MANAGEMENT DEVELOPMENT INSTITUTE
GURGAON,

INVITE TENDER FOR

DESIGN, SUPPLYING, INSTALLATION, TESTING & COMMISSIONING OF SEWAGE TREATMENT PLANT FOR 500 KLD, MODULAR STP ELECTROMECHANICALLY SYSTEM BASED ON MBBR TECHNOLOGY.

(INCLUDING ALL CIVIL, PLUMBING, ELECTRICAL AND OTHER ALLIED WORK IN ALL RESPECT)

AT MDI CAMPUS, GURGAON.

Management Development Institute Gurgaon
Mehrauli Road, Sukhrali, Gurgaon-122007
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PART-A

MANAGEMENT DEVELOPMENT INSTUTUTE, GURGAON
(NIT No. MDI/ESTATE/STP/2022 DATED: 19.09.2022)

INFORMATION TO BIDDERS.

1. INTRODUCTION: -

Management Development Institute Gurgaon (MDIG) invites tenders under two bids system from the firm/agency for Design, Supplying, Installation, Testing & Commissioning of Sewage Treatment Plant for 500 KLD, Electromechanically Modular System Based On MBBR (Moving Bed Bio-reactor) Technology. (Including All Civil, Plumbing, Electrical and other allied work in all respect) at MDI Campus, Gurgaon, Haryana. The firm/agency shall be selected on the basis of Quality-cum-cost based selection system (QCBS) as defined in the tender documents: -

S. No.	Information	Dates
1	Employer	Management development Institute Gurgaon (MDIG)
2	Completion Time	4 MONTHS
3	Bid Security (EMD) in the form of Bank Guarantee	Rs.8,00,000/- (Rs. Eight Lakh only) in the form of DD/TDR/BG
4	Date of Publishing of Advertisement	19.09.2022
5	Pre bid meeting	22.09.2022
6	Date/Time of closing of Tender	08.10.2022/ 3:00 PM
7	Period of validity of Tender	Minimum 90 days from closing date

The tender documents can be downloaded from the website: www.mdi.ac.in and Corrigendum, if any, would be uploaded only on the above website.

The sealed tenders may be submitted to" The Chief Administrative Officer (Admin), MDI Gurgaon, Mehrauli Road, Sukhrali, Gurgaon-122007 on or before last date of submission of tender.

MDI, Gurgaon reserves the right to accept or reject any or all tenders without assigning any reason thereof.

2. **TENDER NOTICE:**

MDI invites sealed Tenders under two bid systems (Technical & price bid) for Design, Supplying, Installation, Testing & Commissioning of Sewage Treatment Plant for 500 KLD, electromechanically modular System Based On MBBR Technology. (Including All Civil, Plumbing, Electrical and other allied work in all respect) at MDI Campus, Gurgaon, from the firms/ companies who have carried out the same nature of works.

The prospective Bidders are advised to read the entire tender document carefully and satisfy themselves about the work, site condition by visiting the MDI Campus (Estate office), on any working day between 10.00 a.m. and 5.00 p.m. before submitting their tenders (nothing is payable for visiting the MDI campus in this regard). The sealed tender as Specified in the tender document may be address it to: -

"(The Chief Administrative Officer (Admin),
Management Development Institute,
Mehrauli Road Sukhrali, Gurgaon-122007"

so as to reach on or before 03.00 PM, 08.10.2022. The tender may be dropped in Tender Box placed at Estate department at Takshashila building before last date and time.

3. **SUBMISSION OF RELEVANT DOCUMMENTS**: The agencies/companies shall enclose the copies of the following documents

(i) Latest Income Tax Clearance Certificate.
(ii) The agencies/companies have valid GST & PAN registration (Copy attached).
(iii) ESI, PF registration Certificate.
(iv) Work Experience
(v) Establishment Detail & manpower details

4. MODE OF SUBMISSION:

The price bid & EMD should be sealed in separate covers duly super scribed as 'Price Bid' & 'EMD' in the appropriate covers & both these sealed covers are to be put in a bigger cover in two part (Part- A (Technical) and Part-B (Financial) which should also be sealed & duly super scribed and mention in top of cover "Design, Supplying, Installation, Testing & Commissioning of Sewage Treatment Plant for 500 KLD, electromechanically modular System Based On MBBR Technology. (Including All Civil, Plumbing, Electrical and other allied work in all respect) at MDI Campus". Any Addendum/Corrigendum date extension in respect of above tender shall be updated in our website only and no separate notification shall be issued in the press/Bidders. Opening date and time of Price Bid will be notified after evaluation of price Bid to the shortlisted Bidders only.

5. EARNEST MONEY DEPOSIT (EMD)):

a) The Earnest Money Deposit (EMD) of an amount of Rs.8,00,000/- in the form of Demand Draft only in favor of Management Development Institute and payable at Gurgaon, will not bear any interest.

b) Forfeiture of the EMD: If any tenderer withdraws the rates, the EMD amount deposited by him will be forfeited and he will be disqualified from participating in any future tender of the Institute.

c) Refund of EMD): The EMD of unsuccessful tenderer will be refunded within 45 working days of opening of price bid.

d) If the EMD is not enclosed, the Tender offer will be summarily rejected

e) Cheque will not be accepted towards EMD.

f) The Earnest Money Deposit/Security Deposit will be forfeited and they will be disqualified from participating in any future tender of the Institute if:

i. Tenderer withdraws his tender or backs out after acceptance.

ii. Tenderer fails to remit the EMD.

iii. Tenderer violates any of the conditions prescribed in the Tender Document.

iv. Tenderer revises any of the terms quoted, during validity period

v. If the successful tenderer fails to enter into an agreement. In the event of refusal to carry out work by the successful Bidder on any grounds.

6. PERFORMANCE GUARANTEE (PG):

a) The EMD amount of Rs.8,00,000/- (Rs. Eight Lakh only) of successful bidder will be retained as security deposit in the form of performance guarantee for the period of 180 days of satisfactory completion of works. No interest shall be accrued on the deposit before the agreement with MDI, Gurgaon is entered in to.

b) Forfeiture of the EMD: The whole amount of the earnest Money deposit shall be liable to be forfeited in case of breach of any of the terms agreed upon by the contractor. The whole amount of the EMD shall be liable for forfeiture in event of the contractor not being able to continue the contract for the entire duration of the contract on the same rates, terms and conditions.

7. SPECIAL CONDITION OF CONTRACT

7	**SPECIAL CONDITIONS OF CONTRACT (SCC)**	
S. No.	**Particulars**	**Description**
1	The Employer's:	Management Development Institute, Gurgaon
		Mehrauli Road, Sukhrali, Sector-17, Gurgaon, Haryana-122007
2	Email:	caoadmi@mdi.ac.in
3	Project Duration	4 Months Construction 3 Months testing followed by 12 months DLP Period
4	Proposals must remain valid days after the submission date	120 days
5	Nos of Bid	Single Bid per Bidder..

	Site Visit	Bidders are instructed to familiarize themselves with the site location.
6	In addition to technical proposal, Bidders are required to submit financial proposal (as per forms prescribed). Submission of the technical and financial proposal in improper form will render the proposal liable to be rejected.	
7	Taxes	The Financial Proposal shall take into account all expenses but excluding GSTN, if applicable. Only GSTN as applicable shall be paid in addition to the financial quote and calculated as per applicable laws at the time of payment. All payments to bidders shall be subject to deduction of taxes at source as per Applicable Laws.
8	Bidder to state the cost in	INR Percentage of the estimated cost Indicative Example: Estimated Cost given as under: CAPEX = INR Annual Maintenance Contract Bid Percentage (to be given by the bidder), as discounted cost = 90% Then bid value in INR becomes as follows: CAPEX -INR Annual Maintenance Contract Note: The bidder needs to evaluate the overall cost and to quote a percentage for estimated CAPEX and Annual Maintenance Contract (AMC) for each household combined. The single percentage quoted shall be considered for both CAPEX and AMC hence bidders are advised to distribute their costing across both the components to ensure optimal competitiveness.
9	Evaluation Criteria: Criteria, sub criteria, for evaluation of Technical Proposals have been prescribed:	Detailed evaluation as mentioned below this Table of Technical Data Sheet.

10	Eligibility of Bidders	Bid is opened to all eligible bidders as per the eligibility criteria
		All bidders shall provide qualification information, declaration & other submissions regarding past directly or indirectly with the employer
		Any bidder found concealing facts in violation of the above shall automatically be disqualified from the tendering process
		Bidder is required to provide requisite information as per the Annexed format
		Bidder should have achieved a minimum annual financial turnover of the value not less than the value indicated as per the bid document for civil / Mechanical Constructions.
		Bidder should have satisfactorily completed in the last 5 Years similar work(s) of value(s) not less than the value indicated in the bid document.
		The bidder should have documentary evidence of financial standing equal to the value indicated in the bid document along with the audited balance sheet ITR of Last 5 Years.
		Experience of work in central state/ undertakings or in Private Corporations of similar work orders obtained by the bidder for Capacities of STP Plants singularly or in parts.

		Bidder should furnish Banker's Solvency Certificate of Last Completed Financial year.

