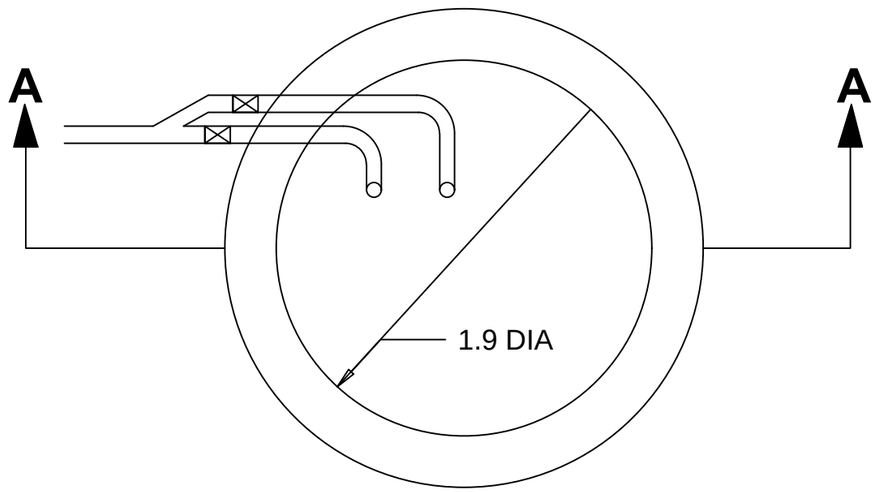
9/KOYILANDY/ZONE 2

Not in scale

AE	AEE	EE	SE	CE



SECTION AA



PLAN

GENERAL NOTES

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

No.	Rivision/ Issue	Date

PPD & SEWERAGE CIRCLE,
KERALA WATER AUTHORITY,
KOZHIKODE

PROJECT NAME

Sewerage scheme to Koyilandy Municipality Phase 2- Construction of 3 MLD capacity sewage treatment plant and laying Sewerage network to zone 2 of Koyilandy Municipality

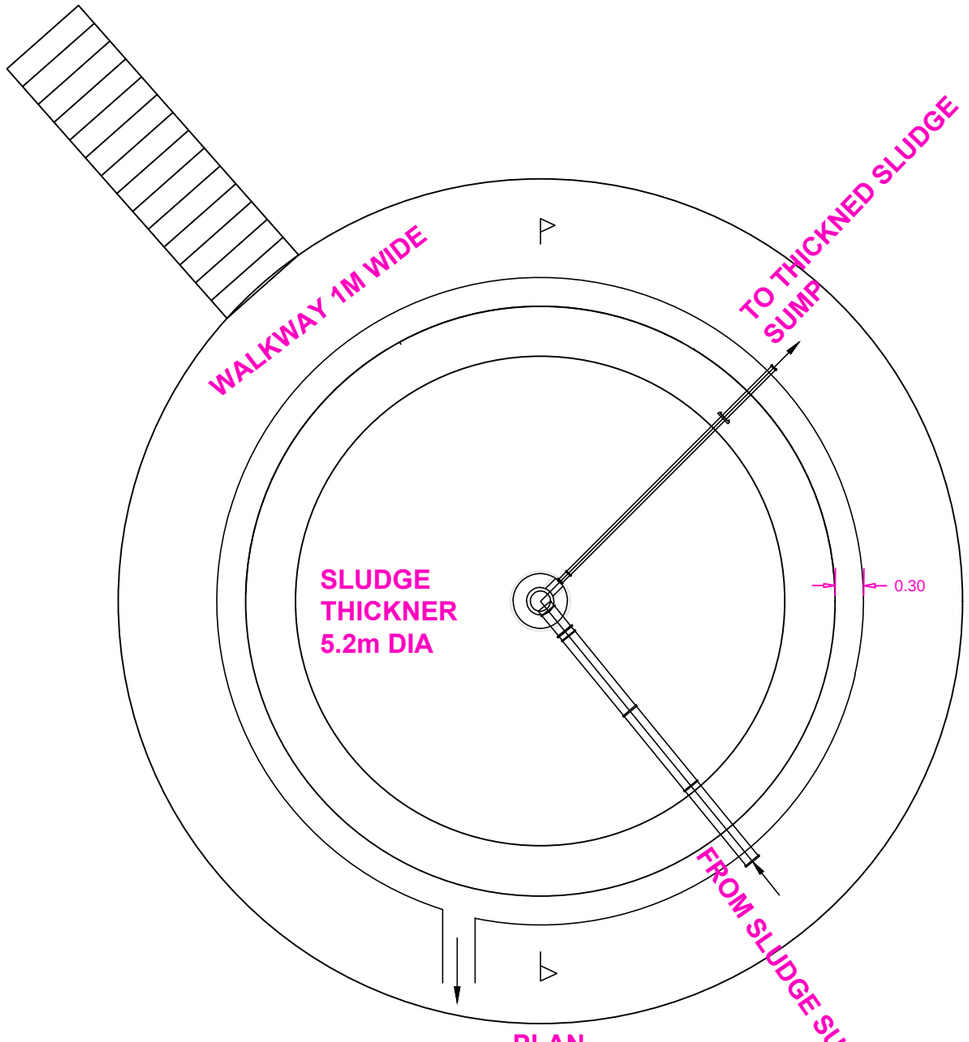
DRAWING TITLE

SLUDGE SUMP

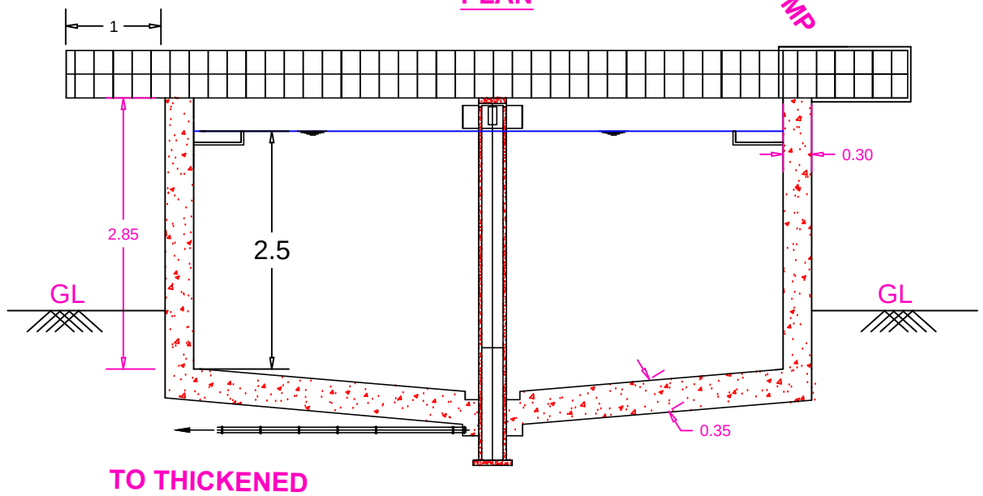
10/KOYILANDY/ZONE 2

Not in scale

AE	AEE	EE	SE	CE



PLAN



SECTION AA

GENERAL NOTES

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

No.	Rivision/ Issue	Date

PPD & SEWERAGE CIRCLE, KERALA WATER AUTHORITY, KOZHIKODE

PROJECT NAME

Sewerage scheme to Koyilandy Municipality Phase 2- Construction of 3 MLD capacity sewage treatment plant and laying Sewerage network to zone 2 of Koyilandy Municipality

