वसई - विरार शहर महानगरपालिका
पाणी पुरवठा विभाग, मुख्यालय

जा.क्र.वविशम/पापु/ २१३/२९४ /२०२२
दिनांक :- २२/०५/२०२२

"कोटेशन नोटीस"

वसई विरार शहर महानगरपालिकेच्या कार्यक्षेत्रातील खाली उल्लेख केल्याप्रमाणे काम करावयाचे असून सदर काम करण्यास इच्छुक संस्था/ठेकेदार यांनी त्यांच्या लेटरपॅड वर खालील उल्लेख केलेल्या कामांच्या बाबींचे दर (सर्व करासहीत) दि.२८/०५/२०२२ रोजी दुपारी २:०० वा. पर्यंत कार्यकारी अभियंता, (पा.पु.) वसई विरार शहर महानगरपालिका यांचेकडील आवक बारनिशीकडे / ई-मेल व्दारे (cevvcmc@gmail.com) सादर करावे.

सुचना :-

१) मुदतीनंतर प्राप्त कोटेशन स्विकारले जाणार नाहीत.
२) याकामी प्राप्त दरपत्रकांपैकी कोणतेही एक दरपत्रक स्विकारण्याचा अथवा कोणतेही कारण न देता सर्व दरपत्रके नाकारण्याचा अधिकार निम्नस्वाक्षरीकार यांनी राखून ठेवला आहे.
३) खाडाखोड केलेले दरपत्रक स्विकारण्यात येणार नाहीत.
४) सदरचे दरपत्रक हे निव्वळ अंदाजपत्रक तयार करणेकामी मागविण्यात येत आहे.

कामाचे नाव :- **वसई विरार शहर महानगरपालिका कार्यक्षेत्रात मलनि:स्सारण केंद्र उभारणे व भुयारी गटार योजना राबविणेसाठी.**

कोरे कोटेशन फॉर्म मिळण्याचा कालावधी :- दि.२२/०५/२०२२ ते दि.२८/०५/२०२२ रोजी कार्यालयीन कामकाजाच्या वेळेत

सिलबंद कोटेशन स्विकारण्याची तारीख व वेळ :- दि.२९/०५/२०२२ रोजी दुपारी २:०० वाजे पर्यंत

सिलबंद कोटेशन उघडण्याची तारीख व वेळ :- दि.२९/०५/२०२२ रोजी संध्याकाळी ४:०० वाजे पर्यंत

वरिलप्रमाणे कोटेशन नोटीस महानगरपालिकेच्या नोटीस बोर्डवर / वेबसाईट वर प्रसिध्द करण्यात यावी.

कार्यकारी अभियंता
वसई विरार शहर महानगरपालिका

सोबत :- कोटेशन फॉर्म जोडले आहे.

Vasai Virar City Municipal Corporation

(V.V.C.M.C Head Office) Opp. Virar Police Station, Bazaar ward, Virar East, Maharashtra 401305

Quotation Notice

Name of Project:-"Underground Sewerage System For Nallasopara Area In VVCMC ".

Notice No: VVCMC/2022/

We are hereby issuing this Notice inviting quotation from developers, contractors, vendors & suppliers for various works proposed under "**Underground Sewerage System for Nallasopara Area in VVCMC**".

You are therefore requested to submit the budgetary rates for below mentioned works

Sr. No	Item Description	Unit	Qty	Item Rate (Rs.)	Amount (Rs)
1)	**Membrane Bioreactor (MBR):- Design and Process Engineering along with Supply** of Membranes Cassette & Modules as per the minimum technically specifications mentioned below for Membrane Bioreactor (MBR) based Sewage Treatment Plant with all duties and taxes, etc. complete membrane accessories and offer Extended warranty for 10 yrs, for membrane life. The Inlet Influent for the MBR plant shall be the domestic sewage. The Treated water shall be utilised for non-domestic purpose like Gardens, flushing and Industrial process.				
a)	**STP-3**	**MLD**	**62**		
b)	**STP-4**	**MLD**	**30**		
2)	**Civil Works: Design** (including Hydraulic design, STP unit sizing & RCC design) **& Construction of** STP including the cost of RCC Foundation, Structural & Civil Works of all the units like of inlet chamber, screen Channel, De-greeting unit, Grit separator unit, Equalisation tanks, aeration tanks, pre anoxic and post anoxic tank, sludge sump and pump house, sludge thickener, Membrane tank,				

Sr. No	Item Description	Unit	Qty	Item Rate (Rs.)	Amount (Rs)
	permeate tank, Centrifuged building, chlorine contact tank, chlorinator room, Sludge Holding Tank, Sludge Thickener, Chemical Storage Room, Blower Building, DG room, Staff Quarters, MCC & PLC Room, Administrative building cum laboratory, laboratory equipment's, tools and plants, spare parts, Internal Roads, Compound Wall Storm water drains, pathways, Security room, Parking Space ,Landscaping etc. complete as turnkey job.				
a)	**STP-3**	**MLD**	**62**		
b)	**STP-4**	**MLD**	**30**		
3)	**Electro-Mechanical works:-** The rates shall include all Mechanical units like Manual & Mechanical Coarse & Fine Screens, Blowers, Vortex Grit Unit, Centrifuged Unit, chlorinators, EOT Crane beams, guide rail and necessary piping work with required valves, gates etc., Electrical units like MCC & PCC panels, cables, HVAC /AC system, DG set, Internal Lightning, & Instrumentations items like PLC SCADA, Field Instruments, Analysers, etc. complete as turnkey job tanks and Extended warranty for 10 yrs. of Operations.				
a)	**STP-3**	**MLD**	**62**		
b)	**STP-4**	**MLD**	**30**		
4)	**Installation ,Commissioning and Trial run**: The rate shall include Erection of all the Electro-Mechanical Units, successfully Commissioning giving satisfactory Trail run of Sewage Treatment Plant for 1 year.	**JOB**	**1**		
a)	**STP-3**	**MLD**	**62**		
b)	**STP-4**	**MLD**	**30**		
5)	**Comprehensive Operation & maintenance cost for STP :**				
i)	It shall also include the cost of manpower, consumables, and spares required (excluding power consumption cost) for the O & M of the plant.				
a)	**STP-3**	**Per MLD/month**	**62**		

Sr. No	Item Description	Unit	Qty	Item Rate (Rs.)	Amount (Rs)
b)	**STP-4**	**Per MLD/month**	**30**		
ii)	It shall also include the specific power consumption cost required during the O & M of the plant.				
a)	**STP-3**	**Per MLD/month**	**62**		
b)	**STP-4**	**Per MLD/month**	**30**		
6)	**Ultraviolet (UV) Disinfection:** - The treated sewage from MBR Plant shall be supplied for Disinfection with UV. O & M cost/KL shall be given separately. The Rates shall include Design, Supply, Installation, Testing, Commissioning, civil and structural requirements and storage tanks and Extended warranty for 10 yrs. of Operations. Warrantee shall also include the specific power consumption and consumables for the O & M of the plant. The UV MOC shall be suitable for minimum 10 years of full replacement warrantee.				
7)	**Pumping Machineries: -** Pumping Machinery required to pumping the Sewerage and recycled water from sump to Primary chamber and Elevated Storage Reservoirs. O & M cost shall be given separately. The desired technical specification & required flow and head for the pumps are provided in subsequent column				
	Submersible pump Specification: Providing, Installing, Testing, Commissioning of non-clog Submersible Sewage Pumps, as specified below. Capacity - …MLD Pump Head in mWC- …mtr.	**Nos.**			