11	Documents to be submitted for qualification	Proof of Company registration, PAN, GST, PF & ESI Registration, MSME Certificate
		Turnover Certificate of last 7 Years
		Audited Balance Sheet of Last 7 Years
		Affidavit of undertaking on Rs. 100/- Stamp paper duly notarized accepting the validity the conditions of tender as per format.
		Power of attorney of authorized signatory
		Earnest Money Deposit. Rs.8,00,000/- in form of Demand Draft/ FDR Receipt in favour of MDI
		Banker's detail
		Performance Security for qualified bidder on award of LOA of 10% deposited in form of
		Bank Guarantee/ Fixed Deposit in Favour of MDI within 10 days for the issue of letter.
12	Corrupt or Fraudulent Practices	The employer requires the bidders to observe the highest standard of ethics during the procurement and execution of this contract.

		No sub-letting of work in part or full on the behalf of the contractor will be allowed by the Employer.
		Notarized Affidavit on Rs. 10/- Stamp paper undertaking for blacklisting recoveries against the company with regards to Incomplete work in any department.
13	Documents of office/ Service Center within 50 Kms from premises of MDI	Bidder must have submit the documents/ evidence/ proof of their office within 50 Kms from premises of MDI for providing quick services during maintenance / breakdown services

8. EVALUATION CRITERIA:

Combined Quality cum Cost Based System (QCBS) as detailed elsewhere in the tender.

8.1 EVALUATION OF TECHNICAL BIDS (ON MEETING MIN. ELIGIBILITY CRITERIA):

The duly constituted Tender Evaluation Committee shall evaluate the Technical Proposals on the basis of their responsive ness to the Terms of Reference and by applying the evaluation criteria bid shall be evaluated as under:

S. No.	Criterion	Evaluation
A	**Technical Manpower: (will be awarded based on in house capabilities of the organization. Kindly submit the same) Site Engineer, Technicians, Operators**	
1	**Established STP in India – State/ Central Government/ Govt Undertaking Institute/ Govt Organization/ Corporation**	**20**
	Project Experience Document as per Format with Work Order and Completion certificate.	
1a	1-2 Nos	10
1b	3-5 Nos	12
1c	6 - 10 Nos	15
1d	11 -15 Nos	18
1e	16 and above	20
2	**Established Plants Cumulative Capacity (STP/ETP/CETP)**	**20**

	Project Capacity indicated in Work Order or Certificate from Client	
2a	500-1000 KLD	10
2b	1001 - 1999 KLD	15
2c	2000 KLD ABOVE	20
3	**Relevant Experience (Project Experience Document with Work Order/Completion Certificate/Client Certificate (Description of Work shall Include type of work as per evaluation requirement)**	**15**
3a	Design and Construction of Plant vetted by IIT/ Central University	5
3b	Design and Construction of Plant + Experience of O & M of plant	5
3c	Monthly Monitoring Report of Minimum 3 plant in same Technology by any NABL lab	5
4	**Approach and Methodology and Technical Design of the Plant Vetted by any IIT/ Central Institute.**	**25**
	Presentation to be made in front of the committee. (*Only those bidders will be called for who gets a score of equal to or more than 70% in Sr. No 14 of this table)	
4a	Relevance of Technology	5
4b	Design of the plant	5
4c	Focus on meeting the required outlet parameters	5
4d	Methodology, understanding of Project and presentation on Company/organization	5
4e	Past experience (Will be evaluated based on experience of doing similar work and successful completion of projects in Government Sector.	5
		80 Marks
B	**Financial capability**	**Max. 20 marks**
1	**Average Annual Turnover during the last 7 consecutive financial year.**	**10**
	CA Audited Average Annual Turnover of the lead bidder -	
1a	INR 3 to < 5 Crore	5
1b	INR >5 to <10 Crore	10
2	**Solvency / Net worth (Share Capital and Net Profit**	**10**
2 a	3.0 Crore – 4.0 Crore	5
2 b	4.0 Crore & Above	10

		20 Marks
	TOTAL (A+ B)	**100 Marks**

8.2 **Evaluation of Financial Bid Award of work:**

The Financial Bids will be opened only of those bidders who secure 60 marks and above in technical bid (Stage —I). The cost indicated in the Financial Bid shall be deemed as final and reflecting the total cost of services and should be stated in % only. GST as applicable shall be paid extra. The final selection of the tenderer for the award of work will be based on the scores secured by it in the technical bid (Stage- I) and the price quoted by it in the financial bid (Stage-II) as detailed below:

I) 70 % weightage will be considered for Technical Score (TS) obtained in the technical bid (stage I).

II) 30 % weightage will be considered for the price quoted by the bidder in the financial bid, this will be termed as Financial Score (FS).

Financial score of the proposals will be determined using the following formula: FS = 100 x (FL/F) Where,

'FS' is the financial score of a bidder,

'FL' is the lowest Financial Proposal among all and

'F' is the financial proposal of the particular bidder.

III) For the purpose of calculation of Composite Score (CS) for each bidder, the weightage shall be 70 % for the Technical Score (Stage II) (TS) and 30% for Financial Score (FS) of the respective applicants. The Composite Score shall be calculated using the following formula: CS = TS x 0.70 + FS x 0.30.

Tenderers will be ranked accordingly to their Composite Scores and will be listed in the order of merit as H 1, H 2 and H 3 and so on. The top scorer H 1 would be eligible for award of work.

9. BROAD SCOPE OF WORK:

(i) Design, Supplying, Installation, Testing Commissioning of Sewage Treatment Plant for 500 KLD, Electromechanically System Based On MBBR Technology. (Including All Civil, Plumbing, Electrical and other allied work in all respect)

(ii) Obtaining NOC from Pollution Control Board.

(iii) Handing over the facilities to Owner.

(iv) Maintenance of STP during the defect liability period of 12 months from date of handover.

(v) The details Broad Scope of work and Technical specification is attached in Part —B.

(vi) AMC of STP for the period of Three years. Which will be extended further on yearly basis of agreed on both the parties.

10. GENERAL CONDITION OF CONTRACT:

(i) The price quoted for the above items should be inclusive of packing, transportation, insurance, Supplying, installation, Testing & Commissioning and exclusive of GST. The price should be quoted in price format (Annexure-I) only.

(ii) The scope of work shall include Design, Supplying, Installation, Testing & Commissioning of Sewage Treatment Plant for 500 KLD, electromechanically modular System Based On MBBR Technology. (Including All Civil, Plumbing, Electrical and other allied work in all respect) at MDI Campus. This will also include delivery & installation at site. The successful bidder will assume full responsibility of the complete system until final acceptance.

(iii) Owner reserves to itself the authority to reject any or all of the bids received and changes the scope of the work without assigning any reason. The Owner also reserves the right to itself to terminate the bidding process at any stage without assigning any reason.

(iv) Payment will be restricted to actual quantity supplied at site.

(v) The entire work should be completed within 3 to 4 Months of the confirmed order in writing by the Institute.

(vi) In case the work is not completed within the date stipulated penalty shall be imposed Rs. 5000/- each day of delay subject to a maximum of Rs.1,00,000/- (Rs One Lakh only). However, Director, MDI shall be empowered to grant extension of time on valid grounds.

(vii) In case any item is found to be defective /substandard, the same shall be rejected and no amount shall be paid for such items and such items shall be removed from the site immediately on cost to the suppliers has to be replaced.

(viii) The contractor shall take all safety precautions for the safety of his employees and the Institute shall not be, in any way, liable for any damage/ liability on account of any mishap or negligence of the contractor.

(ix) You shall be responsible for any mishap/accident and liability, if any, falling thereof, shall be entirely yours and the Institute shall in no way be responsible for the same.

(x) Water and electricity shall be supplied by the Institute free of cost.

(xi) Contractor shall bring only the actual quantity of materials required after measuring the actual area of work to be done at site.

(xii) The dismantled mulba /rubbish should be disposed outside the campus at a suitable dumping ground at no extra cost within 3 days of completion of work or it would be got done by the Institute at the risk and cost of the contractor and the said amount shall be deducted from the bills of the Contractor.

(xiii) The watch and ward of materials brought at site shall be the responsibility of the contractor.

(xiv) The contractor must get acquainted with the proposed site for the work and study specifications and conditions before quoting the rates.

(xv) The contractor shall get the samples of materials approved sufficiently in advance from the Institute. The materials brought at site shall strictly conform to the quality of samples approved and in case of variation such materials shall liable to be rejected and to be removed from the site within 24 hours of the rejection by the Engineer-in- Charge/Officer. The Sample of items shall be got approved before bulk procurement by the Contractor.

(xvi) The quantities indicated in the schedule of quantities are approximate only. The quantities can be increased or decreased or totally deleted while placing order by the Institute. Payment shall be made to the actual quantity of material supplied at site.

(xvii) The rates shall be valid for entire duration of work.

(xviii) Before quoting the rate, the supplier may ascertain the requirement(s) and design of STP for the purpose supplier may visit the MDI Campus.

(xix) The Institute reserves the right to get the whole or part of work done through one or more parties.

(xx) The quantities indicated in the schedule of quantities are approximately only. The quantities can be increased or decreased or totally deleted while placing order by the Institute. Payment shall be made to the actual quantity receipt at site.