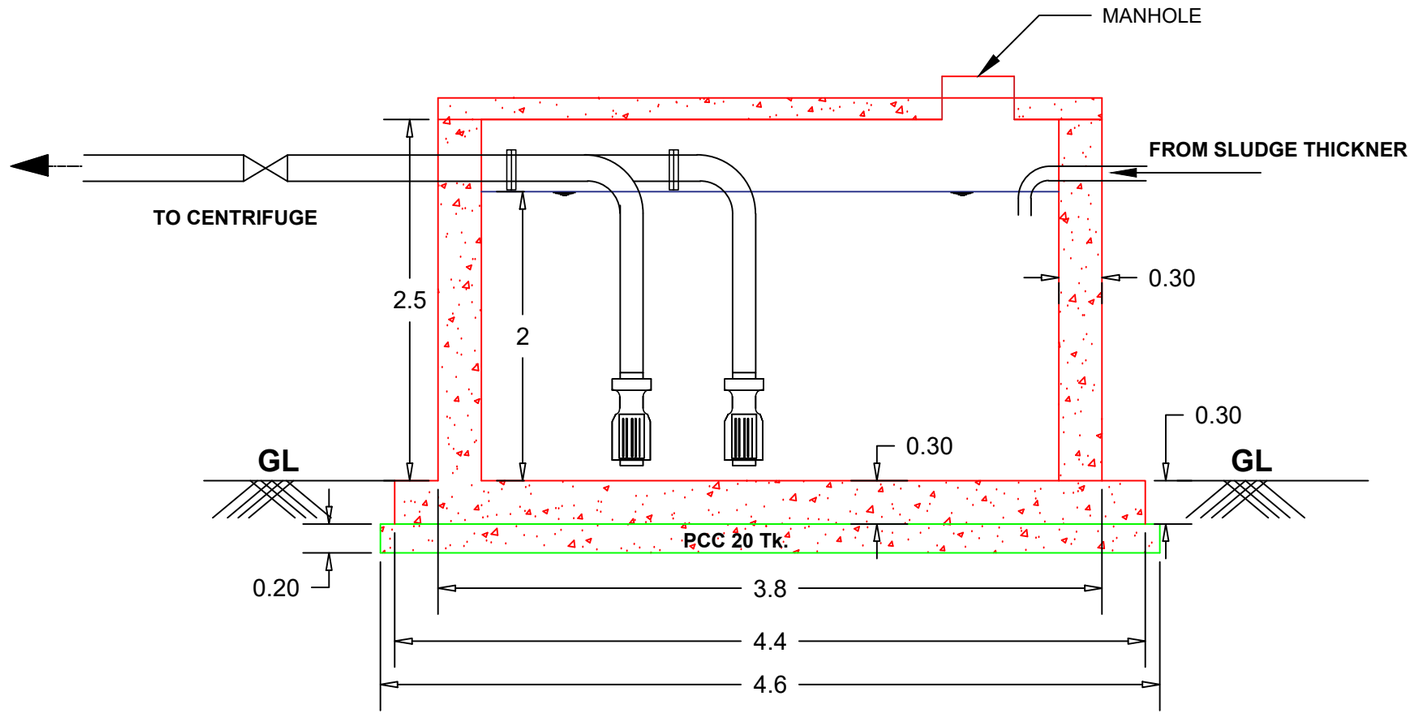
DRAWING TITLE

SLUDGE THICKNER

11/KOYILANDY/ZONE 2

Not in scale

AE	AEE	EE	SE	CE



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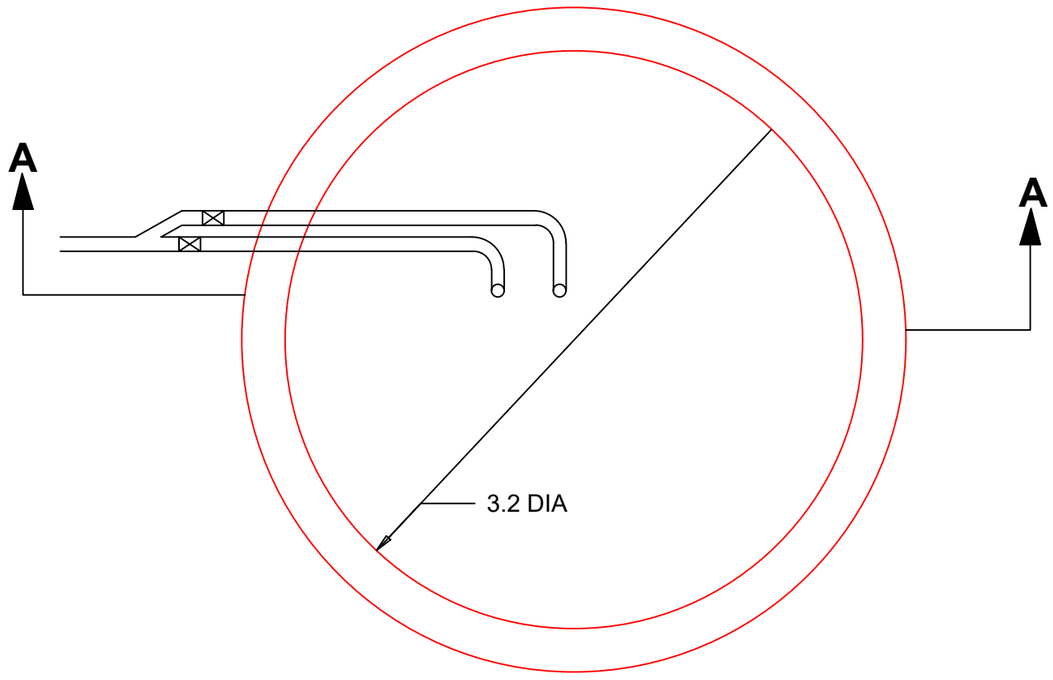


PLAN

GENERAL NOTES

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

No.	Rivision/ Issue	Date

PPD & SEWERAGE CIRCLE,
KERALA WATER AUTHORITY,
KOZHIKODE

PROJECT NAME

Sewerage scheme to Koyilandy Municipality Phase 2- Construction of 3 MLD capacity sewage treatment plant and laying Sewerage network to zone 2 of Koyilandy Municipality

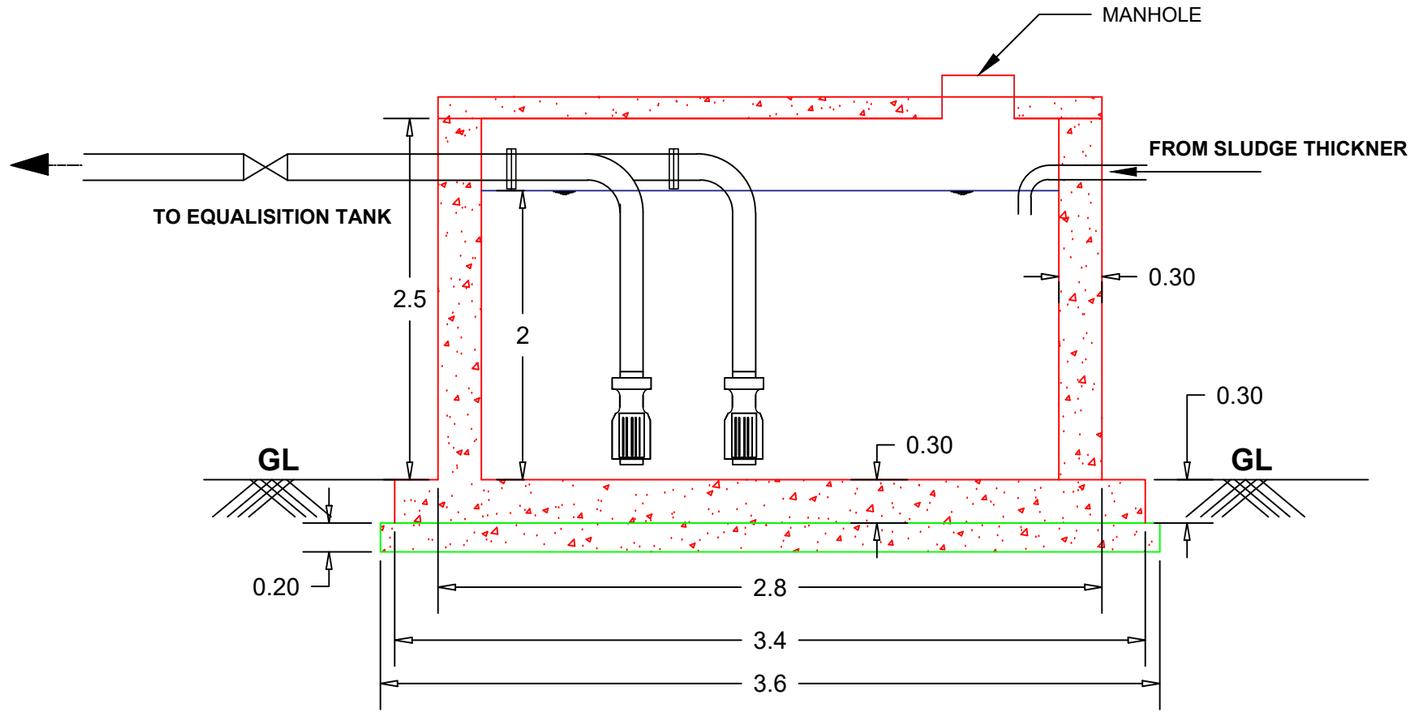
DRAWING TITLE

THICKNED SLUDGE SUMP

12/KOYILANDY/ZONE 2

Not in scale

AE	AEE	EE	SE	CE



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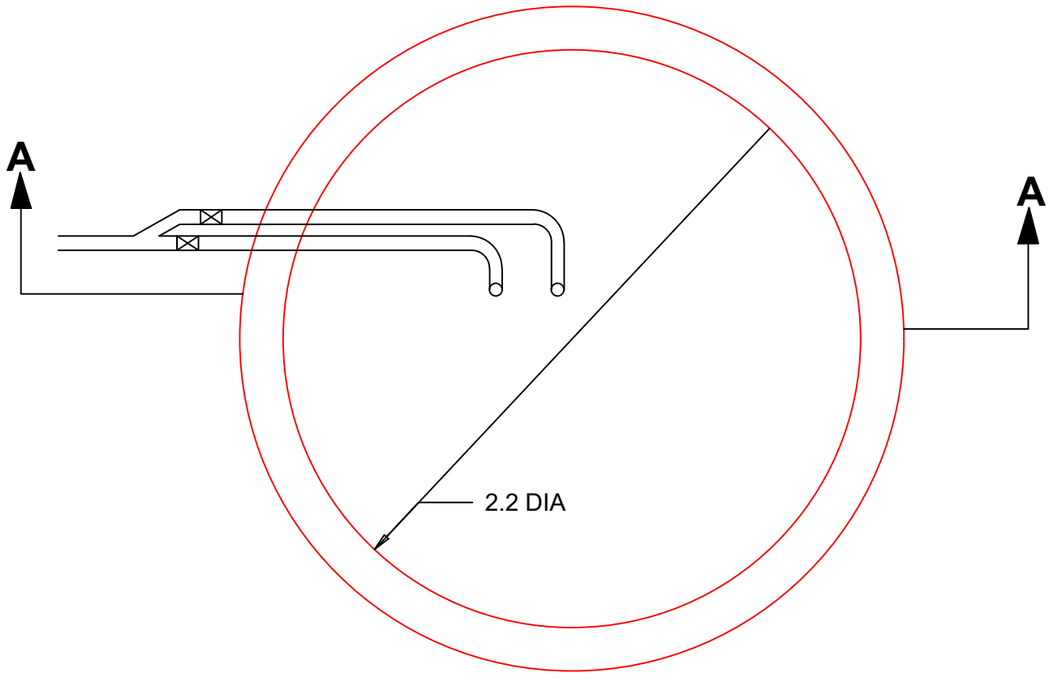