Sr. No	Item Description	Unit	Qty	Item Rate (Rs.)	Amount (Rs)
	Efficiency of the pumps- not less than 80% Required Motor rating HP- … HP Solid Handling size – 100 mm Sp Gravity – 1.05 MOC Casing – CI EN-GJL 250 suitable for 4 to 10 pH Impeller – Shall be of Single, Multi vanes or S-TUBE type CI EN-GJL 250 Shaft - SS 329 ; MOTOR Casing - CI EN-GJL 250 Motor Parts – CI IS 210 Gr. FG 220 Fasteners – BHT Steel Guide Pipe –SS 304 Lifting Chain – SS 304 Mech. Seal – Mechanical Seal shall be of SIC vs SIC for Primary & SIC vs Carbon for Secondary, The pump must equipped with a method of restoring impeller to casing clearance in axial direction, to restore the pump efficiency at site, without dismantling the pump and machining for replacement of wear rings. Motor cooling must be achieved by a cooling jacket, using the pumped media /coolant to cool the motor. The pump impeller must be equipped with a system to ensure a pumped flow of liquid through the				

Sr. No	Item Description	Unit	Qty	Item Rate (Rs.)	Amount (Rs)
	cooling jacket and also incorporate a device to prevent the liquid channels from blocking with hair and foreign material.				
i)	**Pumping station to STP sump:**				
	a) 2DWF -Flow=64.32 mld , m3 /hr. =2679.92, Head=15.41 m, Pumping length= 4000 m	**Nos**	**1**		
	b) 1DWF-Flow=27.97 mld , m3 /hr. =1165.28, Head=13.15 m, Pumping length= 4000 m	**Nos**	**2**		
	c) ½ DWF-Flow=18.93 mld , m3 /hr. =788.59, Head=12.83 m, Pumping length= 4000 m	**Nos**	**2**		
ii)	**Sump to STP :**				
	a) 2DWF -Flow=68.91 mld , m3 /hr. =2871.60, Head=22.97 m, Pumping length= 50 m	**Nos**	**2**		
	b) 1DWF-Flow=61.31 mld , m3 /hr. =2554.46, Head=22.96 m, Pumping length= 50 m	**Nos**	**2**		
	c) ½ DWF-Flow=40.45 mld , m3 /hr. =1685.34, Head=22.96 m, Pumping length= 50 m	**Nos**	**2**		
	Vertical Turbine Pump Specification: Providing, Installing, Testing, Commissioning with test and trail of each VT Pump giving discharge …..mtr3/ Hr. at Total Head …Meter including foundation base frame bolts etc. complete. No. of …. Stages. Capacity - … MLD Total bowl head- ….mtr. Pump HP- ….				

Sr. No	Item Description	Unit	Qty	Item Rate (Rs.)	Amount (Rs)
	Pump model-…. Number of stages- … Pump speed RPM –…. Bowl efficiency- Not less than 80% Total Suspension length including Bowl & strainer- 7.5Mtr Type of Lubrication- Self water Material of constructions: Casting- Cast Steel Impeller- CF8M Neck Ring - CF8M Shaft- SS410 Shaft sleeve - SS410 Intermediate Bearing - Cutless Rubber				
i)	Flow=34.46 mld , m3 /hr. =1435.84, Head=51.19 m, Pumping length= 200 m, Construct sump depth = 7.5m	**Nos**	**3**		
8)	**Instrumentation Works** Supply installation, testing Commissioning of following ONLINE Monitoring instruments and Integrations with CPCB Web Link. SCADA INTEGRATION WITH CPCB WEBSITE ON READY TIME BASIS including Building information Management software and services	**Job**	**1**		
9)	**Field Instrumentation with online monitoring Interface.**				
i	**pH Analyzer** **Certifications** :- TUV	**Each**	**1**		
ii	**COD, BOD, TSS:-**	**Each**	**1**		

Sr. No	Item Description	Unit	Qty	Item Rate (Rs.)	Amount (Rs)
	Certifications :- TUV.				
iii	**Temperature sensor :-** **Certifications :-** TUV.	**Each**	**1**		
10)	Supplying and erecting **Air circuit breaker** manually operated drawout type of …….A rated at 50º C without deration, 500V, 3 pole having short circuit rating 50 kA (Ics=Icu=Icw for 1s), with standard accessories and thermal magnetic release on provided iron frame.				
i)	2000 A	**Each**	**1**		
ii)	2500 A	**Each**	**1**		
iii)	3200 A	**Each**	**1**		
iv)	4000 A	**Each**	**1**		
v)	5000 A	**Each**	**1**		

Sd/-

Executive Engineer

Vasai Virar City Municipal Corporation (VVCMC)

Note: - The required site visit/inspections shall be carried out by the vendor/supplier, before providing the Techno-Commercial Offer. Only informative assistance shall be provided by VVCMC officials.

Vasai Virar City Municipal Corporation
(V.V.C.M.C Head Office) Opp. Virar Police Station, Bazaar ward,
Virar East, Maharashtra 401305

"Underground Sewerage System For Nallasopara Area In VVCMC".

NOTICE INVITING QUOTATIONS

FOR

SEWAGE TREATMENT PLANT

Contents

1 INTRODUCTION

1.1 PROJECT BACKGROUND

Vasi Virar is a city in Maharashtra state in western India. It is located in Thane District, 50 km north of Mumbai. The city is located on the north bank of Vasai Creek, part of the estuary of the Ulhas River. The newly formed Vasai Virar Municipal Corporation (VVCMC) is the civic body that governs the city. Vasai-Virar is an agglomeration of several formerly separate towns, which includes Vasai, Virar, Navghar-Manikpur and Nala Sopara. The area covered by the city roughly corresponds to the ancient city of Sopara.

The Vasai-Virar Sub-region (VVSR) is bounded on the north by the Vaitarna River, on the south by the Vasai creek and on the west by the Arabian Sea. The eastern boundary is the hill ranges of Tungar full of forest extending from village Sasunavghar upto village Chandip. A number of hillocks and isolated peaks dot the region in the east.

The region on the whole, is low-lying mainly in the southern part along both sides of Western Railway line. The old village settlements in the coastal belt are slightly on higher level and moderately plain. The average elevation of the area above sea level is 1.5 to 2 m. There are many local variations caused by small hillocks scattered in the eastern and north-eastern part of the region. The area lying to the east of the National Highway is hilly and covered mostly by thick forests. The hill ranges of the Tungar and the above two creeks create a natural barrier separating the sub-region from the rest of the Mumbai Metropolitan Region. The Chinchoti fall, Tungareshwar Temple and thick forest offer good tourism potential to this eastern part. The low-lying lands along the coast and along two creeks are marshy, khazan lands and some of them mainly to the south of Nallasopara Railway Station are still used for salt cultivation.

The project consist of two STP's of 62 & 30 MLD .Treated sewage shall be made available for meeting non domestic demands, as required.

The scope under the present work includes the design, construction, operation & maintenance of STPs in Nallasopara area. Each zone is designed in such a way that sewage shall be collected by gravity. And one STP is provided in each zone along with pumping station as per topography wherever needed.

The treatment of sewage in the STP is based on Membrane Bio Reactor (MBR) technology.