11. PAYMENT TERMS:

11.1 Capex Payment

The payment for various items under the schedule will be made based on the actual work completed satisfactorily. For payment under schedule the payment conditions will be as under.

Stage No. 1: After approval of drawing and design of 500 KLD fully mechanized and automatized (PLC/SCADA operated) STP Plant and mobilized equipment- 5%

Stage NO. 2: Electrical & Mechanical works - 30%

Stage No. 3: Civil works — 50%

Stage No. 4: Installation of Equipment — 10%

Stage No. 5: Post Trial Run and Commissioning — 5%

Retention money shall be deducted @ 5 % of the value of the bills. Which will be released after twelve months from the date of final bill.

NOTE: 1. For civil structure — Excavation & P CC- 20%, Construction - 70% &Testing- 10 %

NOTE: 2. For E/M - Supply - 80 %, 10 % on Installation & Commissioning & 10 % After seccesfully Trail Run.

11.2 Invoices

11.2.1 At the end of each Billing Month, the Contractor shall submit to the Authority an invoice (each, a "Contractor Invoice") in the form set out in Schedule as per MDI Format showing stating the total amount due and payable from the Authority for the previous Billing Month.

11.3 Taxes

11.3.1 The Contractor shall be liable for all taxes imposed on the Project and the Facilities.

11.4 Mobilization Advance

11.4.1 Mobilization Advance to the extent of 10% of contract value of award of work against submission of Bank Guarantee of Nationalize Bank. The amount will be recovered from each Running bills (@ 10 % of mobilization amount).

MDI reserves the right to accept or reject any or all the quotations without assigning any reason whatsoever.

Enclose: Annexure-I , Il, Ill & IV

Thanking you,

Chief Administrative Officer (Admin),
MDI, Gurgaon

PART-B

1. PREAMBLE

1. The job of providing STP in one modules of capacity 500 m^3/day has to be done on a Turnkey basis. Therefore, the contractor shall be fully responsible for designing, preparation of drawings and calculations, supply of materials, installation, testing and commissioning.

2. Generally, (but not limited to), the following main activities are expected from the Executing Agency in a sequential manner.

   i) Preparation of scheme based on the design data & guidelines given in the documents and getting it approved from the consultant.

   ii) Preparation of detailed Shop drawings for: -

      (a) Civil Works including all cutouts, sleeves and puddle flanges, as per architectural requirements.

      (b) For Mechanical, Electrical & all relevant piping work and as may be required.

   iii) The STP contractor shall be completely responsible for the design of all components, structural details of the civil works at no extra cost, including preparation of BOQ & drawings.

   iv) Supply, Installation, Testing of the Mechanical, Electrical pipes, Fittings & other accessories.

   v) Getting of successful test results & obtaining of approval from authorized Lab / Agency of the Pollution Control Board and relevant Authorities.

3. The entire STP shall be installed underground.

4. The entire STP shall be designed smell / odor free and environmental friendly considering the fact of very close habitable areas. It shall be the responsibility of the Vendor that no foul smell originates from the Operation of the Plant.

5. For sludge handling the centrifuge shall be provided, and it is recommended to suitably collect and store the de-watered compressed sludge for re-use and/or disposal to the final destination as per the approval of the Pollution Authorities.

2. DESIGN DATA

(The data's as provided below are only for guideline purposes and are to be verified by the Executing Agency)

1. Site Location: The site is located in Management Development Institute, Gurgaon - 1220in the State of Haryana.
2. Air Temperatures

(a) Annual mean Max.	..	40.7 °c (May)
(b) Annual mean Min.	..	7.1 °c (January).

3. Rainfall

Normally rains occur between June to September.

(a) No. of rainy days	..	39.1 days
(b) Average Annual rainfall	..	797.3mm
(c) Average relative humidity		(08:30 Hrs.) (17:30 Hrs.)

4. Wind

From February to August the wind direction is prevalently North-Westerly to Westerly & from September to January it is mainly Easterly to North Easterly.

5. Ground Water

To be verified from the site.

6. Soil Characteristics

To be verified from the site.

7. Accessibility of Site

The site is well connected by all-weather roads from all directions.

8. Construction Material Available

As the site is well connected by all-weather roads construction material can easily be available at site. Skilled and unskilled laborers are available.

9.0 Influent

9.1 Type of Waste Water: The influent is the product of the waste water from different activities such as:

(a) Domestic sewage from the toilets & bathrooms.

10.0 It may be clearly understood that client wants to make reuse of treated effluent after treatment for HVAC cooling tower, flushing & horticulture purposes. Hence, it is imperative that the contractor ensures that the effluent is usable for above purposes.

11.0 Space Availability. Proposed Height/Section & Mode of Planning

The following provisions are presently proposed for the construction of the Sewage Treatment Plant. However, the details are subject to change as per the final planning, architectural approval and coordination, and at present should only be considered for guidance purpose. At the time of detailing, the contractor shall get approved the exact space and location from all concerned. The STP shall have to be accommodated as per the finally designated area.

11.1 Site area available for entire STP shall be as per plans attached along with tender document. (Refer sketches)

11.2 The STP shall be constructed completely below the ground level. The design shall be as per final architectural approval and final architectural planning requirements. If space availability is a constraint then the STP may need to be constructed in multiple levels, for which no extra amount shall be paid to the contractor.

11.3 Influent levels given on the tender drawings are approximate and no extra payment shall be admissible for any change in the same. For the purpose of preparation and submission of tender the level of incoming effluent may be taken as 3-4 meter below the mean ground level of STP. The contractor may however be permitted to revise levels of his plants to suit the new levels without any change in quoted price.

11.4 For entrance into the STP, mumties shall be provided along with staircases / ramps as per detailed layout and requirements, in coordination with Engineer in Charge

11.5 All necessary cutouts shall be provided as per detailed layouts and requirements for pipelines, equipment, ventilation etc.

11.6 The top of the STP slab shall be used for other purposes, hence shall be designed accordingly.

A. TECHNICAL SPECIFICATION

1 Sewage Treatment Plant

The scope of work for all STP works and system comprises of Engineering, supply, execution, delivery, installation, testing and commissioning, handover, training, maintenance and warranty. The Agency is obliged to provide fully functioning works and systems in conformance with the requirements of the Contract. In the event certain items are not fully described or indicated in the Contract, but deemed essential by the Engineer-in-Charge for the performance of the works and systems, then the provision of such items shall form part of the Agency's scope of works and no extra shall be paid for this.

Shop drawings shall take into account actual measurement and setting out dimensions/levels obtained and determined by the Agency on site, actual equipment/material used, co-ordination with all installation.

Engineering, supply, testing, installation and commissioning of STP - 500 KLD - MBBR Based Technology with Ultrafiltration and UV treatment including all civil works complete in all respects.

Electromagnetic type flow meter for Inlet and outlet water for flushing and irrigation.

pH, TDS meter for online metering of treated water.

All valves shall be ISI marked and as per approved makes.

All civil works to be done as per CPWD.

1.1 Process

The treatment process shall comprise the following stages:

a) Physical treatment : Coarse & Fine bar-screening
b) Primary treatment : Equalization tank, Oil & Grease Trap & Grit Chamber
c) Equalization Tank : Flow equalization with air mixing
d) Biological treatment : Anoxic, MBBR with tube settler
e) Disinfection : UV unit with chlorination system as standby
f) Flushing Water Pump : Space provision to be kept for Fixed speed type Hydro-pneumatic Pumps
g) Irrigation Water pump : Space provision to be kept for VFD type Hydro-pneumatic Pumps (2W+1S)
h) Sludge disposal : Sludge dewatering using filter press to achieve 80% water removal.
i) Performance Criteria

The treatment plant shall be designed to treat the following basic characteristic expected in the raw sewage.

Description	
Estimated daily flow	500 m3/day
Discharge period	20 hrs/day

Average flow	25 m3/hr
Peak flow	50 m3/hr
Minimum Influent BOD5 concentration	300 - 400 ppm
Minimum Influent chemical oxygen demand	400 - 800 ppm
Minimum Influent suspended solids	50 ppm
Oil & Grease	5%

The plant shall be capable of treating effluent to the following standards:

Final effluent discharge standard after treatment
pH - 6.0 - 8
BOD5 - Less than 5 Mg/L
S. Solids - Less than 5 Mg/L
COD - Less than 30 Mg/L
Oil & Grease - Nil
Total Nitrogen (TN)- <2 Mg / L
Total Phosphorus (TP)- <1 Mg / L
E Coli - Nil

1.2 Process Description

The out fall sewer main from the premises 500 m3 / day will be let into screening chambers by gravity flow. Large solids particles shall be intercepted by a bar screen, preceded by a grease trap.

a. The sewage after screening is collected in oil & grease trap after that goes-in to grit chamber & finally to the equalization sump for smoothing out peak flows.

b. The homogenized effluent is then pumped into the Biological reactor for the removal of BOD, COD, Phosphate and Nitrates. The air shall be provided through an air diffusion system to scour the sludge & for biological treatment of sewage.

c. Depending on the MLSS to be retained in the Biological reactor the sludge is wasted. The wasted sludge is collected in sludge thicker and aerated with diffused aeration and then sludge shall be feed to filter press where sludge shall be collected in the form of Cake for manure use & primate shall be send back to equalization tank.