PLAN

GENERAL NOTES

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

No.	Rivision/ Issue	Date

PPD & SEWERAGE CIRCLE,
KERALA WATER AUTHORITY,
KOZHIKODE

PROJECT NAME

Sewerage scheme to Koyilandy Municipality Phase 2- Construction of 3 MLD capacity sewage treatment plant and laying Sewerage network to zone 2 of Koyilandy Municipality

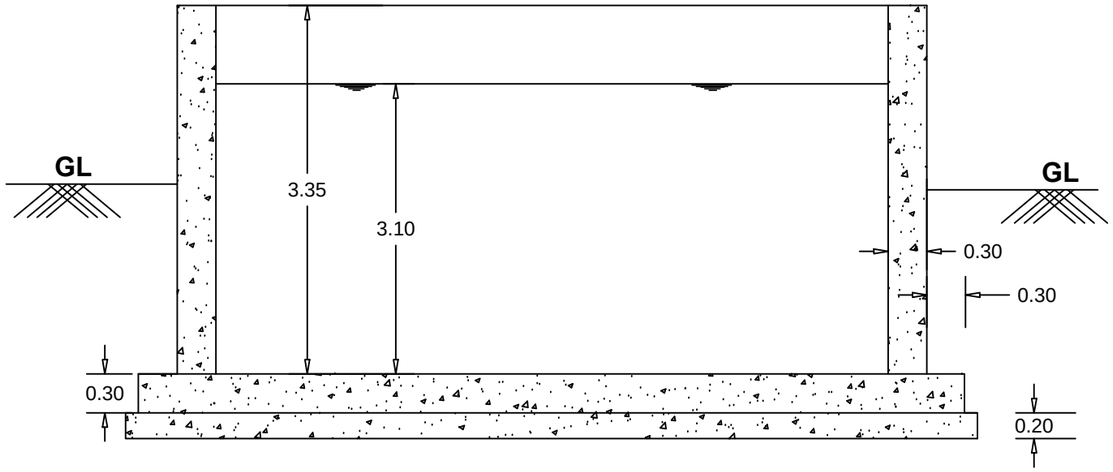
DRAWING TITLE

CENTRATE SUMP

13/KOYILANDY/ZONE 2

Not in scale

AE	AEE	EE	SE	CE



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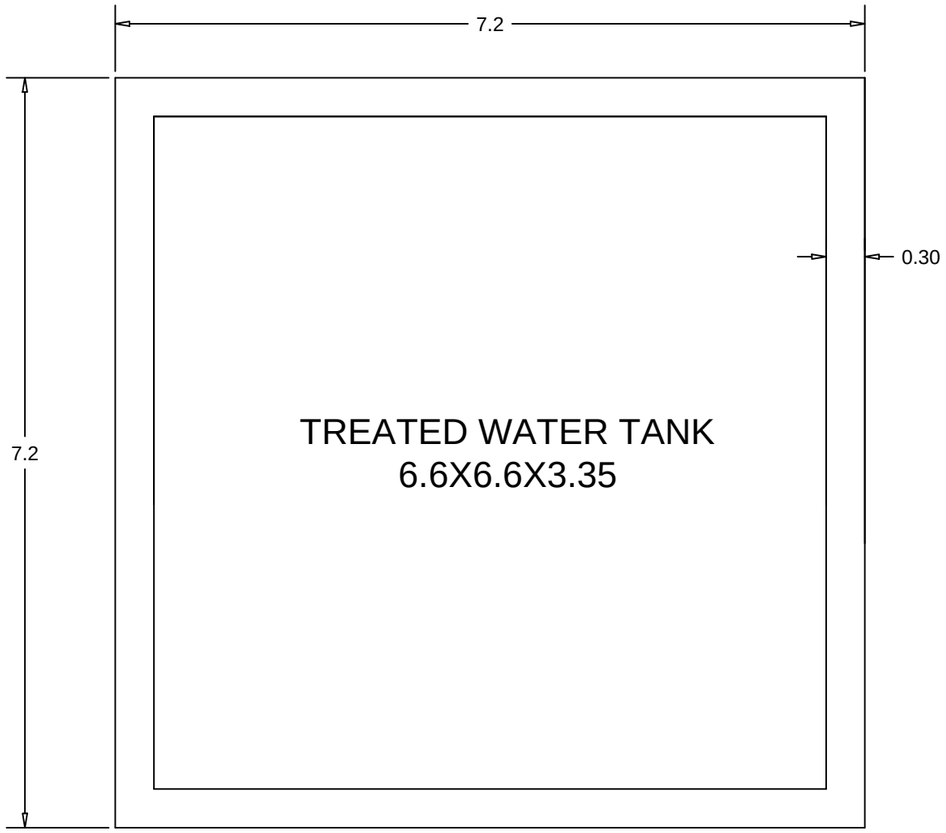

PLAN

GENERAL NOTES

- ALL DIMENSIONS ARE IN METERS
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- FOR ESTIMATION PURPOSE ONLY

No.	Rivision/ Issue	Date

PPD & SEWERAGE CIRCLE,
KERALA WATER AUTHORITY,
KOZHIKODE

PROJECT NAME

Sewerage scheme to Koyilandy Municipality Phase 2- Construction of 3 MLD capacity sewage treatment plant and laying Sewerage network to zone 2 of Koyilandy Municipality

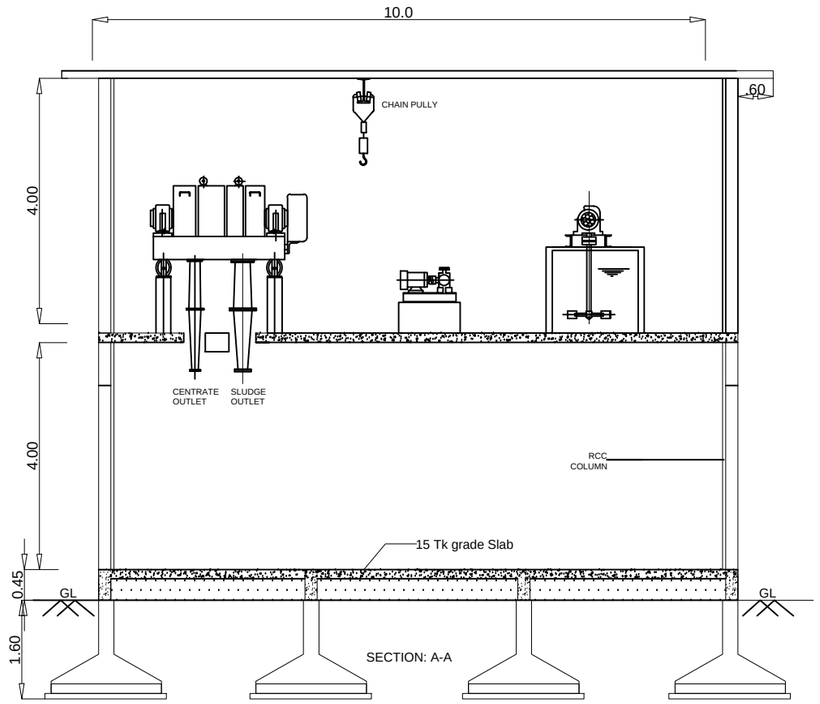
DRAWING TITLE

TREATED WATER TANK

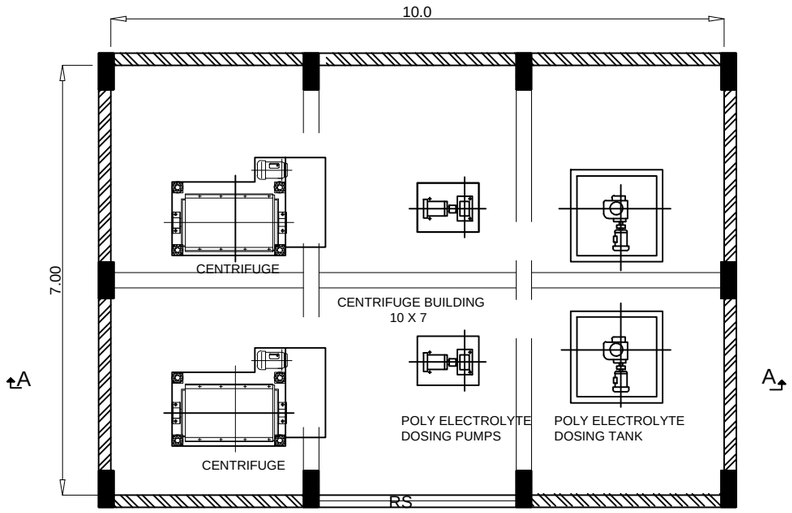
15/KOYILANDY/ZONE 2

Not in scale

AE	AEE	EE	SE	CE



SECTION: A-A



PLAN OF CENTRIFUGE BUILDING

GENERAL NOTES

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

No.	Rivision/ Issue	Date

PPD & SEWERAGE CIRCLE, KERALA WATER AUTHORITY, KOZHIKODE

PROJECT NAME

Sewerage scheme to Koyilandy Municipality Phase 2- Construction of 3 MLD capacity sewage treatment plant and laying Sewerage network to zone 2 of Koyilandy Municipality