STP	Total STP Capacity (MLD)
3	62
4	30

The Notice inviting quotation for the above said work shall have the following scope of works:

Design & Drawings, Construction/ Fabrication/ Erection, Testing & Commissioning of proposed Sewage Treatment Plant with reject water treatment, including all the works related to Civil/Electrical/Mechanical/ Instrumentation or any other field of Engineering, all inter-connecting piping, Supply of equipments etc., including all type of Foundation work as per the existing strata, RCC works, required materials & labour etc. complete as per terms & conditions, and specifications of this notice.

The agency shall have to also submit the details on the electricity consumption for the entire system i.e. for all the project components. The agency shall have to submit the performance guaranteed in the table furnished hereunder in this notice for evaluation purpose. It shall be reviewed in future for actual electricity consumption also.

1.2 INFLUENT SEWAGE CHARACTERISTICS

The characteristics of influent wastewater shall be as per the details provided in Table

Parameters	Raw Sewage	Unit
BOD5	100-200	mg/l
COD	300-400	mg/l
Total Suspended Solids	25-35	mg/l
pH	7-7.5	mg/l
Total Coliform	1600	mg/l
Fecal Coliform	94	mg/l

1.3 TREATED EFFLUEN QUALITY REQUIREMENTS FOR REUSE

The treated effluent characteristics are considered for STP process design as per Specifications for recycled water.

The specifications for treated sewage to be used for recycled water are as follows:

Sr.no.	Parameters	Unit	Quality Parameters of Treated Water
1	Bio chemical Oxygen demand (BODs)	mg/l	≤ 5.0
2	Chemical Oxygen demand (COD)	mg/l	≤ 50.0
3	Total Suspended Solids (TSS)	mg/l	≤ 1.0
4	Turbidity	NTU	≤ 0.5
5	Total Nitrogen (TN)	mg/l	≤ 10.0
6	Ammonical Nitrogen	mg/l	≤ 2.0
7	Total Kjehldal Nitrogen	mg/l	≤ 5.0
8	Dissolved Oxygen	mg/l	> 2.0
9	Total Phosphorus	mg/l	≤ 1.0
10	pH		7.0-8.5
11	Free Residual Chlorine	mg/l	1-2
12	Bacteria		< log 6 reduction
13	Viruses		< log 6 reduction
14	Protozoa		< log 6 reduction
15	Oil and Grease	mg/l	≤ 0.010
16	Total Dissolved Solids (inorganic)	mg/l	≤ 1500

1.3.1 General:-

Tentative location of proposed STP is attached as an annexure. For any other details, Agencies are encouraged to visit the site and allowed to do their own due diligence. However, agencies shall have to prepare & submit their layout plan and hydraulic flow diagram etc. along with the quotation.

The scope of work will be in general but not limited to design and detail engineering, construction, procurement, civil, mechanical, electrical, instrumentation interconnecting

pipes works including erection, testing, trial runs, commissioning and guaranteeing and operation and maintenance (including major and minor spares and consumables).The agencies shall have to give guarantee for smooth running of the plant. During guarantee period if any component or components of mechanical equipment, or electrical, or electronic instruments and or measuring equipments or valves or pipes or specials etc. gets out of order or found to be malfunctioning the same shall have to be replaced by the agencies at his cost and for the replaced article, the guarantee period shall be twelve months from the date of re-commissioning.

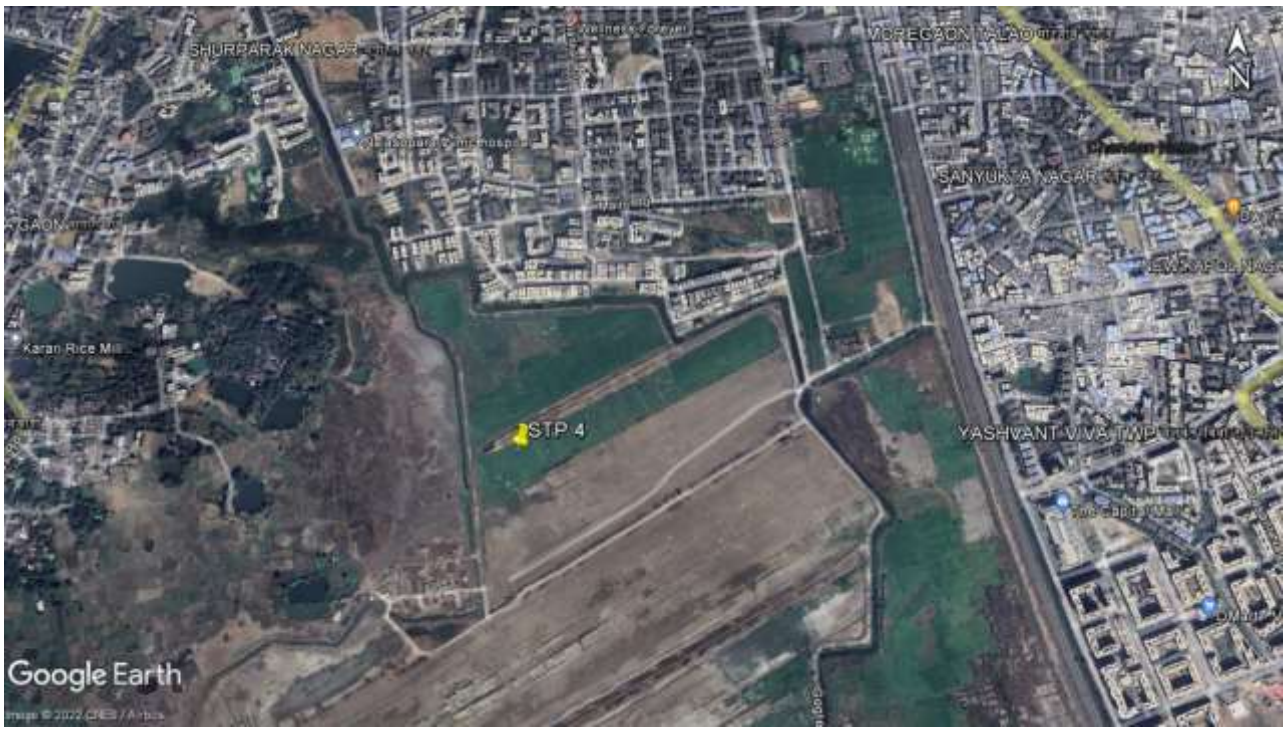
This is the minimum requirement and agency may provide additional units if required within the quoted price to meet the performance guarantees. Alternative offer shall not be accepted. The Agency shall visit the site and based on the following minimum requirements and in line with the data sheet of various units as specified elsewhere in the notice, prepare and submit the layout and hydraulic of proposed TSTP as per his design.