1.3 Inlet Screen Chamber

Raw sewage shall flow into the inlet screen chamber by gravity. Large solids particles shall be intercepted by a Coarse & fine step screen of SS material. A manual screen shall be installed in parallel with the screw screen as a standby screen when the step screen is under maintenance.

1.4 Equalization Tank

Two nos. pumps (1w+1s) as per BOQ shall be provided with level switch control and automatic cut-in of the standby unit.

An aeration system shall be provided for mixing and aerating the sewage.

1.5 Air Blowers

Air blowers shall be provided in duplicate (i.e. one duty and one standby). Blowers shall be twin lobe complete with motor, base-plate, inlet filter, intake silencer and off-load starting system outlet silencer, anti-vibration damper, flexible coupling, filter restriction indicator, non-return valve, pressure relief valve, direct drive coupling.

The size and performance of the air blower shall be submitted for approval with calculations.

1.6 Ultra Violet Treatment/Chlorination

Waster shall be passed through UV unit for disinfection. As standby measure chlorine solution shall be metered in to the effluent by an electric dosing pump paced according to the sewage inflow. The effluent shall be retained in the baffle walled chlorine tank for a minimum of 30 minutes for effective disinfection prior to discharge.

1.7 Sewage feed, sludge Transfer Pump

Minimum one standby pump for each function.

Non-submersible type centrifugal pump with suction grid and automatic discharge connection. Pump casing and impeller shall be of cast iron material. Shaft shall be of CS material.

1.8 Sludge Transfer and Disposal Pumps (SCREW TYPE)

Two numbers of sludge feed pumps to filter press (one duty and one standby)

1.9 Treated Water Supply Pumping System

1.9.1 Hydro pneumatics Water Supply System – For Irrigation network

(i) Design, supply, installation, testing and commissioning of the Hydro-pneumatic pumping system with variable frequency drive for one motor in one pumping system complete with all controls and electrical work for Flushing water supply.

(ii) One set of pumps will consist of: -

(iii) Variable frequency speed pumping units for one motor and the balance pumps in the set shall have DOL starters for motor up to 7.5 HP and star/delta starter for motor above 7.5 HP.

(iv) Suitably sized pressure vessels complete with necessary interconnections and controls capacity to be minimum for one-minute operation of one pump.

(v) Control panel complete with variable speed drives, for one motor / starters for balance motors circuit breakers, MCB's, pressure transmitters etc. complete with all interconnections to pumps and electrical supply panels.

(vi) Set of Hydro Pneumatic Pumping unit shall be supplied as a complete set including, pressure vessels suction and discharge manifolds, non-return valves, isolating valves, pressure transmitters on the discharge side and level electrode at the suction tank.

(vii) Each unit shall have electronic microprocessors for unit control and monitor for automatic operation sequence control and tandem operation of pumps as per demand of water.

(viii) Level switches, flow switches and other sensing devices for status indication.

(ix) Testing & commissioning and balancing of the Pumping system;

(x) Provision of twenty-four (24) months operational maintenance and breakdown services;

(xi) Provisions of operating instructions and maintenance manuals;

1.9.2 Hydro – Pneumatic, fixed speed Package Units for Flushing Water Supply

(i) Pumps shall be in line vertical, centrifugal, directly coupled to motor. Pump head & base of cast iron and other parts in SS-304. Impeller shall be hydraulically balanced and keyed to shaft.

(ii) Pump shall be mounted on a concrete foundation, projecting at least 15 cm above finished floor level. The pumps base shall be set on a vibration elimination pad. The pump shall be selected for the lowest operating noise level and shall be complete with flexible connections, valves and pressure gauges.

(iii) Pumps shall have duty point within 5% of the maximum efficiency point.

(iv) Pump curves for all pumps offered shall be submitted. All curve indicating excessive shut-off head will not be approved.

Functions to limit the No. of start/stop of pumps per hour.

a. LCD Display
b. Pumps selections for pumps so that system controller can control all pump.
c. Pump status button to display duty pump speed and system capacity
d. Setting button to input pre-set pressure, system start/stop time etc.
e. ±1 button to key in numeric data such as pressure set point, etc.
f. Enter button for confirmation of input into the system
g. Alarm button to show location of fault - self diagnostic function display
h. Hour Run measurement for each supplied pump set
i. Buttons for scrolling to select the actual display reading for system, i.e. up and down scroll concept.
j. All pumps shall start / stop automatically.
k. Manual Mode

a) Variable Frequency Drive

Variable frequency drive shall be complete with RFI filter and harmonic dampers.

b) Enclosure 2 mm CRCA Sheet IP 54 powder coated steel enclosure. All motors shall be IE3.

1.9.3 Pump Pressure Vessel – Diaphragm Type

The pressure vessel shall be sized equal to discharge capacity of one pump for one minute to accommodate a considerable fluctuation in water demand by the system with minimum start / stop cycles of the pumps. The vessel shall be constructed of steel plate built as per IS-11791 for Unfired Pressure Vessel. A rubber diaphragm shall be provided in the vessel for separating the water and pre-charge nitrogen. The pre-charge pressure shall be adjustable and charging port with non-return device shall be provided. The adjustable cut-in and cut-off pressure unit for the pumps shall be built-in at the vessel to suit the system.

1.9.4 Float less Type Level Switch i.e. pressure transmitter for each tank (installed in drain pipe of tank). Pressure transmitters with strainers for water level and automation complete with mimic screen. The pressure transmitter shall be installed in the drain pipe with 15 mm valves complete with strainer.

High level alarm (over-flow);
Low level alarm;
Low level cut-out for raw water pumps;
The following audible and visible indication shall be provided at the pump local control panels as applicable:

a. Red "overflow level" indicator with buzzer for the associated water tanks;
b. Amber "low water level" indicator;
c. Red "pump trip" indicator for each pump;
d. Green "pump on" indicator for each pump;
e. "Pump electrical supply healthy" indicator for each pump;
f. Water level in each compartment on common display panel.

1.10 Sump Pump (Drainage and Sewer)

These shall be submersible with a fully submersible motor IE3. The pumps shall be provided with an automatic level controller, Dry run protection, Class - H Insulation, chair and lifting chain and hooks and all interconnecting power and control cabling which shall cause the pumps to operate when the water level in the sump rises to a pre-set level and stop when the pre-set low level is reached.

Pumps for drainage shall be single stage, single entry.

Impeller clearance
(i) Sump pumps for drainage 10mm,
(ii) Sewer pumps min. 38mm.

Stuffing box shall be provided with mechanical seals.

Each pump shall be provided with a suitably rated induction motor suitable for 415 volts, 3 phase, or 230 volts, single phase as per pump capacity, 50 Hz A.C. power supply.

Each pump shall be provided with liquid level controllers for operating the pump between predetermined levels.

The pumping set shall be for stationary application and shall be provided with pump connector unit. The delivery pipe shall be joined to the pump through a rubber diaphragm, and bend and guide pipe for easy installation.

Pump shall be provided with all accessories and devices.

Drainage and Sewer sumps shall have minimum 1 standby pump.

Level control shall be such that one pump starts on required level, 2nd pump cuts in at high level and alarms is given at extra high level. All level controllers shall be provided with remote level indicator

Note: Sump depth to be indicated/ mentioned in term of water.

1.11 Chlorination System (Standby System)

A chlorine contact tank (HDPE) with a capacity of not less than 30 min average flow detention shall be attached to the settling tank.

Chlorine feed system shall be furnished as a complete package assembly for installation in the plant room. Assembly shall include base plate, electronic positive displacement type chemical feed pump, fiberglass solution tank, suction and discharge tubing and fittings.

Each chlorine solution dosing pump shall perform to achieve a residue not more than 1 mg// in the treated effluent. Solution feed pump shall have a maximum capacity of 1 /hr chemical pump will operate on 50 Hz supply. Fiberglass solution tank shall be of no less than 200 litre capacity and include suction line fitted with strainer.

Control shall be by means of compound loop (i.e. flow proportional and residual measuring).

The feed pump shall be of variable speed positive displacement, solenoid-riven diaphragm metering type. The construction material shall be suitable for corrosive nature and as follows:

1.12 UV Unit / System

UV system for disinfection: Shall Utilize High purity quartz sleeves and high output UV lamps. UV Reactor MOC will be SS316L. System shall be designed to provide a UV dose of 600 J/m2 at UVT of 65% and TSS less than 10 mg/L. System should deliver a 4 log reduction of coliforms and provide TC count to less than 200 CFU/100ml. The electrical control system should utilize high frequency electronic ballasts and provide efficiency of more than 90%. The reactor vessel shall utilize internal baffles to ensure turbulent and plug flow.

The UV intensity monitoring system shall be designed in accordance with the German DUGW W294 standard/US standard. The sensor shall be of dry type and removable without system shutdown.