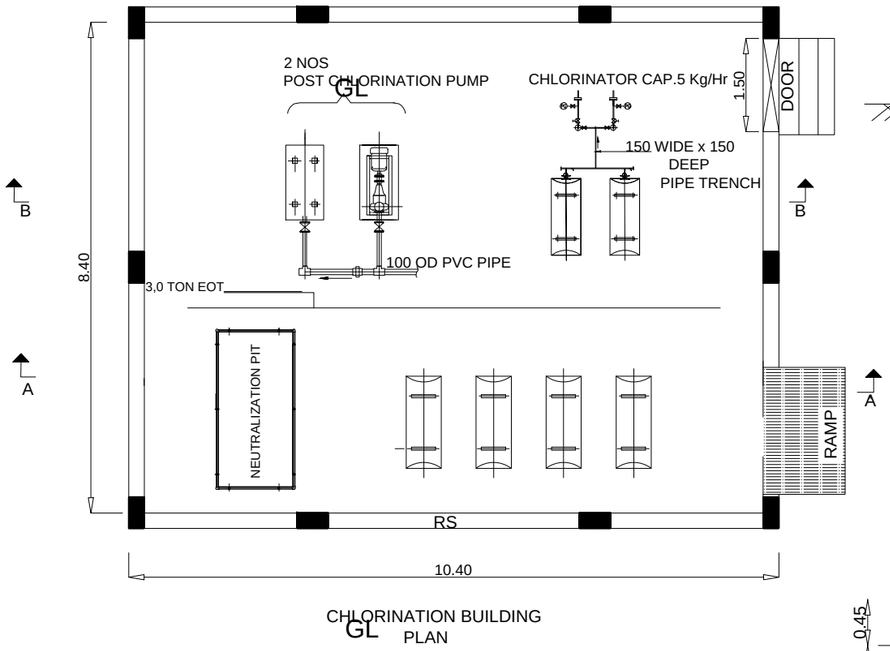
DRAWING TITLE

CENTRIFUGE BUILDING

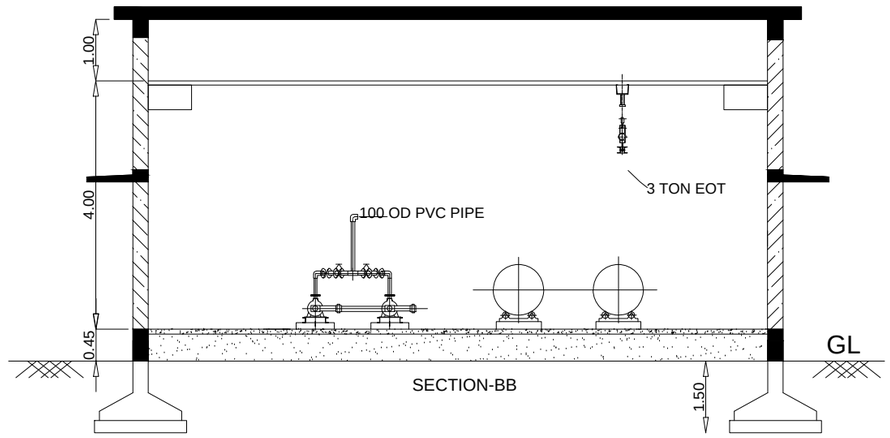
16/KOYILANDY/ZONE 2

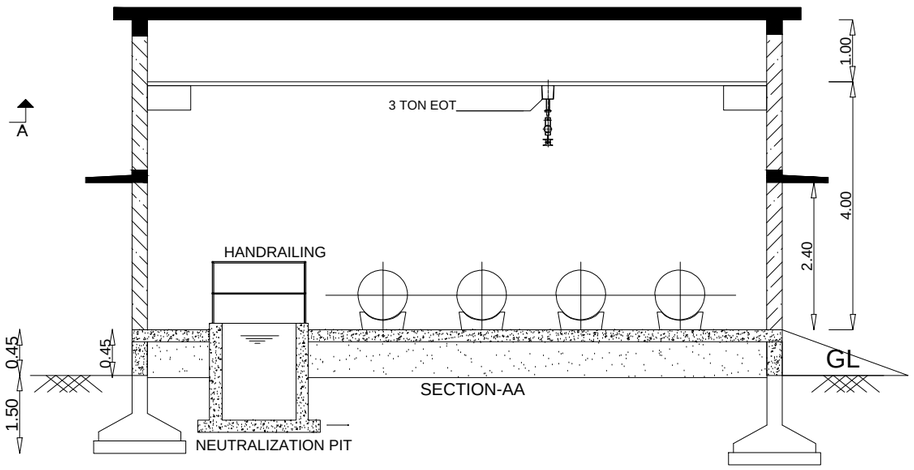
Not in scale

AE	AEE	EE	SE	CE



CHLORINATION BUILDING
PLAN





GENERAL NOTES

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

No.	Rivision/ Issue	Date

PPD & SEWERAGE CIRCLE,
KERALA WATER AUTHORITY,
KOZHIKODE

PROJECT NAME

Sewerage scheme to Koyilandy Municipality Phase 2- Construction of 3 MLD capacity sewage treatment plant and laying Sewerage network to zone 2 of Koyilandy Municipality

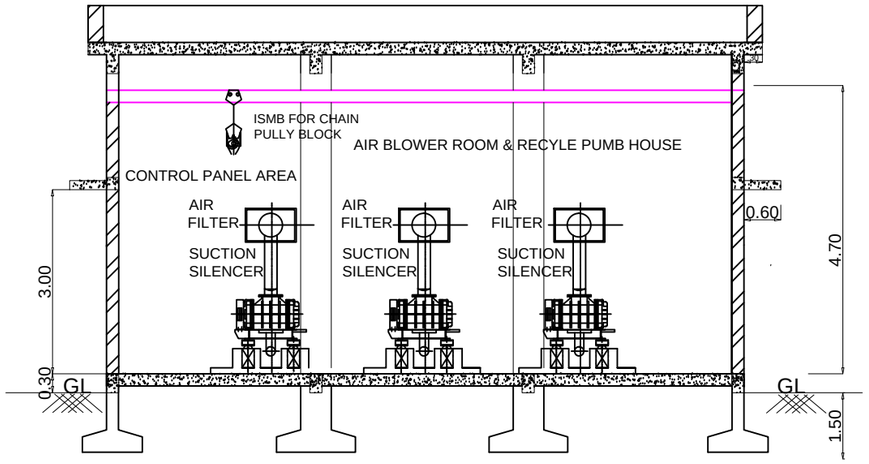
DRAWING TITLE

CHLORINATION ROOM

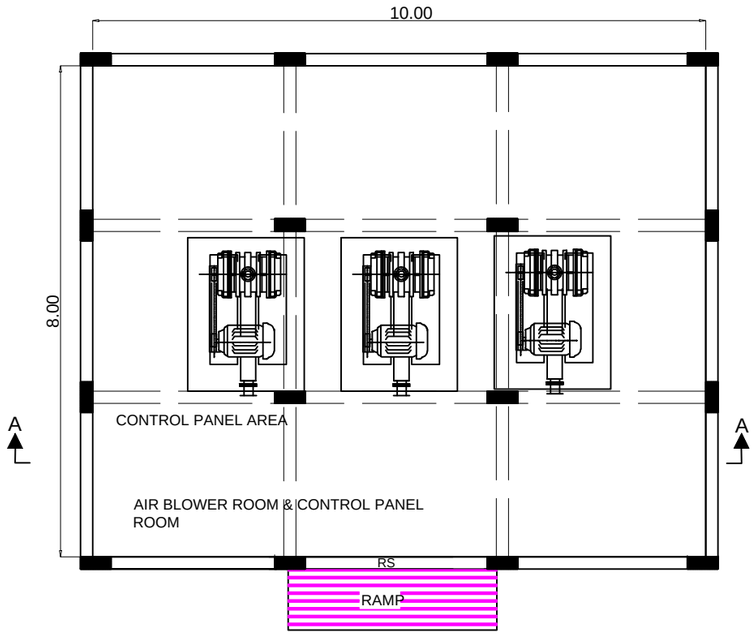
17/KOYILANDY/ZONE 2

Not in scale

AE	AEE	EE	SE	CE



SECTION A-A



PLAN

GENERAL NOTES

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

No.	Rivision/ Issue	Date

PPD & SEWERAGE CIRCLE,
KERALA WATER AUTHORITY,
KOZHIKODE

PROJECT NAME

Sewerage scheme to Koyilandy Municipality Phase 2- Construction of 3 MLD capacity sewage treatment plant and laying Sewerage network to zone 2 of Koyilandy Municipality