INDIA
States and Union Territories
INDIA FLAG
TAJIKISTAN
AFGHANISTAN
PAKISTAN
CHINA (TIBET)
NEPAL
BHUTAN
LADAKH
JAMMU & KASHMIR
HIMACHAL PRADESH
PUNJAB
CHANDIGARH
UTTARAKHAND
HARYANA
DELHI
New Delhi
UTTAR PRADESH
RAJASTHAN
GUJARAT
DADRA & NAGAR HAVELI AND DAMAN & DIU
JHARKHAND
CHHATTISGARH
ODISHA
TELANGANA
Hyderabad
Yanam (Puducherry)
ANDHRA PRADESH
GOA
KARNATAKA
Bengaluru
Chennai
PUDUCHERRY
Mahe (Puducherry)
TAMIL NADU
Karaikal (Puducherry)
LAKSHADWEEP (INDIA)
KERALA
Thiruvananthapuram
SRI LANKA
INDIAN OCEAN


PALGHAR
TEHSIL MAP
Gujarat
Dadra and Nagar Haveli
Nashik
Jawhar
Vikramgad
Mokhada
Palghar
Vada
Vasai
Thane
Legend

STP-3 Location Nallasopara (E)

STP-4 Location Nallasopara (W)



1.4 General Design Requirements

The following general design requirements shall be met by the agencies. These requirements shall be fully met regardless of whether or not such requirements.

- All components (including but not limited to equipment such as pumps, blowers, screens, diffusers, inline devices; instruments such as flow meters; and distribution and collection channels or pipes) shall be provided with appropriate isolation devices such as valves, gates, or other devices in order to allow isolation, drainage, cleaning, calibration, servicing, and maintenance of such components. Bypasses shall be provided around all flow meters and other in-line instrumentation such that the instrument can be isolated and removed for calibration and maintenance without interrupting the flow.

- Where necessary, high noise equipment shall be provided with acoustic, sound- dampening enclosures to limit ambient noise during normal operation to the limits detailed in the General Requirements.

- All equipment shall be arranged and buildings and structures designed to permit safe and easy access to and for removal of all equipment.

- Fixed runways, lifting eyes, cranes, hoists, or other appropriate devices and means shall be provided to permit safe and easy removal of all equipment for maintenance or any other purpose

- All structures, whether liquid-holding or not, shall be designed such that they can be fully and completely drained and will not float or move when empty, because of groundwater buoyancy or any other reason. The structures shall be designed to counteract any possible floatation without the use of any type of groundwater pressure relief valves.

- The floors of all liquid-holding structures shall be appropriately sloped and trenches and drain sumps shall be provided at the bottoms of such slopes to facilitate complete drainage of liquid.

- Non-liquid-holding areas, structures, or buildings where leakage or other wet activities can occur, whether in normal use or during maintenance, shall be

provided with covered drainage channels which shall direct the spillage to the plant gravity drain sump that takes the waste sludge and other waste flows to the Wet Well.

- Inlets into tanks, reactors, or other structures via pipes, channels, valves, or gates shall be designed such that the incoming flow does not cause any damage or excessive wear whatsoever to the structure or any equipment in the vicinity under any hydraulic condition, including but not limited to the condition when the structure is empty.

- For liquids and sludge, the minimum pipe flow velocity shall be no less than 0.5 m/s and the maximum pipe flow velocity shall be no more than 1.5 m/s for pumped suction and no more than 2.0 m/s for pumped discharge or gravity flow. All mixed liquor and sludge lines shall be minimum 80 mm diameter and shall be provided with appropriate cleanouts and flushing arrangements for safe and easy flushing using high-pressure water.

- All liquid service pipes shall be provided with appropriate means for safe and easy drainage of the pipes when not in service.

- All pipes shall be colour banded and suitably labelled with the stream designation and direction of flow to enable individual lines to be identified throughout their run.

- Particular attention shall be paid to the layout of the chemical piping, which shall be arranged without clutter and shall be functional and neat in appearance.

- All piping routed under any type of structure or equipment shall be fully and completely encased in reinforced cement concrete, with the encasement thickness beyond the outer diameter of the pipe being at least 200 mm on all sides.

- Platforms, handrails/guardrails, ladders, and stairs shall be provided where necessary for proper, safe, and easy access to and/or operation of valves, gates, instruments, control panels, and other devices, equipment, or structures.

- Appropriate sampling ports and/or sampling valves shall be provided to allow easy, safe sampling of all process streams without spillage or contamination and without the need to interrupt normal operation.

- Foam, scum, fats, oil, grease, or any other floating material removed from any location in the STP shall be completely removed from the process flow path.

1.4.1 Process and Facilities Description

This Process and Facilities description is intended to provide a general indication of the processes and types of facilities that the Agencies shall be required to design, construct, commission and operate, and applies to STPs in this notice unless specifically indicated otherwise. The Agencies shall use this description together with other specific information for SPS, Pumping Main, and STP provided elsewhere in these documents.

1.4.2 Wet Well Coarse Screen & Gate

The Wet well receives raw sewage directly from one or more sewer(s), which shall be conveyed from the inlet manhole and/or collection chamber to the Coarse Screen influent channel via an appropriately sized gravity pipe and screened using Coarse Screens placed in deep concrete channels immediately upstream of the Wet Well. One numbers of Mechanical Coarse screens shall be provided. The screenings removed by the screens shall be discharged in to a container. One number of penstock gate shall be provided before the screens for isolation purpose.

1.4.3 Raw Sewage Pumps

The coarse-screened sewage from wet well shall be pumped by the Raw Sewage pumps to the Fine Screen Inlet Channel of STP as specified in the notice. Pump operation shall be automatically controlled based on wet well level.

1.4.4 Fine Screens

The Medium Screens shall receive coarse-screened sewage from the upstream Wet Well. An electronically controlled automatic jam removal system shall be provided in addition to the safety devices specified elsewhere in the document. One number of Mechanical fine screen shall be provided as working unit and one number of manual fine screen shall be provided as standby. The screenings

removed by the screens shall be directly discharged in to a container at the appropriate elevation above finished ground level.

1.4.5 Grit Basins

Gravity type grit basins shall be provided without mechanical grit collector. The sediment grit shall be discharged to grit pit by manual operation through pipes and valves. The grit slurry shall be taken to the nearest manhole of gravity sewer. The de-gritted sewage stream shall flow to the next process unit through a channel.

1.4.6 Rotary Drum Screens

Self-cleaning Fine Screens shall be provided in one duty and one standby arrangement. The screenings removed by the Fine screens shall be directly discharged in to a container at the appropriate elevation above finished ground level. Performance requirements for Fine Screens shall be as specified by the MBR membrane manufacturer.

1.4.7 MBR Basins

The MBR Basins shall have complete mixed/plug flow. Minimum of two MBR basins shall be provided.

The MBR design shall provide for easy isolation of each aeration tank and shall include all required facilities for cleaning the membranes. An electric monorail chain pulley block shall be provided for easy removal of the membrane cassettes. The block shall provide adequate vertical clearance to safely lift the membrane modules above all piping, equipment, or other items that may be located in the travel path from the module location in the tank to an adequately-sized adjacent membrane “lay-down” area designated for membrane maintenance or chemical tanks meant for recovery cleaning.

The scope of supply for the MBR system shall consist of, but not limited to the following:

a) A complete microporous membrane system with relevant track record in sewage treatment application and associated pumps and process equipment as necessary to meet the performance requirements listed subsequently.

b) All equipment associated with the backwash system (if the membrane is backwash-able) including, pumps, chemical addition systems, air blowers, air compressors;

c) Chemical storage, handling, injection and mixing systems, pumps, tanks, and instrumentation associated with the microporous membrane cleaning system;

d) All interconnecting pipe works, fittings and valves,

e) All interconnecting wiring (power and control)

f) All required process control and monitoring instrumentation, and

g) All on-line analysers for performance monitoring and verification.

1.4.8 Sludge Extraction

The sludge from aeration tanks shall be pumped to De watering Building MBR Equipment Building.