1.13 Piping Materials:

SS - 304	-	Submerged air piping
MS (Heavy) epoxy coated-	Air piping and pumped effluent riser (Non submerged)	
PVC piping	-	Pumped effluent (submerged) & tank overflow pipe line.
GI (Heavy)-	Interconnecting pipe line after delivery header of pump / filter.	

1.14 Valves:

The Contractor shall supply and install all isolating valves and control valves as indicated on the approved drawings and as required for the proper and efficient operation and maintenance of the entire systems.

All valves supplied shall be suitable for the working pressure and test pressure of the system as specified elsewhere in this specification.

Regulating valves shall be of similar materials as that specified for cast iron gate valves.

All regulating valves shall be lock shield type.

All valves shall be full line size.

Each valve shall have a purpose made reference number plate for label engraved or stamped indicating the manufacturer's catalogue number, pressure and temperature ratings. Valves shall be arranged so that clockwise rotation of the spindle will close the valve.

Furnish all valves and accessory materials necessary in the piping whether or not shown on drawings as flows.

All valves shall be packed with an approved packing and threads shall be coated with oil and graphite. Pickings should be replaced when found deteriorated on site.

Where possible locate all valves at convenient positions of operation from the floor with valve stems upright.

Valves that are flanged shall have flanges to the table specified for the pipework.

Plastic or metal plates (rust less) shall be provided to indicate the open / close status as well as the use of each valve in the pump and tank rooms.

1.15 Air Diffusers for Aeration Reactor Tank:

Air diffusers shall be made to provide a uniform distribution of fine bubble air release performance in the system. The air diffuser shall be either made of elastomer rubber membrane or composed of crystalline fused aluminum oxide with a suitable ceramic bonding material.

Membrane endurance shall be more than 180,000 expansion/contraction cycles.

Diffuser shall be of self-cleaning, non-clog disc or dome-shaped type. Oxygen transfer efficiency shall not be less than 20% at 3.5m submergence in clear water. Alternatives may be offered for consideration.

Diffuser hold down assemblies shall consist of a retainer bolt, a matching washer and gasket. Sealing gasket shall be composed of solid neoprene rubber and shall be conform to ASTM D-2000 and shall be suitable for withstanding the effects of wastewater high temperature up to 120°C.

The Contractor shall submit calculation to justify the diffuser selection and air requirement during the detailed design.

1.16 PIPE SUPPORTS:

General Support:

The Contractor, on the award of the work, shall prepare detailed design drawings, showing the cross-sections, longitudinal sections, details of fittings, locations of isolating and control valves, drain and air valves, and all pipe supports. He must keep in view the specific openings in buildings and other structure through which pipes are designed to pass.

Piping shall be properly supported on, or suspended from, on stands, clamps, hangers as specified and as required. The Contractor shall adequately design all the brackets, saddles, anchor, clamps and hangers, and be responsible for their structural stability.

Pipe work and fittings shall be supported by hangers or brackets so as to permit free expansion and contraction. Risers shall be supported at each floor with Galvanised steel clamps. To permit free movement of common piping support shall be from a common hanger bar fabricated from Galvanised steel sections.

Piping shall be supported from the building structure, which shall support the sum of the load of a water-filled pipe and a minimum of 120 kg applied at the point of hanging.

All piping brackets shall be constructed as shown on the standard detail drawings.

Vertical pipework shall be supported at intervals of at least one per floor level.

Horizontal pipework shall also be supported by adjustable flat iron or clevis type hangers hung by hot rolled steel rods of the following diameters and spacing subject to the Architect's approval:

Nominal Pipe Size	Distance between Supports	Diameter of Rod
25 mm	1.8 m	10
32 mm	2.4 m	10
40 mm	2.7 m	10
50 mm	2.7 mm	10
65-80 mm	3.0 m	12
100 mm	3.0 m	16
150-200 mm	3.6 m	18

The end of the steel rods shall be threaded and not welded to threaded bolt.

Hangers shall be supported by means of approved fasteners. Wood plugs shall not be used. Unless allowed by the structural engineer, power fixings may be used for pipework of diameter less than 50 mm. Expansion fasteners may be used for vertical pipework under 100 mm diameter.

All pipe work shall be carried out in a proper workman like manner, causing minimum disturbance to the existing services, buildings, roads and structure. The entire piping work shall be organized in consultation with other agencies work, so that area can be carried out in one stretch.

Requirement of Cut-outs in the structural slab or wall for installing the various pipes shall be clearly identified in the detailed drawing to be prepared by the STP contractor.

Pipe sleeves, larger diameter than pipes, shall be provided wherever pipes pass through walls and slab and annular space filled with fiberglass and finished with retainer rings.

The contractor shall make sure that the clamps, brackets, saddles and hangers provided for pipe supports are adequate or as specified / approved by Consultants. Piping layout shall take due care for expansion and contraction in pipes and include expansion joints where required.

All pipes shall be accurately cut to the required sizes in accordance with relevant BIS codes and burrs removed before laying. Open ends of the piping shall be closed as the pipe is installed to avoid entrance of foreign matter. Where reducers are to be made in horizontal runs, eccentric reduces shall be used for the piping to drain freely. In other locations, concentric reduces may be used.

Automatic air valves shall be provided at all high points in the piping system for venting. All valves shall be of 15mm pipe size and shall be associated with an equal size gate valves.

Discharge from the air valves shall be piped through a pipe to the nearest drain or sump.

Allpipes shall be pitched towards drain points.

Pressure gauges shall be provided as shown on the approved drawings. Care shall be taken to protect pressure gauges during pressure testing.

1.17 Maintenance Facilities

Permanent work platform and catwalk shall be designed by the Agency and provided by the Agency for access to elevated equipment. The catwalk and platform for access shall allow a minimum width of 1000mm.

Catwalk to maintenance platform shall be provided with railings and guards designed for safe movement of personnel in a restricted space including provision for gaining access and to accommodate maintenance personnel.

Hand railing and guards shall be designed by the Agency and provided by the Agency for all concrete tanks to allow safe movement of personnel.

Waterproof power sockets required for servicing shall be provided by the Agency. The number and locations shall be proposed by the Agency and approved by the Engineer-in-Charge.

The design of all permanent work platforms, hand rails, etc. shall be submitted to the Engineer-in-Charge for approval. The loading and fixing method of lifting facilitate shall also be submitted to the Engineer-in-Charge for approval and checking within 4 weeks on award of Contract or receipt of letter of intent.

a) All Manhole Covers shall be minimum 5mm M.S chequered plate encased with 1 mm thick aluminum sheet.

1.18 Testing at hand over

The performance of the system shall be demonstrated by taking hourly samples of the raw sewage and final effluent over a twelve-hour period. The sample shall be taken at periods approximately the flow rates specified by the plant. The sample shall be combined and a 5-day BOD shall be run, the results of which must verify the capacity of the treatment plant prior to acceptance.

1.19 Training

Provide training facilities courses to ensure that the employer's staff may acquire full knowledge and appreciation of all aspects, day-to-day operation, breakdown and routine maintenance, and fault diagnosis of all plant, equipment and systems.

Training to the employer's staff shall be held as appropriate at the Agency's or manufacturer's premises and on site. A detailed syllabus for each of the training courses specified or proposed and the timing of the courses shall be submitted for approval. The Agency shall recommend the desirable qualifications and experience of the trainees to optimally benefit from the courses.

All consumable required for operation of plant for one year will be supplied at the time of handover.

1.20 Electrical Installation: As per electrical specifications

Work shall be carried out in accordance with the accompanying specifications and shall comply with the latest relevant Indian Standards and Electricity Rules and Regulations.

The configuration of the MCC shall be designed to suit the requirements of the process". The necessary Single Line diagrams/ Schematic drawings shall be furnished for approval by Engineer-in-Charge/ Owner.

All motor control centers shall be CPRI approved and shall be suitable for operation on 3 phase/single phase 415/230 volts, 50 cycles power supply system.

Note: All motors: IE-3 rating.

1.21 Constructional Features

Control panel with pump logic controller: founder coated inclusions: 2 mm CRCA sheet, floor mounted.

a) Bus Bar : Sheathed aluminum
b) Multi-meter : Incoming
c) Control power cables up to 10mm : Copper
d) Power cable – 10 mm above : Aluminum
e) Indicating lamps : LED
f) Incoming MCCB : 25 KA breaking capacity
g) Motor Protection : MCCB, 25 KA Rating
h) MCB's : 10 KA rating
i) Starters : DOL up to 7.5 HP
j) Soft starter : Above 7.5 HP
k) VFD starters for submersible pumps in equalization tank for all capacities

1.22 Thermal Overload Relay

Thermal over load relay shall have built in phase failure sensitive tripping mechanism to prevent against single phasing as well as on overloading. The relay shall operate on the differential system of protection to safeguard against three phase overload, single phasing and unbalanced voltage conditions.

Auto-manual conversion facility shall be provided to convert from auto-reset mode to manual-reset mode and vice-versa at site. Ambient temperature compensation shall be provided for PW/TS/128 variation in ambient temperature from -5° C to +55°C.

All overload relays shall be of three elements, positive acting ambient temperature compensated time lagged thermal over load relays with adjustable setting. Relays shall be directly connected for motors up to 35 HP capacity. C.T. operated relays shall be provided for motors above 35 HP capacity. Heater circuit contactors may not be provided with overload relays.