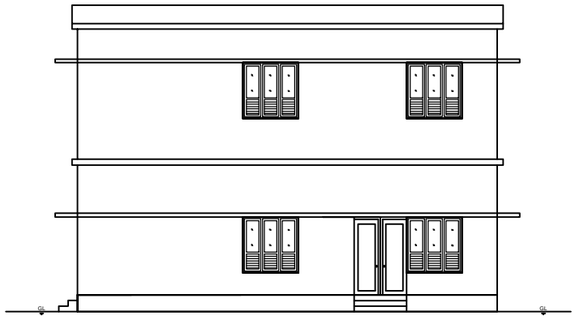
DRAWING TITLE

AIR BLOWER ROOM
AND CONTROL PANEL ROOM

18/KOYILANDY/ZONE 2

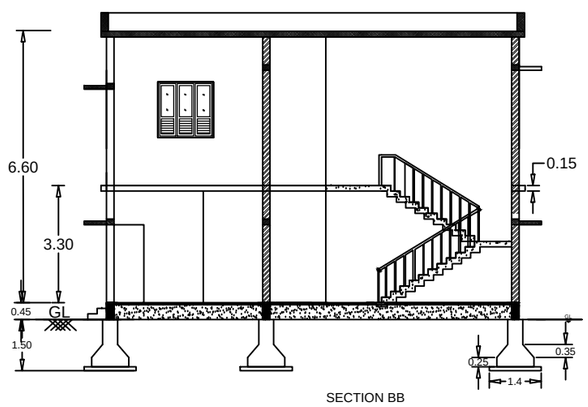
Not in scale

AE	AEE	EE	SE	CE

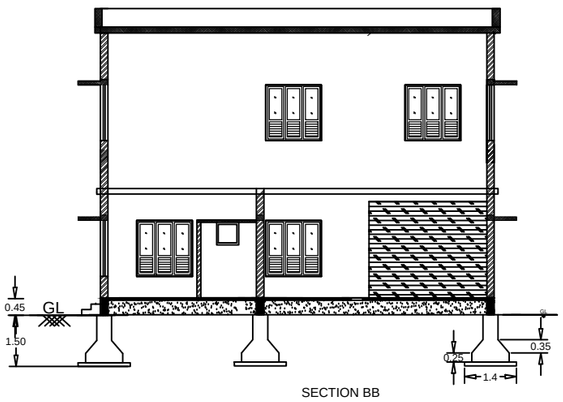


FRONT ELEVATION

SIDE ELEVATION



SECTION BB



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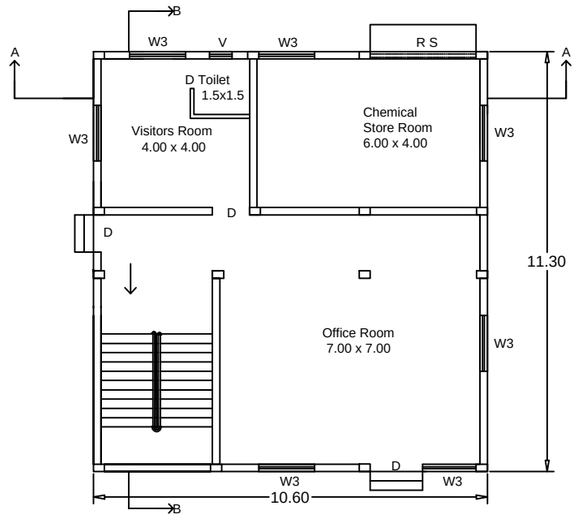
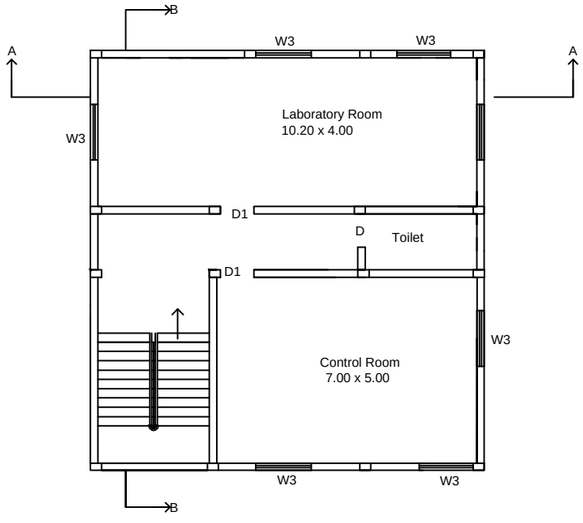


GROUND FLOOR
PLAN



FIRST FLOOR
PLAN

GENERAL NOTES

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

No.	Rivision/ Issue	Date

PPD & SEWERAGE CIRCLE,
KERALA WATER AUTHORITY,
KOZHIKODE

PROJECT NAME

Sewerage scheme to Koyilandy Municipality Phase 2- Construction of 3 MLD capacity sewage treatment plant and laying Sewerage network to zone 2 of Koyilandy Municipality

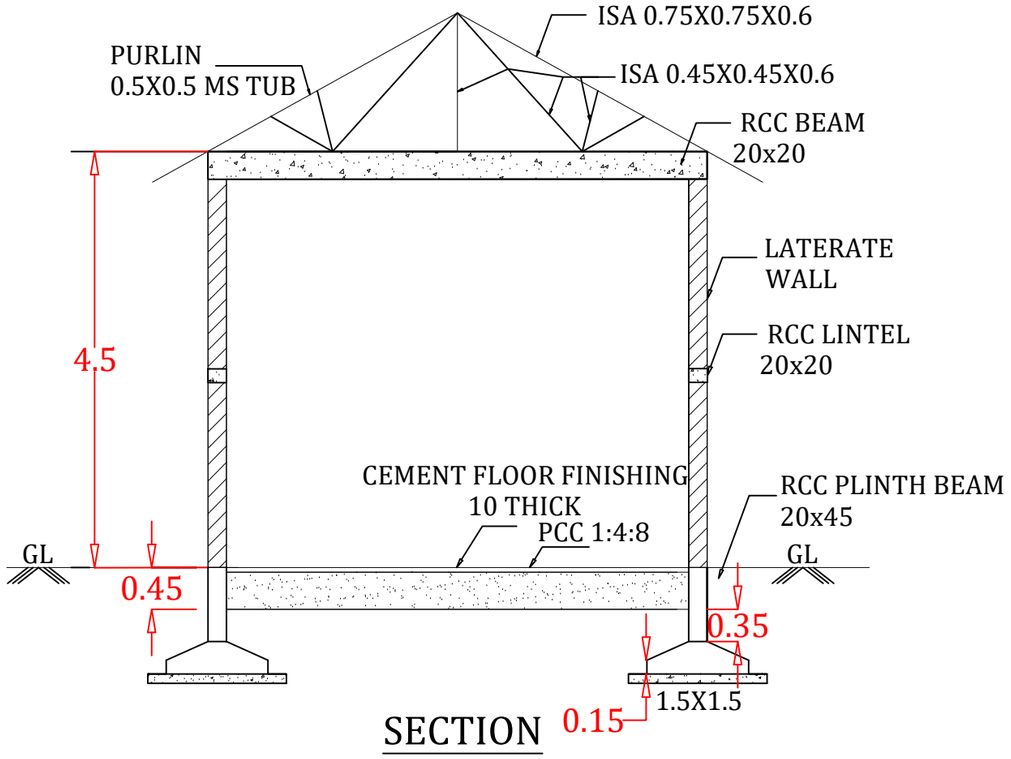
DRAWING TITLE

ADMINISTRATIVE BUILDING
MCC AND LAB

19/KOYILANDY/ZONE 2

Not in scale

AE	AEE	EE	SE	CE



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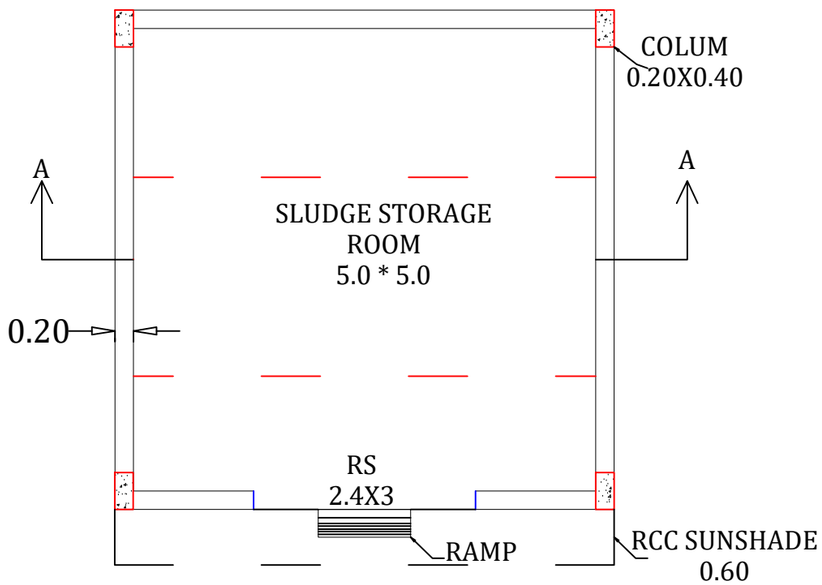


PLAN

GENERAL NOTES

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

No.	Rivision/ Issue	Date

PPD & SEWERAGE CIRCLE,
KERALA WATER AUTHORITY,
KOZHIKODE

PROJECT NAME

Sewerage scheme to Koyilandy Municipality Phase 2- Construction of 3 MLD capacity sewage treatment plant and laying Sewerage network to zone 2 of Koyilandy Municipality

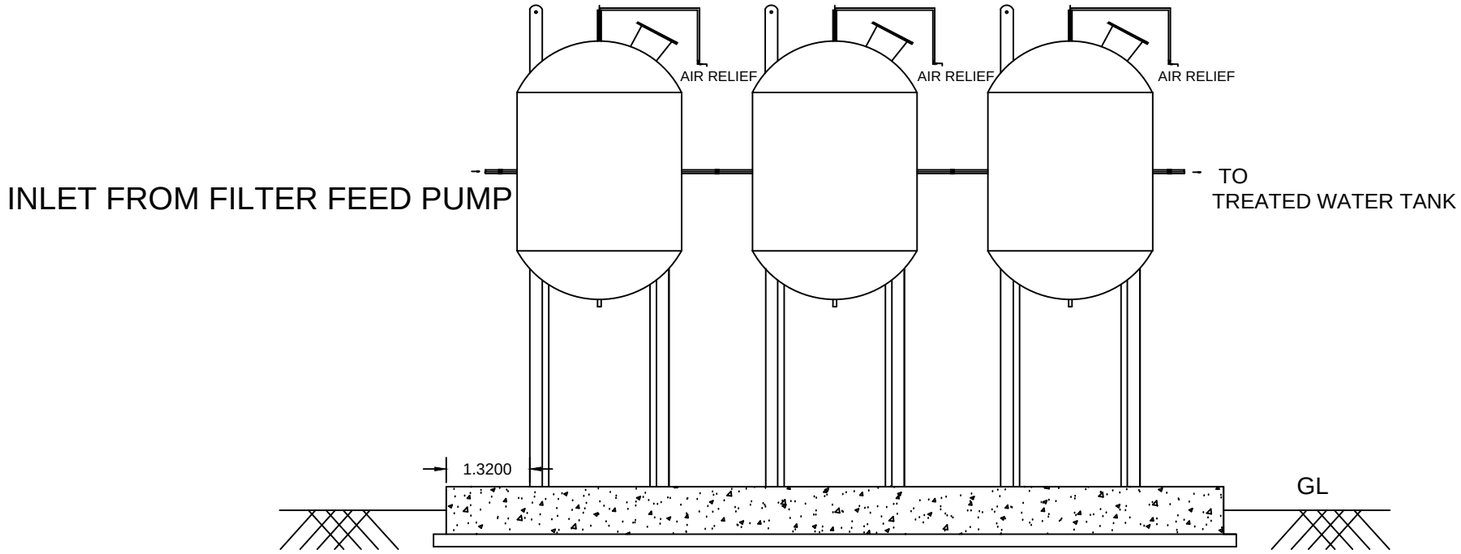
DRAWING TITLE

SLUDGE STORAGE ROOM

20/KOYILANDY/ZONE 2

Not in scale

AE	AEE	EE	SE	CE



SECTION A A

PLAN

GENERAL NOTES

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

No.	Rivision/ Issue	Date

PPD & SEWERAGE CIRCLE,
KERALA WATER AUTHORITY,
KOZHIKODE

PROJECT NAME

Sewerage scheme to Koyilandy Municipality Phase 2- Construction of 3 MLD capacity sewage treatment plant and laying Sewerage network to zone 2 of Koyilandy Municipality