This building shall house all MBR-related equipment such as Scour Air Blowers, Permeate/ Backpulse Pumps, air compressors and WAS Pumps.

In addition, the MBR Equipment building shall house all equipment necessary for all types/modes of membrane cleaning.

The Process Air Blowers for Aeration may also be housed in the MBR building or in a separate building.

1.4.9 Chlorine Contact Tank/UV unit

The Chlorine Contact Tank/UV unit shall be used for disinfection of MBR permeate.

1.4.10 Chemical Building

A Chemical Building shall be provided to house all equipment for sodium hypochlorite and membrane cleaning chemicals such as citric acid storage tanks, storage area, dosing pumps and all associated equipments.

1.4.11 MBR Equipment Building

This building shall house all MBR-related equipment such as Scour Air Blowers, Permeate/ Backpulse Pumps, air compressors and WAS Pumps.

In addition, the MBR Equipment building shall house all equipment necessary for all types/modes of membrane cleaning.

The Process Air Blowers for Aeration may also be housed in the MBR building or in a separate building.

1.4.12 Return Activated Sludge (RAS) Pump Station

RAS pumps shall be provided to return settled sludge from the membrane- separated sludge from the MBR basins back to the Aeration Basins. A valve- controlled and metered tapping shall be provided from the RAS pump discharge header to withdraw Waste Activated Sludge (WAS) to solids processing. Return activated sludge pumps shall be used if required.

1.4.13 Chlorine Contact Tanks/UV channel:-

Chlorine Contact Tanks/UV channel shall be provided for disinfection of treated effluent from the upstream MBRs.

1.4.14 Hypochlorite Building

A Hypochlorite Building shall be provided to house all equipment including sodium hypochlorite tank and dosing pumps and all associated equipments.

1.4.15 Emergency Chlorine Scrubber for Chlorine Gas System

This contract does not include Emergency Chlorine scrubber.

1.4.16 Service Water requirements

Service water shall be used for multiple applications including but not limited to Citric Acid and polymer solution preparation, screen washing, hose down and area washing, gardening and landscaping, MBR backpulse and chemical cleaning operations, human domestic non-potable needs, laboratory needs, and other general cleaning and flushing needs. The water system shall be designed to provide adequate water pressure for all of the above applications. The disinfected MBR permeate shall be used as service water for all the above applications.

1.4.17 Gravity Sludge Thickener

Gravity sludge thickener shall be provided for thickening of Waste Activated Sludge (WAS) generated from MBR basins.

1.4.18 Thickened Sludge Pumps

Thickened sludge pumps shall be provided for pumping of thickened sludge to the sludge storage tank.

1.4.19 Sludge/Biogas Storage Tanks

Sludge/biogas storage tanks shall be provided to store the digested sludge in case of STPs with digesters or the thickened, undigested sludge in case of STPs with no digesters. For STPs with digesters, these tanks shall be provided with floating gas-holder covers with the gas space connected to the gas space of the digesters and shall thus serve the additional function of storage of the biogas produced in the digesters. For STPs with no digesters, the storage tanks shall be provided with fixed concrete covers with the gas space vented to the atmosphere. No heating shall be provided for these tanks. The tanks shall be designed to provide all of the following functions:

Thicken digested or undigested sludge by settling and decanting of supernatant Store sludge for periodic feeding to the centrifuges.

1.4.20 Centrifuge Building

Thickened sludge pumps shall be provided in Centrifuge building for pumping of thickened sludge from the thickener to the sludge storage tank.

The Building shall be provided along with dewatering centrifuges and all associated/ancillary equipment, including sludge feed pumps, a complete polymer system, dewatered sludge conveyors, sludge storage/loading hoppers, and truck access and loading facilities. Sizing of the centrifuges and all related equipment shall be based on the operating schedule specified in Paragraph 5.12 – “Design/Sizing Criteria and Other Requirements”.

1.4.21 Plant Drain Pump Station

A Plant Drain Pump Station shall be provided to collect solids processing recycles and other miscellaneous waste flows such as cleaning and wash- down flows generated in the plant and pump them back up to the headworks for treatment through the plant.

1.4.22 Administration, Laboratory, Maintenance, and Other Related Buildings/Facilities

An administration building, a laboratory, a maintenance workshop, a storage facility, a guard house, and other miscellaneous buildings and related equipment and furnishings shall be provided as needed for a fully functional facility and as described elsewhere in the bid documents.

Technical Specification for Membrane Bio-Reactor (MBR) :-

The following are the approved membrane specifications for proposed STP.

1. The membranes shall be Hollow Fibre a proven design of a membrane manufacturer engaged in the production of membrane of this type.
2. Membranes shall allow product water (permeate) to be drawn through from the outside surface of the membrane to the inside.
3. The nominal pore size of the membrane shall be equal to or less than 0.04 micron.
4. Membranes shall be physically strong enough to withstand the operating conditions associated with continuous operation in an aerated tank of mixed liquor at concentrations of up to 12,000 mg/L.
5. The membranes, membrane modules, and membrane cassettes shall be by one manufacturer.
6. The membrane modules shall be constructed such that the membranes are held vertically and bonded firmly. The membrane modules shall also be attached to a common base to avoid lateral movement of the membrane modules during operation.
7. The material used for the manufacturing of the membrane fibres shall be PVDF preferably reinforced suitable for providing a full replacement warrantee for a minimum period of 10 years.
8. The materials used to hold hollow membrane fibres in place shall be chemically resistant to high concentrations of chlorine and high pH wash respectively.
9. Membranes shall be capable of regular backwashing with and without cleaning chemicals to minimize pore fouling.
10. At least 25-30 lmh Avg. flux @ 25^0 C shall be considered to arrive at total membrane area required to treat specified wastewater quantity.
11. Clean-In-Place System: The membranes shall be cleaned “in-place” without removal from the membrane tank. The system shall consist of a chemical feed pump (if

required) and storage tank (if required) and include all interior piping, valving, and in-tank piping and supports.

12. The minimum membrane warranty for life of membranes should be for 10 years where the membrane manufacturer should offer 2 years full replacement warranty and additional 8 years on pro-rata basis.

Technical Specification for UV Disinfection System:-

1. Minimum UV transmittance shall be ≥75%
2. System shall give > 6 log reduction of E.Coli. / Feacal Coliform.
3. System shall withstand the maximum operating pressure of 102 psi (7 bars).
4. System shall withstand the maximum operating temperature of 70^{o} C.
5. UV lamp type shall be medium pressure variable intensity.
6. Maximum power consumption shall be ≤ 8.5 kW
7. Lamp Life shall be ≥16,000 Hours with lamp life factor of ≥0.90.
8. Total head loss across the disinfection system shall be < 200 mm.
9. Construction Materials

Housing	SS-316
Internal	High grade fused silica (Quartz)
Seals	EPDM & Viton

1. Online Analyzer Technical Specifications

4 Channel Smart Controller for COD BOD TSS pH Temperature :

Sr No	Item	Description of Requirement
1	Basic Requirement	Controller should have the latest features of highly advanced Multi Parameter Controller having capability of handling at least 4 Sensors in a single controller configuration and more as and when required. ➢ With Sensor ID recognition ➢ High EMC interference immunity ➢ Backup controller function to increase reliability (in terminal mode) ➢ Control should be not touch screen unit