1.23 Time Delay Relays

Time delay relays shall be adjustable type with time delay adjustment from 0-180 seconds and shall have one set of auxiliary contacts for indicating lamp connection.

1.24 Indicating Lamp and Metering

All meters and indicating lamps shall be in accordance with IS:1248 and IS-1258. The meters shall be flush mounted type. The indicating lamp shall be of low wattage. Each MCC and control panel shall be provided with voltmeter 0-500 volts with three ways and off selector switch, CT operated ammeter of suitable range with three nos. CTS of suitable ratio with three

ways and off selector switch, phase indicating lamps, and other indicating lamps as called for. All phase indicating lamp shall be backed up with MCB.

1.25 Push Button Stations

Push button stations shall be provided for manual starting and stopping of motors / equipment Green and Red colour push buttons shall be provided for 'Starting' and 'Stopping' operations. 'Start' or 'Stop' indicating flaps shall be provided for push buttons. Push Buttons shall be suitable for panel mounting and accessible from front without opening door, Lock lever shall be provided for 'Stop' push buttons. The push button contacts shall be suitable for 6 amps current capacity.

1.26 Drawings

Shop drawings for control panels and for wiring of equipment showing the route of conduit & cable shall be submitted by the agency for approval of Engineer-in-Charge/Engineer-in-Charge before starting the fabrication of panel and starting the work. On completion, four sets of complete "As-installed" drawings incorporating all details like, conduits routes, number of wires in conduit, location of panels, switches, junction/pull boxes and cables route etc. shall be furnished by the agency.

1.27 Testing

Before commissioning of the equipment, the entire electrical installation shall be tested in accordance with relevant BIS codes and test report furnished by a qualified and authorized person. The entire electrical installation shall be gotten approved by Electrical Inspector and a certificate from Electrical Inspector shall be submitted. All tests shall be carried out in the presence of Engineer-in-Charge. Testing of the panels shall be as per relevant BIS Codes:

1.28 Painting

All sheet steel work shall undergo a process of degreasing, thorough cleaning, and painting with a high corrosion resistant primer. All panels shall then be baked in an oven. The finishing treatment shall be by application of powder coating of approved shade.

1.29 Rubber Mat

Rubber mat shall be provided in front to cover the full length of all panels. Where back space is provided for working from the rear of the panel, rubber mat shall also be provided to cover the full length of panel on the rear also.

1.30 Testing

The entire works shall be fully tested in stages as the work proceeds and on completion of work as applicable.

The Agency shall provide during normal working hours, all necessary labours, instruments, equipment, materials, fuel, power and maker's representatives, to carry out such tests as may be necessary to satisfy the Engineer-in-Charge that the installation meets the requirement and intent of the Specification as well as such tests required by Local Authorities.

All tests shall be made in the presence of the Engineer-in-Charge or any inspecting authority. At least seven working days' notice in writing shall be given to the inspecting parties before performing any test.

Three copies of all test results shall be submitted to the Engineer-in-Charge in A4 size sheet paper within two weeks after completion of the tests.

Tests described hereinafter and including all tests prescribed by the Authority having jurisdiction shall be carried out. Any tests proved unsatisfactory shall be repeated to the satisfaction of the inspecting parties.

The Agency shall provide skilled technicians/Engineer-in-Charge to commission the plant and associated controls to the satisfaction of the Engineer-in-Charge. The technicians/ Engineer-in-Charge will be required to demonstrate the correct procedures in starting and stopping the plant, running the various items of equipment under automatic and manual control and the correct maintenance of the plant.

Water flow rates of all equipment shall be adjusted to design conditions. Complete results of adjustments shall be recorded and submitted.

The Agency shall submit for the Engineer-in-Charge approval a detailed programme for conducting on-site acceptance tests and commissioning.

All instruments, tools, material and labour required to perform these tests shall be provided by this Agency.

The following inspection, tests and pre-commissioning treatment shall be carried out by the Agency:

a. Tanks and Level Switches

   The level switch shall be simulated for the various cut-in and cut-out settings. The tanks shall be thoroughly cleaned with water and drained before city mains supply will feed in.

b. Pressure Switches

   The testing equipment arrangement for pressure switches and pressure gauges shall be as approved by Engineer-in-Charge.

   The pressure gauges shall be connected as shown on the drawing in lieu of the pressure switch. The gauges to be tested shall be regarded acceptable when the pressure readings of all three gauges are the same throughout the jacking pressure range varied by applying the hand pump.

c. Hydrostatic Tests

   All parts of the water circuit shall be filled with water before hydrostatic pressure testing, and pump running tests for verification of pressure and flow rate, are conducted.

   The hand jacking pump shall be applied to increase the system pressure to 2 times the working pressure and 1.5 times the working pressure plus 3.5 bar whichever is the lower but, in any case, not less than 7 bar. The pressure shall be maintained for a period not less than 24 hours.

Where any section of pipe work or equipment is found to be unable to withstand the maximum pipe work test pressure, it shall be isolated during the pipe work test then that section of pipe work or equipment shall be made good and re-tested at the appropriate test pressure.

The working pressure for various systems shall be as per shop drawings.

d. Drains shall be tested with dense smoke.

e. Cleaning, Flushing and Pre-Treatment

Prior to start-up and hydraulic testing of pressure pipes, the Agency shall clean the entire installation including all fitments and pipe work and the like after installation. All pumping systems shall be flushed and drained at least once through to get rid of contaminating materials.

All strainers shall be inspected and cleaned out.

Pre-treatment chemical shall be introduced and circulated for at least 8 hours. Warning signs shall be provided at all outlets during pre-treatment. The pre-treatment chemical shall:

i. Remove oil, grease and foreign residue from the pipe work and fittings;

ii. Pre-condition the metal surfaces to resist reaction with water or air;

iii. Establish an initial protective film;

iv. After pre-treatment, the system shall be drained and refilled with fresh water and left until the system is put into operation.

v. Details and procedures of the pre-treatment shall be submitted to the Engineer-in-Charge for approval.

vi. Pump Operating Test : To verify the capacity of pumps

1.31 Statutory Authorities' Tests and Inspections

As and when notified in writing or instructed by the Engineer-in-Charge, the Agency shall submit shop drawing and attend all tests and inspections carried out by Local Pollution Control Board Authorities, Water Authority and other Statutory Authorities, and shall forthwith execute free of charge any rectification work ordered by the Engineer-in-Charge as a result of such tests and inspections where these indicate non-compliance with Statutory Regulations.

The Agency shall be responsible for the submission of all necessary forms and shop drawings to the Statutory Authorities which shall conform in layout to the latest Engineer-in-Charge plans submitted to and kept by these Authorities.

The submission shall comply with the requirements set forth in the current Codes of Practice and circular letters of the Statutory Authorities. The shop drawings to be submitted shall be forwarded to the Engineer-in-Charge for checking before submission.

The Agency shall allow for at least two submissions of complete sets of shop drawings to the Authorities, one to be made within six months after the award of the Contract but not less than six weeks before the inspection. The Engineer-in-Charge may at his discretion instruct the Agency for additional submissions to the Local Authorities whenever necessary.

The Agency shall notify the Engineer-in-Charge at least seven days in advance of his application for local Authority tests and inspections. On receipt of a confirmed date for test and inspection the Agency shall inform the Engineer-in-Charge without delay.

1.32 Commissioning

When the various installations have been completed and the preliminary commissioning checks carried out, the Agency shall set to work, regulate and calibrate all system in the entire installation. Special attention shall be paid to the following items:

That all valves, switches, controls, etc. are regulated and capable of proper operation and in the case of isolation valves that they are capable of tight shut off.

That all apparatus is silent in accordance with the requirements of this Specification.

That all instruments are correctly calibrated and read accurately.

That all services are tested in accordance with the details in the relevant clauses of this Specification.

Operate pumps, pressure reducing sets, etc. to ensure that all control systems are functioning correctly and are properly set, sequenced or interlocked.

1.33 Final Acceptance Tests

Following commissioning and inspection of the entire installation, and prior to issue of the Completion Certificate, the Agency shall carry out final acceptance tests in accordance with a programme to be agreed with the Engineer-in-Charge.

Should the results of the acceptance tests show that plant, systems and/or equipment fail to perform to the efficiencies or other performance figures as given in this Specification, the Agency shall adjust, modify and if necessary replace the equipment without further payment in order that the required performance is obtained.

Where acceptance tests are required by the relevant Authorities having jurisdiction, these tests shall be carried out by the Agency prior to the issue of Completion Certificate to the acceptance of the Authorities.

1.34 Rejection of Plant

Any item of plant or system or component which fails to comply with the requirements of this Specification in any respect whatsoever at any stage of manufacture, test, erection or on completion at site may be rejected by the Engineer-in-Charge either in whole or in part as he considers necessary/appropriate. Adjustment and/or modification work as required by the Engineer-in-Charge so as to comply with the Authority's requirements and the intent of the Specification shall be carried out by the Agency at his own expense and to the satisfaction of the Engineer-in-Charge.