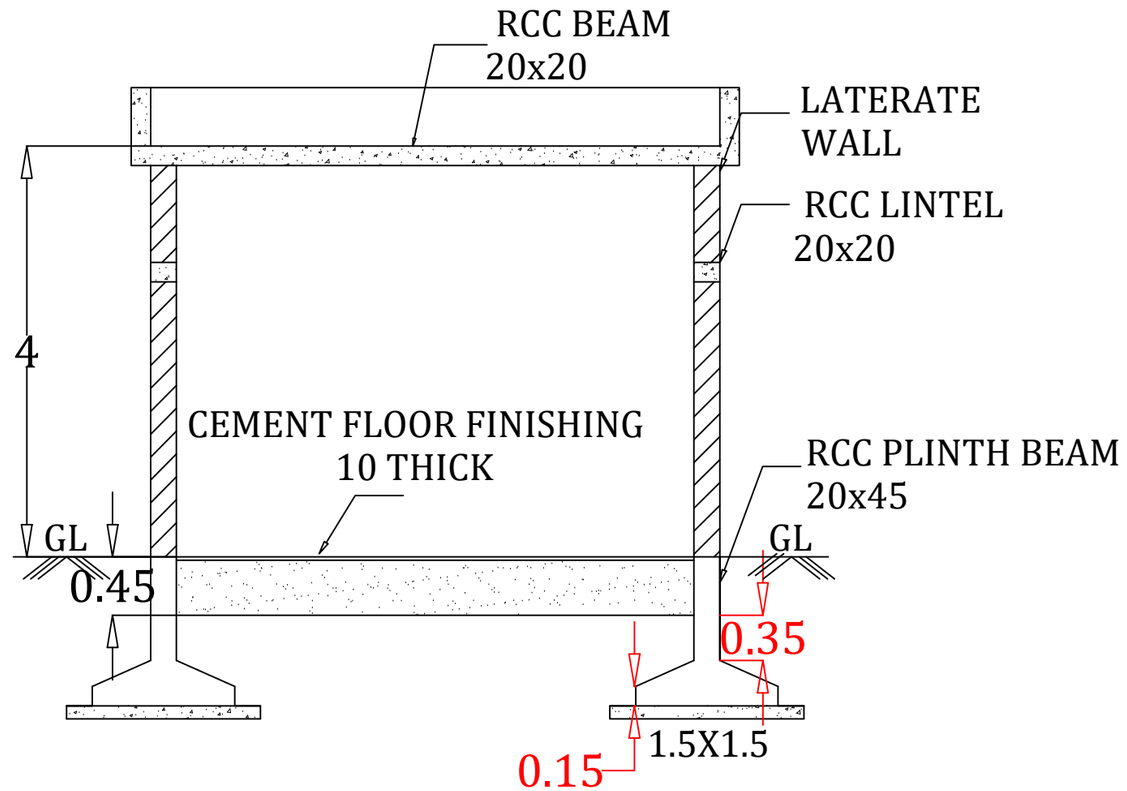
DRAWING TITLE

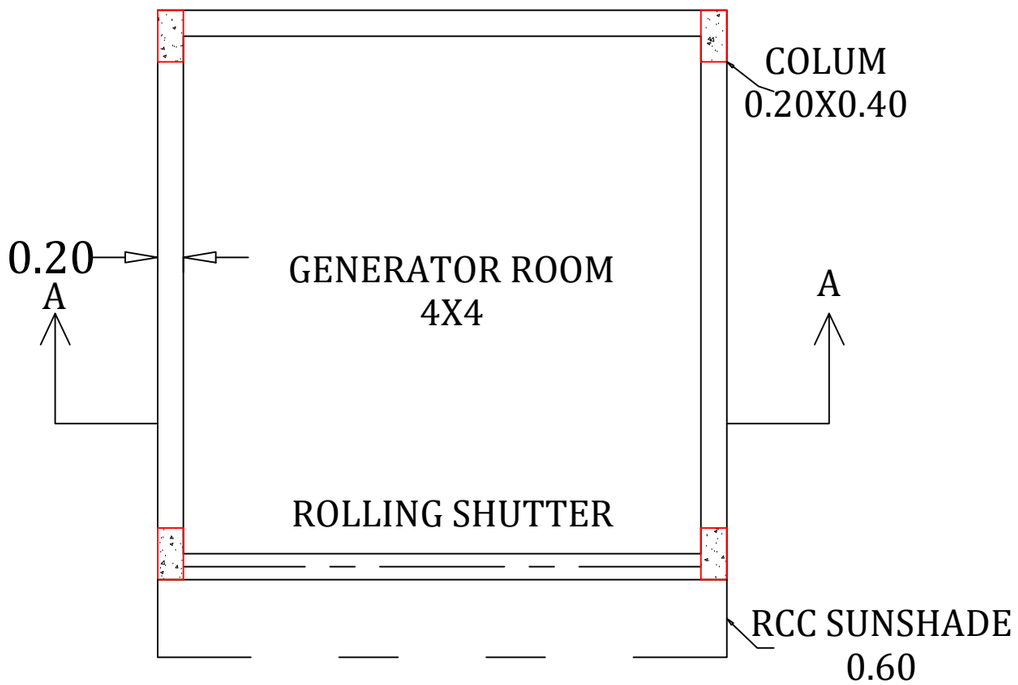
PSF/ACF UNIT

21/KOYILANDY/ZONE 2

Not in scale

AE	AEE	EE	SE	CE





GENERAL NOTES

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No.	Rivision/ Issue	Date

PPD & SEWERAGE CIRCLE,
KERALA WATER AUTHORITY,
KOZHIKODE

PROJECT NAME

Sewerage scheme to Koyilandy Municipality Phase 2- Construction of 3 MLD capacity sewage treatment plant and laying Sewerage network to zone 2 of Koyilandy Municipality