Sr No	Item	Description of Requirement
		with keys and toggle switch for the quick selection of software functions ➢ With integrated back up controller function ➢ Integrated lightning protection ➢ Controller Should have the capability to be operated as Controller (having programmability feature) or just a terminal (that can display the data without any way to make changes). ➢ The Controller should be able to power all the sensors and terminals or accessories attached to it without having to need any additional power sources in the system for increased protection against lightening and possible electromagnetic interference. ➢ The system should start automatically after the power is reset to the system (in case of power failure). ➢ The system should have Service mode for cleaning/calibration/maintenance activities.
2	Display	➢ With large graphic display with backlight ➢ Display should be with improved reading precision through special backlit graphic display
3	Power Consumption	➢ Line power consumption approx. 25 VA ➢ Max. power delivery 18 Watt ➢ The controller should be low power consuming with consumption of less than 5W.
4	Number of sensor to be connected	➢ 4 Sensors to be connected
5	Input Voltage	➢ Input voltage 90 - 264 VAC 50/60 Hz
6	Output, Communication	➢ Galvanically separated current outputs (0/4-20 mA) that can be assigned arbitrarily

Sr No	Item	Description of Requirement
		➢ RS485 Modbus Output Must Require ➢ USB-interface for data transfer, upgrading firmware etc. ➢ It should be possible to download the data via the USB interface an extremely fast data exchange to USB memory stick.
7	Data Logger	- Internal integrated Data logger with minimum data memory for up to 500,000 data sets - The controller should storage the sensor configurations and calibrations - The controller should have Logbook to record the data - The supplier should provide the firmware update free of cost as and when they are available for the life time of the system.
8	Accessibility	- The system should be fully programmable with multiple levels of access control with help of Electronic-Key for data security and protection against non-authorized access to avoid any tampering or changes to the system configuration by unauthorized access.
9	Status LED	- The system should have a status LED that gives reliable and fast information regarding function and status of system. And the Controller/controller should show a LED for diagnostic purposes on the front. This LED should show normal and malfunctions of the system at a glance.
10	Operating Temperature	- Ambient Conditions Operating temperature: -4 °C … +55 °C - Storage temperature: -10 °C … +65 °C

Sr No	Item	Description of Requirement
11	MOC	- Housing Material – Non corrosive e.g. Acrylonitrile-Styrene-Acryl esterpolymer or better
12	Protection Rating	- Protection Rating IP 66 / equivalent to NEMA 4X for controller - Integrated Lightning Protection: According to EN 61326 enhanced overvoltage protection for the entire system, implemented in each component
13	Certifications	- Electromagnetic Compatibility: EN 61326, Class B; FCC Class A, EMC for indispensable operation
14	Warranty	- 1 years warranty

COD, BOD, TSS Specifications :

Sr No	Item	Description of Requirement
1	Basic Requirement	**Continuous Effluent Monitoring of BOD, COD, TOC, TSS with UV-Vis Full Spectrum Technology** - Multi Parameter probe ideal for monitoring of BOD/COD/TOC/TSS in Waste water - The Sensor should have optimized referencing for excellent zero point and long term stability. - The Sensor should provide compensation of interferences by evaluation of the whole measured spectrum.
2	Measurement Principal	➢ Measurement of full wave lengths spectra (UV-VIS Spectrometry) from 200 – 720 nm As per the CPCB Guideline
3	Reagent Free	- The Sensor should not use any reagents

Sr No	Item	Description of Requirement
		and spare parts like WIPERS and should be easy to use and operate without any running costs. - The sensor should be completely reagent free for operation.
4	Measurement	➢ Must be direct In-Situ measurement in outlet of waste water treatment plant
5	Inbuilt Cleaning	➢ The sensor must be preferably with efficient integrated ultrasonic cleaning facility.
6	MOC	- The MoC must be Titanium and PEEK Material to sustain the sensor in highly corrosive wastewater environment. Measuring Window is sapphire glass.
7	Sensor Cable	- The Sensor cable supplied along with the sensor has to be 15 Meters and of Sea Water version so that it's not affected by acids and presence of highly corrosive media in sample.
8	Light Source	- Xenon Flash Lamp.
9	Accuracy	Accuracy in Standard Solutions: □+/-5 % of the measured value
10	Measuring Range	• COD: 0 - 1200 mg/l • BOD: 0 - 800 mg/l • TSS: 0 - 800 mg/l
11	Operating Temperature	Operating temperature: 0 °C to +45 °C; Storage temperature: -10 °C to +50 °C
12	Certifications	TUV
13	Warranty	1 years warranty

pH & Temp Sensor Specifications :

Sr No	Item	Description of Requirement
1	Basic Requirement	**pH Sensor Specifications:** - Integrated temperature measurement and compensation should be provided in the pH sensor. - Sensor check function to detect broken glass of the pH electrode. - The pH sensor should have galvanically separated input. - Calibration history should be stored automatically in the sensor. - Sensor calibration can be done in the laboratory or field. - Signal Output –Digital - Sensor Check function should be available in the pH sensor - Temperature Sensor should be integrated in the pH sensor - protection type : IP 68 for both Sensor and Cable
2	Measurement Principal	➢ Electro-Chemical
3	Reagent Free	- The pH combination electrodes should require very little maintenance and there should be no electrolyte replacement.
4	Power Consumption	- Power Consumption: less than 0.5 Watt
5	MOC	- Stainless Steel or better
6	Sensor Cable	- The Sensor cable supplied along with the sensor has to be 15 Meters and of Sea Water version so that it's not affected by acids and presence of highly corrosive media in sample.

Sr No	Item	Description of Requirement
7	Voltage Protection	Transient Voltage Protection should be integrated in the sensor
8	Measuring Range	Measuring Range: pH: 0.00- 14.00 at least considering the wastewater environment Measuring: -5 to 60 Deg
9	Operating Temperature	- Temp Compensation: -5 to +50 Deg C
10	Certifications	TUV
11	Warranty	1 years warranty on Sensor and 6 month Warranty on pH Electrode

2. SCADA INTEGRATION WITH CPCB WEBSITE

Supply installation, testing Commissioning of following ONLINE Monitoring instruments and Integrations with CPCB Web Link. SCADA INTEGRATION WITH CPCB WEBSITE ON READY TIME BASIS including Building information Management software and services

The major prerequisites of efficient online analysers are:

- Should be capable of operating unattended over prolonged period of time.
- Should produce analytically valid results with precision and repeatability.
- The instrument/analyser should be robust and rugged, for optimal operation under extreme environmental conditions, while maintaining its calibrated status.
- The analyser should have inbuilt features for automatic water matrix change adaption.
- The instrument / analyser should have on-board library of calibration spectras for different industrial matrices with provision of accumulating further calibration matrices.
- Should have data validation facility with features to transmit raw and validated data to central server.
- Should have Remote system access from central server provisioning log file access.

- Should have provision for Multi-server data transmission from each station without intermediate PC or plant server.
- Should have provision to send system alarm to central server in case any changes made in configuration or calibration.
- Should have provision to record all operation information in log file.
- For each parameter there should be provision for independent analysis, validation, calibration & data transmission.
- Must have provision of a system memory (non-volatile) to record data for at-least one year of continuous operation.
- Should have provision of Plant level data viewing and retrieval with selection of Ethernet, wireless, Mod-Bus & USB.
- In case of TOC analyser, the empirical relationship between TOC to COD or BOD must be authenticated for all industrial applications and the correlation calculation (for factor) provided.
- The software will give alarm, in case of the concentration of parameter exceeds the prescribed norms by 10% continuously.
- The correlation/interpretation factor for estimating COD and BOD using UV-Visible Absorption Technique shall be regularly authenticated/ validated and details provided.
- Record of calibration and validation should be available on real time basis on central server from each location/parameter.
- Record of online diagnostic features including sensor status should be available in database for user friendly maintenance.
- Expandable program to calculate parameter load daily, weekly or monthly basis for future evaluation with flow rate signal input.
- Must have low operation and maintenance requirements with low chemical consumption and recurring cost of consumables and spares.