1.35 Warranty and Handover

The Agency shall warrant that all plant, materials and equipment supplied and all workmanship performed by him to be free from defects of whatsoever nature before handover to the Employer.

Handing Over of Documents

All testing and commissioning shall be done by the Agency to the entire satisfaction of the Engineer-in-Charge and all testing and commissioning documents shall be handed over to the Engineer-in-Charge.

The Agency shall also hand over all maintenance and operation manuals, all certificates and other documentation as per the terms of the contract to the 'Engineer-in-Charge'.

1.36 Checklist for Sewage Treatment Plant

a) Capacity of STP : 500 KL per day.

b) Average Flow : 25 KL per hour.

c) Process : MBBR

1. Checklist

a) Bar screen - Stainless steel

b) Check all pumps operation at high level and tripping at low level in their respective tanks.

c) Plant room sump pumps - check each pump operation with float valve for proper start / stop.

d) Check air blower installation. Check direction of rotation.

e) Record name plate details of U V Sterilizer.

f) Record details of filter press. Check the filter press operation.

g) Check water meters for operation.

h) Check electrical panel general conditions and provision of rubber mat.

i) Check by-pass line to Municipal Sewer, operate and check.

j) Obtain laboratory test results of inlet sewage to STP and the outlet water after UV Sterilizer for routine parameters. One of present status and one of full load condition.

k) Test the performance of on line testing equipment of treated power.

2.0 LIST OF APPROVED MAKES FOR SEWAGE TREATMENT PLANT

SL. No.	Equipment / Material	Acceptable supplier / Manufacturer		
1	Ultra Violet Water Purifier	Alfa UV-Mumbai	Eureka Forbes	Pentair
2	Bar Screen	Jash	Shivpad	3 E Technology
3	GI Pipes (IS: 1239 and IS: 3589)	Tata Steel	Jindal	Surya
4	GI Pipes Fittings	Jain Sons	Unik	Zoloto
5	GI Pipe Sealant	Henkel- LOCTITE 55	Superbond	Pidilite (Holdtite)
6	D.I. Pipes	Electro Steel	NECO	Jindal SAW
7	UPVC Pipe	Supreme	Astral	Ashirwad
8	CPVC Pipes	Supreme	Astral	Ashirwad
9	HDPE Pipe	Supreme	SFMC	Vectus
10	Pipe Clamp & Supports	Fisher	Hilti	Mupro
11	Paints	Asian Paints	Berger	Nerolac
12	GM/Forged Brass Ball Valves	CIM	Sant	Zoloto
13	Sluice Valves	Kirloskar	Castle	Zoloto
14	Check Valve – Dual Plate	Kirloskar	Castle	Zoloto
15	Pressure Reducing Valve	Kirloskar	Castle	Zoloto
16	Solenoid Valve	Avcon	Danfoss	Lehry
17	Air Release Valve	CIM	Fouress	SKS
18	Ball Float Valve	Zoloto	Esseti	RB
19	Floor Drain Fixture & Channel Gratings	Jayna	Thermodrain	ACO
20	Y – Strainer	Emerald	Sant	SKS
21	Sewage Handling Sump Pump / Clear Water Pumps	KSB	Grundfos	Kirloskar
22	Self-Priming Pumps	Johnson	Kirloskar	KSB
23	Mechanical Seal	Burgmann	Sealol	AESSEAL
24	Couplings	Lovejoy	Minimax	Precision Coupling
25	Anti-Vibration Mounting & Flexible Connections	Dunlop	Kanwal Industrial Corporation	Resistoflex
26	Pressure Gauge	FIEBIG	H-GURU	Emerald

27	Water Meter (Mechanical Type)	Kent	Capstan	Kranti
28	Level Controller & Indicator (Water)	Auto Pump	Elegent Controls	Rotomatik
29	MH/Water Tank Plastic Steps	Auto Pump	Technika Techtrol	KGM India
30	Water supply Nozzle	Astral	Newage	
31	Motorized Butterfly Valve	Zoloto	Kirloskar	Lehry
32	Fastener	Fisher	Hilti	Mupro
33	Dosing Pumps	LMI	Pulser Feeder	Toschon
34	Flanges	Class 150 Table H		
35	Air Compressor	Ingersoll Rand	ELGI	Atlas Copco
36	Air Blower	Beta	Everest	Kay
37	Screw Press	Auric	SBS Enviro	3 E Technology
38	Screw Pump	Hydor-Prokav	Netzsch	Fluid
39	MCC Panel	MISTUBUSHI-RITAL	Krypton	3 E Technology
40	Cables	KEI	Polycab	Universal
41	End Terminations	Comet	Dowell	Jainson
42	Cable Tray	MEM	RMCON	Shivam
43	Filters (ACF & MGF)	Gopani	Triveni	3 E Technology
44	Softener	Suez	Triveni	3 E Technology
45	TDS Meter	Forbes Marshall	Honeywell	Watts
46	pH Meter	Forbes Marshall	Honeywell	Watts
47	SS pipe	Viega	Jindal Steel	Alpha Press

3.11 List of BIS Codes

All equipment, supply, erection, testing and commissioning shall comply with the requirements of Indian Standards and code of practices given below as amended upto date. All equipment and material being supplied by the contractor shall meet the requirements of IS, Pollution Control Board, electrical inspectorate and Indian Electricity rules and other Codes / Publications as given below:

1.	**General**	
	Manual on Sewage	CPH EEO; Govt. of India & Sewage Treatment
	SP : 6 (1)	Structural Steel Sections
	IS : 325	Three Phase Induction Motors
	IS : 554	Dimensions for pipe threads where pressure tight joints are required on the threads.
	IS : 694	PVC insulated cables for working voltages upto & including 1100 V.
	IS : 779	Specification for water meters (domestic type).
	IS : 782	Specification for caulking load.
	IS : 800	Code of practice for general construction in steel
	IS : 1726	Specification for cast iron manhole covers and frames.
	IS : 2379	Color code for identification of pipe lines.
	IS : 2629	Recommended practice for hot dip galvanizing on iron and Steel.
	IS : 3114	Code of practice for laying of cast iron pipes
	IS : 4111 (Part 1)	Code of practice for ancillary structures in sewerage system: Part 1 manholes.
	IS : 5329	Code of practice for sanitary pipe work above ground for buildings.
	IS : 5455	Cast iron steps for manholes.
	IS : 6159	Recommended practice for design and fabrication of material, prior to galvanizing.
	IS : 8321	Glossary of terms applicable to plumbing work.
	IS : 8419 (Part 1)	Requirements for water filtration equipment: Part 1 Filtration medium sand and gravel.
	IS : 8419 (Part 2)	Requirements for water filtration equipment: Part 2 under drainage system.
	IS : 10221	Code of practice for coating and wrapping of underground mild steel pipelines.
	IS : 10446	Glossary of terms relating to water supply and sanitation.
	IS : 11149	Rubber Gaskets
2.	**Pipes and Fittings**	
	IS : 1239 (Part 1)	Mild steel, tubes, tubulars and other wrought steel fittings: Part 1 Mild Steel tubes.
	IS : 1239 (Part 2)	Mild Steel tubes, tubulars and other wrought steel fittings: Part 2 Mild Steel tubulars and other wrought steel pipe fittings.
	IS : 1536	Centrifugally cast (spun) iron pressure pipes for water, gas and Sewage.
	IS : 1537	Vertically cast iron pressure pipes for water, gas and Sewage.
	IS : 1538	Cast Iron fittings for pressure pipes for water, gas and Sewage.