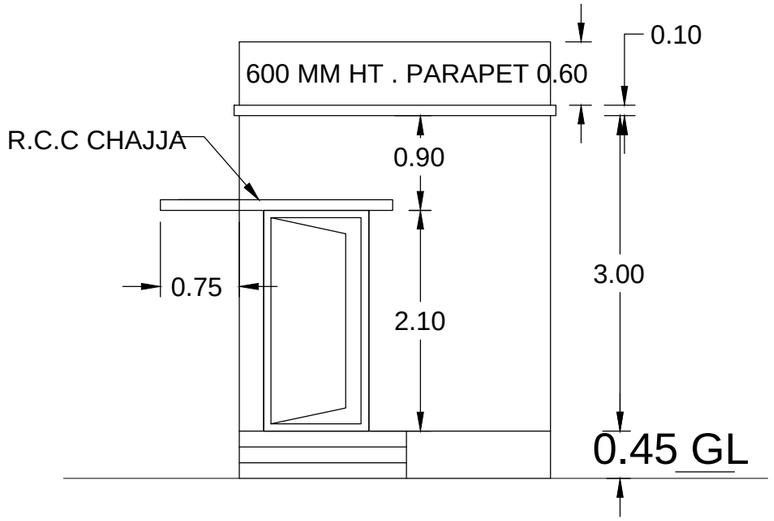
DRAWING TITLE

DG ROOM

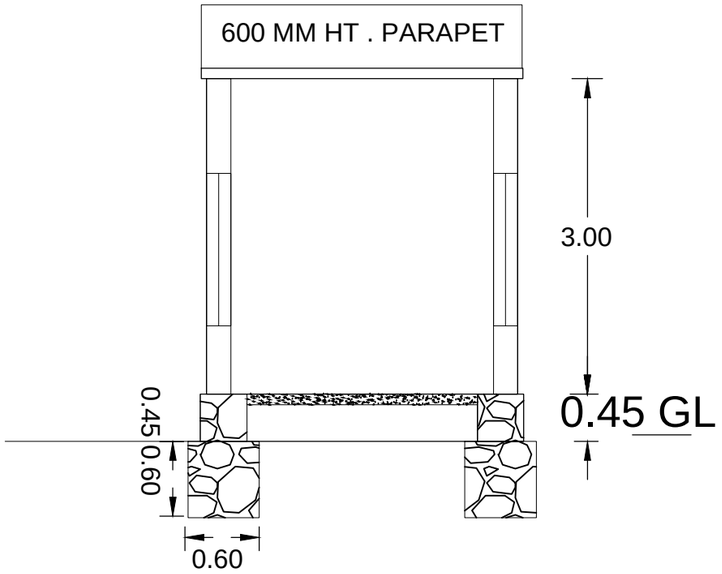
22/KOYILANDY/ZONE 2

Not in scale

AE	AEE	EE	SE	CE



ELEVATION



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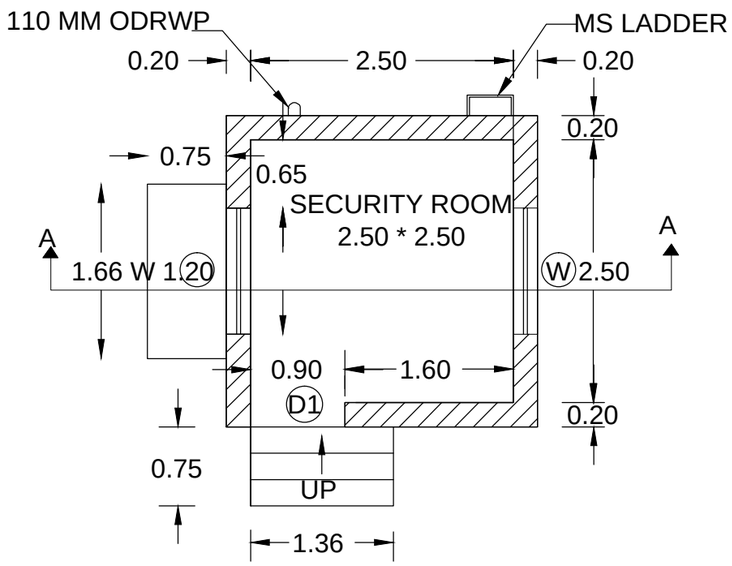

PLAN

GENERAL NOTES

- ALL DIMENSIONS ARE IN METERS
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- FOR ESTIMATION PURPOSE ONLY

No.	Rivision/ Issue	Date

PPD & SEWERAGE CIRCLE, KERALA WATER AUTHORITY, KOZHIKODE

PROJECT NAME

Sewerage scheme to Koyilandy Municipality Phase 2- Construction of 3 MLD capacity sewage treatment plant and laying Sewerage network to zone 2 of Koyilandy Municipality

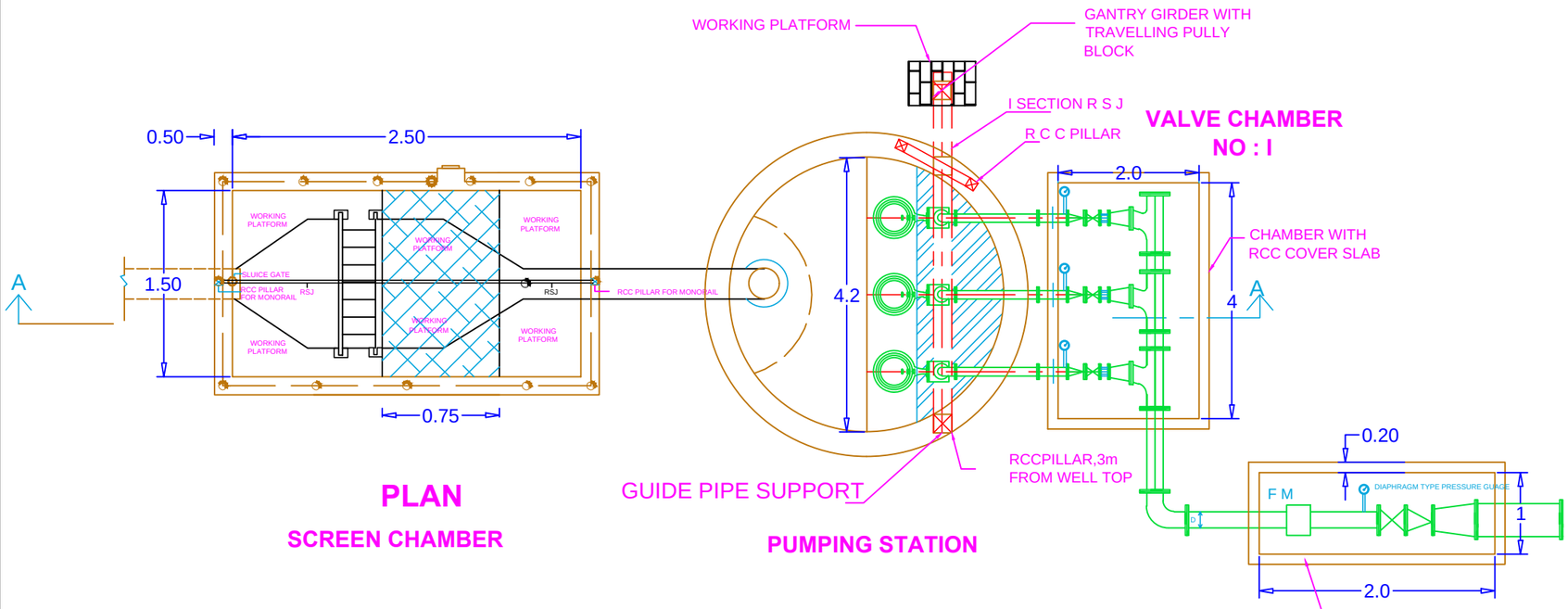
DRAWING TITLE

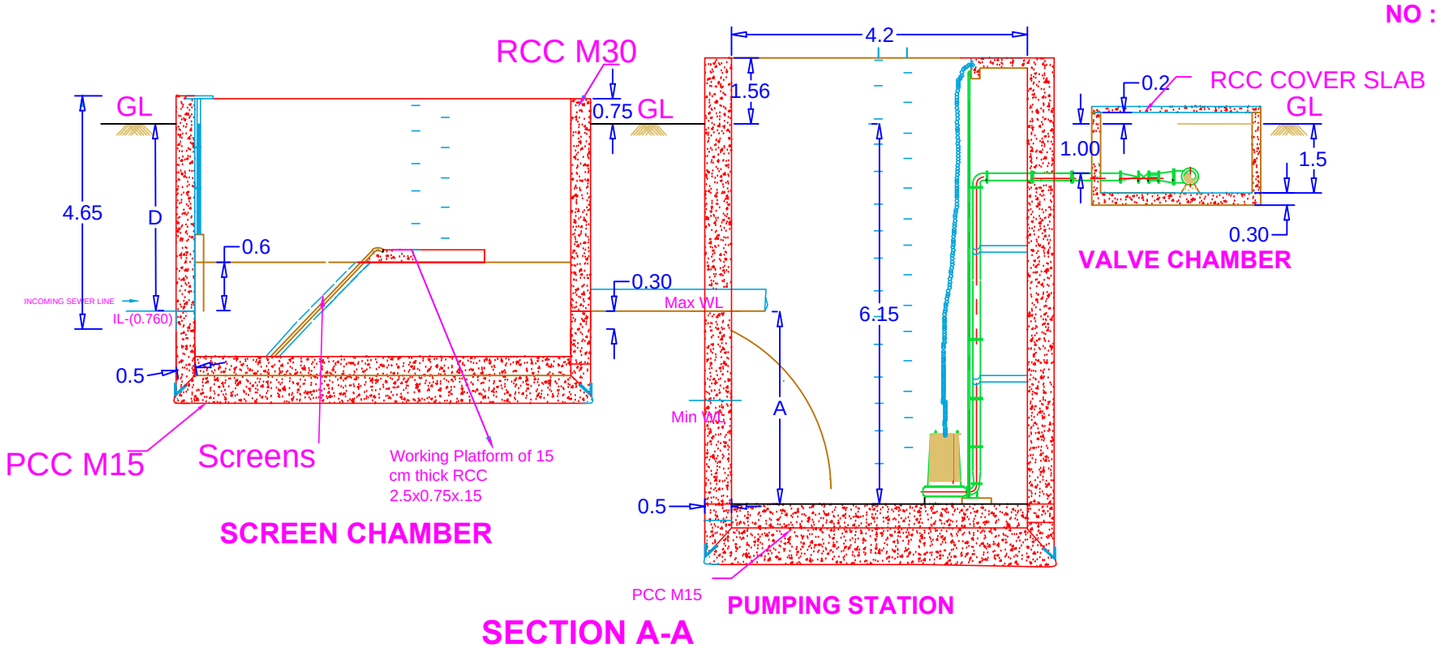
SECURITY ROOM

23/KOYILANDY /ZONE 2

Not in scale

AE	AEE	EE	SE	CE





GENERAL NOTES

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No.	Rivision/ Issue	Date

PPD & SEWERAGE CIRCLE, KERALA WATER AUTHORITY, KOZHIKODE

PROJECT NAME

Sewerage scheme to Koyilandy Municipality Phase 2- Construction of 3 MLD capacity sewage treatment plant and laying Sewerage network to zone 2 of Koyilandy Municipality