System Validation

- Online instrument operation will be evaluated using the known buffers, traceable standards and laboratory techniques.
- By validating sensors and probes with known standards such as KHP (potassium hydrogen phthalate) for COD & TOC, Formazin equivalent standard for TSS & pH buffers have to be used to calculate a running variance of the measurements.

Parameter validation

- Each parameter is validated with reference to standard laboratory analysis and known standards.
- Parameter Accuracy: Allowed Variability

The relative difference between online and laboratory measurements has to be between COD Accuracy ±10% BOD Accuracy ±10% pH Accuracy ±0.2 pH TSS Accuracy +/-10 % Operation & maintenance:

- Daily Check – GPS Transmission, System Diagnostic alarms.
- Monthly Check – Sensors & system cleaning, data backup, Parameter Calibration as specified in calibration schedule.
- Periodic Check – System validation with known standards, Laboratory & Online parameters Comparative

Reporting :

- The RT EQMS suppliers have to provide central server at CPCB and SPCB with latest software to view the data in graphical/ tabular format and also to compare the data features.
- One minute data average must be transmitted/retrieved to servers every 30 minutes. In the event of transmission loss the time stamped data in the data-logger memory must be transmitted to fill from the last transmission break with a stamp of time delay.

The software should have two way communication, so that data from the system can be seen whenever desired and remote of controller/data logger can be taken to visualize the immediate status of the system.

Functional capabilities of software

- The system should be capable of collecting data on real time basis without any human intervention.
- The data generation, data pick up, data transmission; data integration at server end should be automatic.
- The submitted data shall be available to the Boards, SPCBs/PCCs and CPCB for immediate corrective action.
- Raw data should be transmitted simultaneously to SPCBs /PCCs and CPCB.
- In case of delay in collection of data due to any reason, the data transmission should be marked delayed data and reports of delayed data should by displayed on the portal
- At no point of time, manual data handling should be permitted. Data validation should be permitted only through the administrator and data changes recorded with date and time stampings.
- Configurations of the systems once set up (through remote procedure) and verified, should not be changed. In case any setting change is required it should be notified and recorded through the authorized representatives only.
- The data submitted electronically shall be available to the data generator through internet, so that corrective action if any required due to submission of erroneous data can be initiated by the industry.
- The software should be capable to verify the data correctness which means at any given point of time the regulatory authorities/data generator should be able to visualize the current data of any location's specific parameter.
- A system for data validation shall be incorporated in the software with two stage/three stage validation and fixed responsibilities of stakeholders as below;
    I. Data Generator:
    II. SPCBs/PCCs:
    III. CPCB:
    - System should have capability to depict data at the actual location of industry over the map. CPCB and or SPCBs shall develop a map based system for data integration at a single location.

List of STP units considered in the Scope of Agency

Sr no	NAME OF UNIT
1	Incoming Raw sewage Pipe to STP
2	Coarse screen Inlet Channel (RCC)
3	Isolation Gates for Inlet/Outlet of Coarse screen
4	Wet Well Mechanical Coarse screen (20 mm)
5	Manual Coarse screen (20 mm)
6	Coarse screen Outlet Channel (RCC)
7	Belt conveyor for Coarse screen
8	Discharge chute for Coarse screen
9	Screening collection trolley
10	TSPS Wet Well (RCC)
11	TSPS Pumps
12	Guiderails for Submersible pumps
13	Manual chain pulley blocks for lifting of pumps
14	Medium Screen Inlet Chamber (RCC)
15	Medium Mechanical (6 mm) & Manual Fine screen (10 mm) Channel (RCC)
16	Isolation Gates for Inlet/Outlet of Medium Coarse screen
17	Medium Mechanical screen (6 mm)
18	Manual Medium screen (10 mm)
19	Medium screen outlet channel (RCC)
20	Belt conveyor for Medium screen
21	Discharge chute for Medium screen
22	wheeled barrow for Medium screen Disposal
23	Mechanical Grit Separator tank (RCC)

Sr no	NAME OF UNIT
24	Grit Removal System - Mechanical Grit Chamber scraper & Classifier mechanism) or Mechanical Grit Separator Scraper mechanism , Classifier , Organic Return pumps
25	Discharge chute Mechnical Detritors or Mechanical Grit Separator
26	Trolley for grit Disposal or Grit Collection trolley
27	Equalization tank & Cover (RCC)
28	Retrievable Coarse Bubble Diffuser in equalization Tank
29	MiSing Blowers for Equalization tank
30	Air Grid Coarse bubble in equalization tank (Grid Piping for Diffuser)
31	Equalized sewage transfer Pumps
32	Manual chain pulley blocks for lifting of pumps
33	Fine screen Inlet Channel (RCC)
34	Isolation Gates/Valves at Inlet & Outlet of Fine screen
35	Mechanical Fine (Drum screen) 2 mm Punch hole type
36	Fine screen outlet Channel (RCC)
37	collection Bin for Fine screen
38	Bioreactor inlet Channel (RCC)
39	Pre -AnoSic tank (RCC)
40	Pre anoSic Tank Submersible MiSer
41	Aeration tank (RCC)
42	Cover for Aeration Tank (GRP cover plated)
43	Retrievable Diffuser in aeration Tank
44	Air Grid Drop Pipe from Aeration Tank top to bottom
45	Air Grid for Fine bubble in Aeration tank (Grid pipe for diffuser)
46	Post AnoSic tank (RCC)

Sr no	NAME OF UNIT
47	Post anoSic Tank Submersible MiSer
48	Process Aeration Blowers with acoustic hood
49	VFD for Process Aeration Blowers
50	Internal recirculation pumps (Aerobic to Pre-anoSic)
51	VFD for Internal recirculation pumps
52	Bio reactor outlet channel (RCC)
53	Membrane tank Splitter BoS or Tank (RCC)
54	MBR tank Isolation Gates
55	MBR or Membrane tanks (RCC)
56	Membrane Cassette
57	Membrane Modules (Membranes)
58	Ejector System (CHECK Whether Process Ejector System is required or not)
59	Membrane Air Scour Blower with Acoustic hood with Motors
60	VFD for membrane blowers
	Membrane tank accessories
61	Permeate Collection Headers
62	Membrane Air Scour Header Pipes
63	Straub couplings- Air header
64	Straub couplings- Permeate header
65	Air Header Cassette module Isolation Valve
66	Permeate header cassette isolation valve
67	Cassette Modules pins, brackets, hangers, Beams
68	SS 304 L Fasteners supplied header piping (excludes fastners at point where piping connects to piping that will be supplied by Others)
69	Deflector Plate for Membrane Tanks (CHECK REQUIREMENT)

Sr no	NAME OF UNIT
70	Permeate /Back pulse Pump with Motors
71	VFD for Permeate /Back pulse Pump
72	Back Pulse Tank (RCC)
73	RAS Pump
74	VFD for RAS pump
75	MBR Permeate storage tank (RCC)
76	Chlorine Contact Inlet Channel (RCC)
77	Chlorine contact tanks (If required) (RCC)
78	Chlorine Contact outlet channel (RCC)
79	Sodium Hypodosing or Gas chlorination for disinfection
80	UV system for Disinfection
81	Plant water pump station (RCC)
82	Sludge Thickener tank (RCC)
83	Sludge Thickener Centre column Bridge mechanism
84	Thickened sludge pumps (If Required) (screw pump)
85	Sludge holding tank (RCC)
86	Cover for Sludge holding tank
87	Sludge storage tank miSers
88	Centrifuge feed Pump (Screw Pump)
89	Centrifuge with motor (Solid Bowl Centrifuge)
90	Discharge chute for Centrifuge SBC
91	Trolley for Centrifuge SBC
92	Supernant Pump (If required as per hydraulics) (CHECK REQUIREMENT ONCE AGAIN)
93	Poly Electrolyte Tank (RCC)

Sr no	NAME OF UNIT
94	Poly Electrolyte tank Agitator
95	Dewatering PE dosing Pump
96	Dry Polymer storage as bags
97	Centrifuge Building, HT Panel Room Substation. DG Room, Administration Lab and MCC + PLC/SCADA building, Workshop, Guard room, , Chemical house, MBR equipment building, Dewatering building, Hypo chlorite building, (RCC)
98	Common (Sodium chlorite tank) Hypo Dosing Tank for disinfection & Membrane Cleaning
99	Sodium Hypochlorite Pump with Motor
100	Citric Acid Tank
101	Citric Acid dosing tank agitator
102	Citric Acid dosing Pump
103	Coagulant Tank (Fecl3)
104	Coagulant dosing Pump
105	Coagulant tank agitator
106	Methanol Dosing Tank
107	Methanol dosing Pump
108	Na2CO3 (Alkali) Tank
109	Na2CO3 (Alkali) dosing Pump
110	Na2CO3 (Alkali) dosing tank agitator
111	Air Compressor with motor for MBR Portion
112	EOT Hoist for MBR (5 T) LIFTING
113	EOT Crane beams & guide rail
114	EOT Hoist for other locations as required (for Wet well, Air Blower & Centrifuge)

Sr no	NAME OF UNIT
115	Plant water wet well (RCC)
116	Plant water wet well pumps
117	Bore Well pumps
118	Plant drain pumps
119	Plant drain pit (RCC)
120	Bulk storage tanks if any
	VALVES
121	Manual Valves as required from the wet well pumps to the Permeate pumps Scope
122	Manual Valves as required for coarse screen, thickener, grit removal, plant water pumps, bore well pumps, compressor, chlorination, plant drain pumps area
123	ON/OFF valves related to MBR membrane system
	PIPING
124	Complete Interconnecting piping with pipe support and fittings required as per notice including By-pass lines, supernatant and thickener overflow recirculation, permeate piping , within plant boundary Limit
125	Piping between any loose supplied equipment within plant boundary limit
126	Approach platforms for within STP scope of equipment.
127	Supports/ Pipe rack for utilities permeate and treated water as per requirement
128	Puddle, Pipes, Gaskets and Fasteners, Anchor bolts as required for the STP system
	ELECTRICAL & INSTRUMENTATION
129	Field Instruments as per Appendix g or supplied equipment , also refer Typical PID
130	Field instruments required from the wet well pumps to the Permeate pumps, Chemical dosing system scope

Sr no	NAME OF UNIT
131	Field instruments required for coarse screen, thickener, grit removal, plant water pumps, bore well pumps, compressor, chlorination, plant drain pumps area
132	Junction boxes, and Pneumatic tubing for supplied Auto Valves, Local Instrument Panel within plant boundary limit
133	Power, Control & Signal Cables, cable trays from Motors/ Valves & Instruments to Junction boxes/ MCC/PLC as per contract/notice specifications & approved design
134	MCC Panel/VFD Panel
135	PLC for MBR system
136	Single PLC with SCADA system for Total STP which includes PLC for MBR
137	UPS
138	Power and Instrument cabling till MCC incomer & PLC to DCS communication and Cable tray
139	Construction Power and Lighting , Lightning Protection
140	HVAC /AC system for PLC/MCC/Chemical room/Building
141	Complete Plant lighting both indoor /Outdoor area within pant boundary including Transformer Area as per agreed Lux levels
142	Emergency Power for blowers / PLC
143	DG set (suitable rating) 1 no. For full working load
144	Communication Cables and cable tray from PLC to central (DCS/SCADA) with required Hardware at both ends if required
145	Rubber mat ,Fire Extinguisher ,First Aid Box Rubber Gloves for MCC room
146	PLC & SCADA ROOM
147	Pneumatic Tubing for On/off valves
148	HT Cables, Cable Trays & Supports, Termination
149	Suitable KVA OLTC Transformer + Type Test (Impulse & Temp Rise) (CHECK REQUIREMENT)

Sr no	NAME OF UNIT
150	Two Pole structure
151	Earthing lug for supplied Equipment's
152	Plant Earthing (Above ground Earthing only)
153	Safety Equipment's for Sub-station & Electrical room
	CIVIL SCOPE
154	Civil tanks, membrane tank coating, foundations, shed civil building and floorings, Covered Shed for Building, Blower Building, Centrifuge, material handling rooms, and RCC Platforms, ladders, supports, overhead doors, man doors, and windows, Road, drain channels, fencing, storm water drain, waste sumps, waste trench and grating, internal rungs, or monkey ladder / railing, over flow weir with puddle pipes / wash water trench including hand wheels as required
155	All structure support including Building structure / gantry crane girder for EOT Crane / stair case / chequered plates as required for STP
156	Mechanical Ventilation system, firefighting system, Odor control as per notice
	GENERAL
157	Receiving, Unloading and safe storage of supplied equipment at site untill ready for installation
158	Erection tools like cranes, fork lifts, hydra, tractor and other earth moving equipment in time for execution and arranging all safety standards
159	Debris removal on completion of work
160	Statutory approvals CEIG, IBR certifications, any other approvals required for project
161	Weather protection as required for process equipments and control equipment, Skids and electrical panel are designed for Indoor operation and will need shelter from the elements
162	Laboratory Assistance during Erection and Commissioning of Plant
163	Disposal of Initial Start-up wastewater, sludge, from centrifuge and associated chemicals

Sr no	NAME OF UNIT
164	Bulk chemical storage and transfer system including bund tanks (Chemical spill Containment) / linked proof tiles / safety equipment. Chemical leak detection / ladders and bag loaders required in the safe and efficient addition of cleaning chemicals as required
165	Sludge disposal
166	Erection and Installations (Equipment and piping including equipment's & Commissioning
167	commissioning chemicals and consumables
168	Laboratory Equipment's
169	O & M of the STP
170	Training to O&M operators Minimum for 2 Months

Note: The above list is indicative, but if any additional work/component is required than the cost of the same shall by the borne by the agency during the execution work.

Note:

1. Above cost shall include Process Design, Basic Engg Package, Detail Engineering, Procurement, Supply, and Installation & Commissioning.
2. The detail breakup of operation and maintenance cost (Manpower, Consumables, Power Consumptions etc.) shall be given by the agency for the evaluation of O&M cost.