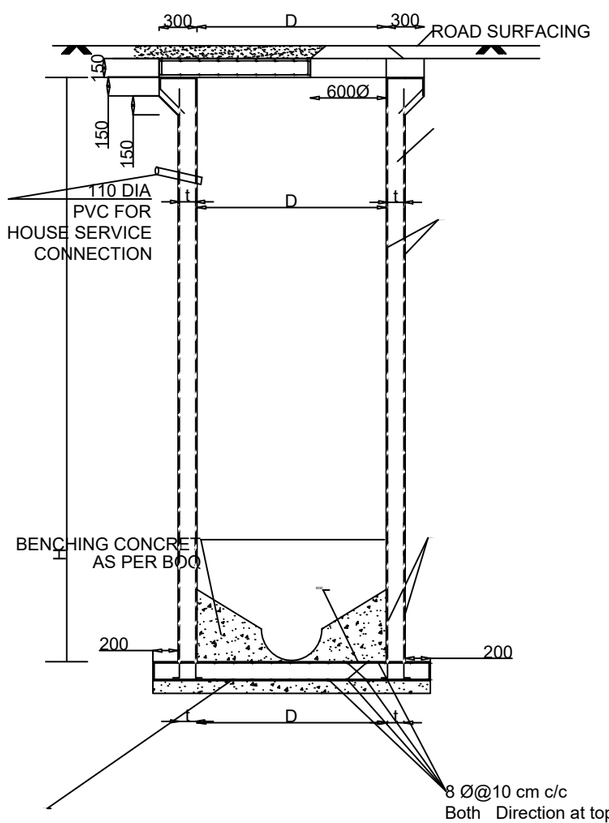
DRAWING TITLE

GENERAL ARRANGEMENT OF PUMPING STATION

25/KOYILANDY/ZONE 2

Not in scale

AE	AEE	EE	SE	CE



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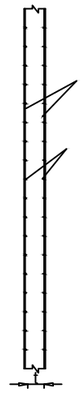
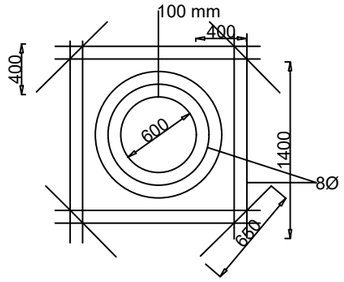
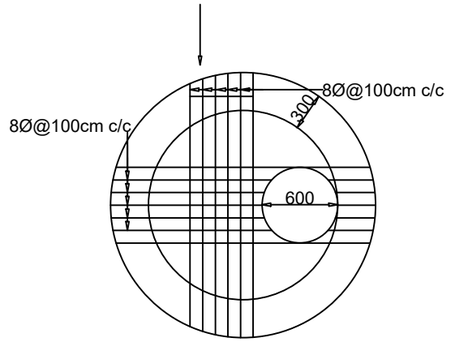




ADDITIONAL REINFORCEMENT AROUND MANHOLE COVER OPENING ,INLET OPENING AND OUTLET OPENING



Reinforcement at Both top &Bottom

COVER SLAB

GENERAL NOTES

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DEPTH,H,(m)	DIA,D(m)
<2.50	1.2
2.50 to 9.0	1.5

No.	Rivision/ Issue	Date

PPD & SEWERAGE CIRCLE,
KERALA WATER AUTHORITY,
KOZHIKODE

PROJECT NAME

Sewerage scheme to Koyilandy Municipality Phase 2- Construction of 3 MLD capacity sewage treatment plant and laying Sewerage network to zone 2 of Koyilandy Municipality

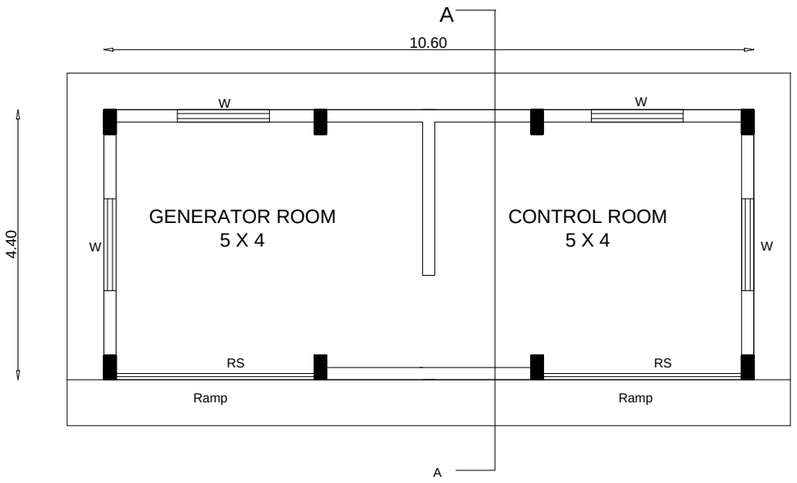
DRAWING TITLE

TYPICAL MANHOLE DETAILS

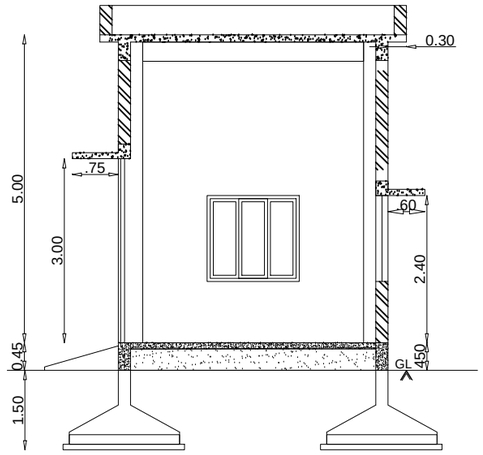
26 /KOYILANDY/ZONE 2

Not in scale

AE	AEE	EE	SE	CE



PLAN OF GENERATOR WITH CONTROL ROOM



SECTION A A

GENERAL NOTES

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No.	Rivision/ Issue	Date

PPD & SEWERAGE CIRCLE,
KERALA WATER AUTHORITY,
KOZHIKODE

PROJECT NAME

Sewerage scheme to Koyilandy Municipality Phase 2- Construction of 3 MLD capacity sewage treatment plant and laying Sewerage network to zone 2 of Koyilandy Municipality

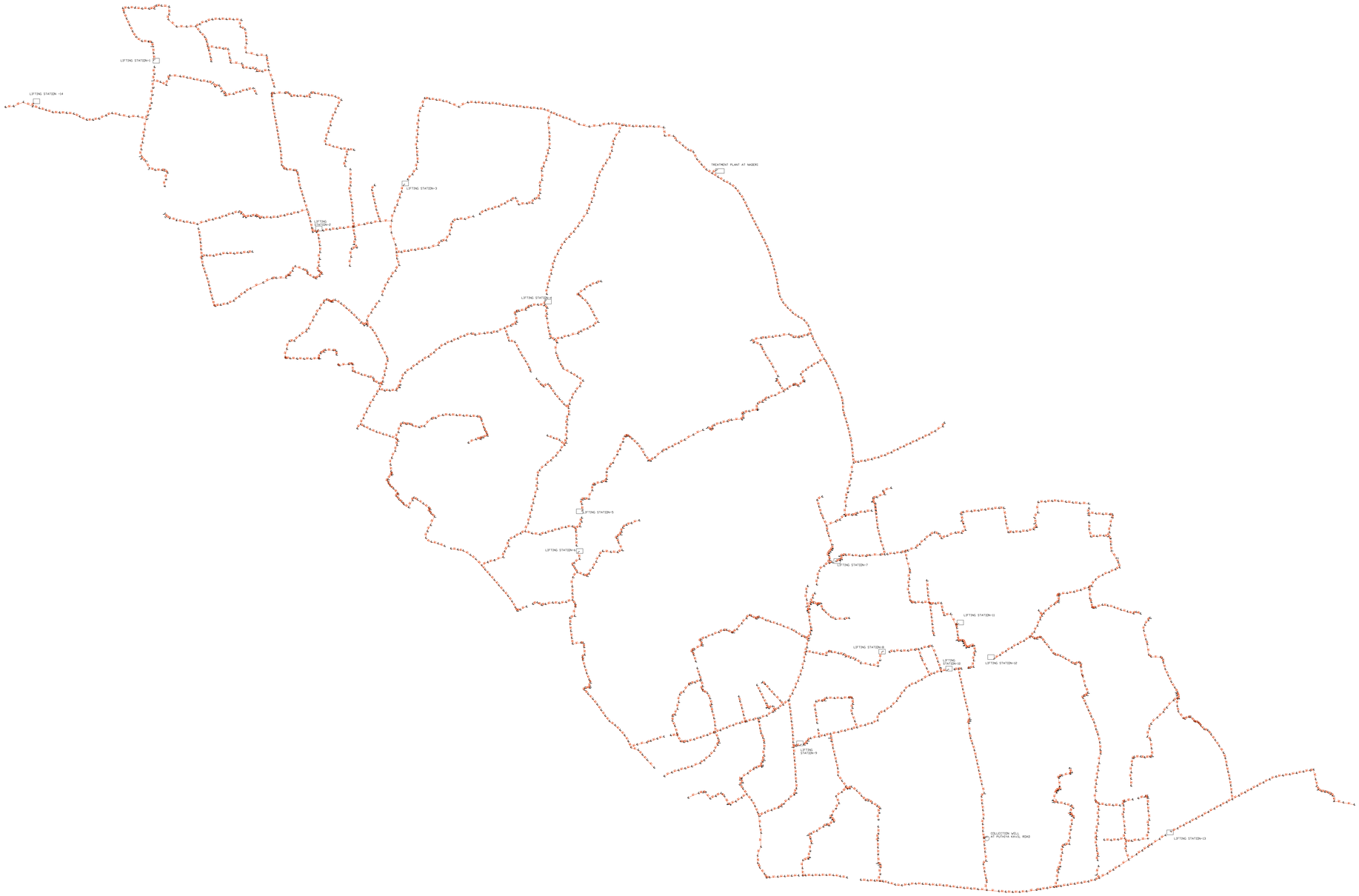
DRAWING TITLE

GENERATOR WITH CONTROL ROOM

27/KOYILANDY/ZONE 2

Not in scale

AE	AEE	EE	SE	CE



PPD & SEWERAGE CIRCLE,
KERALA WATER AUTHORITY,
KOZHIKODE

PROJECT NAME AND ADDRESS

SEWERAGE SYSTEM TO KOYILANDY MUNICIPALITY -PHASE 2
CONSTRUCTION OF 3MLD CAPACITY SEWAGE TREATMENT PLANT
AND LAYNG SEWERAGE NET WORK TO ZONE 2
OF KOYILANDY MUNICIPALITY

Drawing Title

SEWERAGE NET WORK

Not in scale

AE	AEE	EE	SE	CE