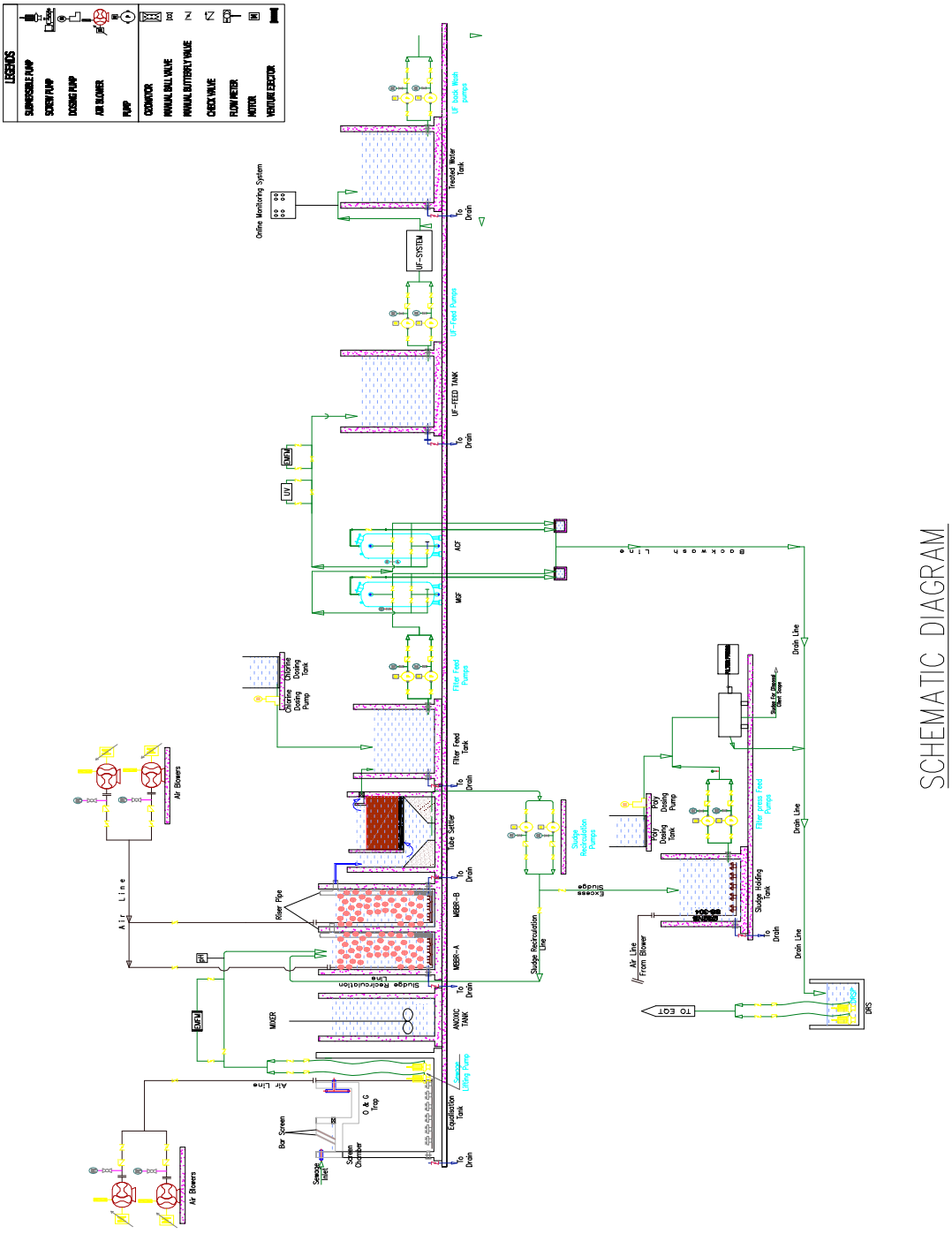
	IS : 1729	Sand Cast iron spigot and socket soil, waste and ventilating pipes, fittings and accessories.
	IS : 1879	Malleable cast iron pipe fittings.
	IS : 2643 (Part 1)	Dimensions for pipe threads for fastening purposes: Part 1 Basic profile and dimensions.
	IS : 2643 (Part 2)	Dimensions for pipe threads for fastening purposes: Part 2 Tolerances.
	IS : 2643 (Part 3)	Dimensions for pipe threads for fastening purposes: Part 3 Limits of sizes.
	IS : 3468	Pipe nuts.
	IS : 3589	Seamless or electrically welded steel pipes for water, gas and Sewage (168.3 mm to 2032 mm outside diameter).
	IS : 3989	Centrifugally cast (sun) iron spigot and socket soil, waste and ventilating pipes, fittings and accessories.
	IS : 4346	Specifications for washers for use with fittings for water services.
	IS : 4711	Methods for sampling steel pipes, tubes and fittings.
	IS : 6392	Steel pipe flanges
	IS : 6418	Cast iron and malleable cast iron flanges for general engineering purposes.
	IS : 7181	Specification for horizontally cast iron double flanged pipe for water, gas and Sewage.
3.	**Valves**	
	IS : 778	Specification for copper alloy gage, globe and check valves for water works purposes.
	IS : 780	Specification for sluice valves for water works purposes (50 mm to 300 mm size).
	IS : 1703	Specification copper alloy float valves (horizontal plunger type) for water supply fittings.
	IS : 2906	Specification for sluice valves for water works purposes (350 mm to 1200 mm size)
	IS : 3950	Specification for surface boxes for sluice valves.
	IS : 5312 (Part 1)	Specification for swing check type reflux (non return) valves: part 2 Multi door pattern.
	IS : 5312 (Part 2)	Specification for swing check type reflux (non return) valves: part 2 Multi door pattern.
	IS : 12992 (Part 1)	Safety relief valves, spring loaded: Design
	IS : 13095	Butterfly valves for general purposes.

STP LAYOUT

Sewage Treatment Plant-500KLD

P & I Diagram

Sewage Treatment Plant-500KLD



CHECK LIST OF THE DOCUMENT TO BE SUBMITTED BY THE BIDDER

S.NO	NAME OF DOCUMENT	TICK (YES/NO)
I	All the Tender are duly signed and stamped by the Bidder.	
2	EMD of Rs. 8,00,000/- Attached with Tender.	
3	PAN, GST, P.F, ESI Number of bidder (attached prof)	
4	Annual Turnover of Certificate of last Five Years	
5	Audited balance sheet of Last Five years	
6	Five Years relevant Work Experience attached proof	
7	Registration certificate of Firm with Technical Manpower details.	
8	Item quoted are as per specification and price bid Annexure mentioned in the tender document.	
9	Data Sheet of all Electromechanical Items	

Annexure-I

(NIT No. MDI/ESTATE/STP/2022 DATED: 19/09/2022)

LETTER OF TRANSMITTAL

From

To,

Sub: Submission of Bid for DESIGN, SUPPLYING, INSTALLATION, TESTING & COMMISSIONING OF SEWAGE TREATMENT PLANT FOR 500 KLD, ELECTROMECHANICALLY SYSTEM BASED ON MBBR TECHNOLOGY. (INCLUDING ALL CIVIL, PLUMBING, ELECTRICAL AND OTHER ALLIED WORK IN ALL RESPECT) AT MDI CAMPUS, GURGAON.

Sir,

Having examined the details given in bid document for the above work, I / We hereby submit the 'Did'. l/We hereby agree with the terms & conditions mentioned in the bid document.

Yours faithfully

(Signature, name and Designation of authorize person with complete address)

(Please affix seal)

Annexure-II

Details about Bidding Agency

S. No	Particulars		
1	Full name of the Bidders (In capital letters)		
2	Full Address of the Bidders		
3	(a) Telephone No. (b) Fax No.		
4	Name and details of the Authorize Signatory of this NIT (Address, contact telephone Number, Mobile number, Fax No., Email ID)		
5	Has the Bidder been black listed by any one organization If so, attach the details of the same.		
6	PAN No:		
7	TAN:		
8	GST Registration No:		
9	No. of full time employees for the organization. (As per Annexure-Ill)	Graduate Engineers	Supporting Staff (Technical)
		Civil/ Electrical/ Architect	
10	Proof of agency that they are notified and set up to carry out civil or electrical works and Notified by the Ministry of Urban Development and are eligible for bidding.		Attached herewith at.....
11	Financial strength of the organization for the last 5 years. Attached photo copies audited balance sheets		
Turnover	2017-18	2018-2019	2019-20

	2020-21	2021-22	
Annual Profit (PB/DT)			

15. Bid security /EMD Rs.8,00,000/- (Rs. Eight lakh Only)

16. Attached attested copies of all the documents in support of above mentioned points including Balance sheet with all supporting schedules.

17. It is hereby certified that .....„ ,...(The bidding agency herein) has never been black-listed by Central /State government/Agency.

18. It is hereby submitted that all the terms and condition of this NIT are acceptable to the Bidder Agency.

I hereby certify that the above mentioned particulars are true and correct.

Signature of Authorized Signatory.
Name of Authorized Signatory

Agency/firm Stamp

Annexure-III

NIT No. MDI/ESTATE/STP/2022 DATED: 19/09/2022

Details of personnel

S. No.	Category	No. of persons
1	Graduate Engineers Civil /Electrical Architect	
	Supporting Staff(Technical)	
	TOTAL	

Signature of Authorized Signatory.

Name of Authorized Signatory

Agency/ firm Stamp

Annexure-IV

NIT No. MDI/ESTATE/STP/2022 DATED: 19/09/2022

Details of works/ projects executed during last Five years

s. No	NAME OF WONE	NAME PROJEC	EXACT LOCATION ON /SITE OF THE PROJECT	APPROVED COST OF PROJECT (in lakhs)	DATE OF COMMENCEMENT OF PROJECT	TIMELINE FIXED FOR COMPLETIO	ACTUAL DATE OF COMPLETIO	FINAL COST OF PROJEC	IS THERE ANY DISPUTE/LEG CASE/ARBITATION	REMARKS

S

Signature of Authorized Signatory.
Name of Authorized Signatory
Agency/ firm Stamp

DETAILED COST ESTIMATE FOR THE CONSTRUCTION OF STP (500 KLD) FOR MANAGEMENT DEVELOPMENT INSTITUTE, MDI, GURUGRAM

GRAND SUMMARU SHEET

Sr No.	Descriptions	Currency	Total Amount
1	**Total Cost Electromechnical Items**	RS.	
2	**Total Cost of Civil Work (STP-500 KLD)**	RS.	
	Grand TOTAL (Rs. In words	**RS.**	
	GST		EXTRA

DETAILED COST ESTIMATE FOR THE CONSTRUCTION OF STP (500 KLD) FOR MANAGEMENT DEVELOPMENT INSTITUTE, MDI,

ASTRACT OF CIVIL WORKS

CIVIL WORK - STP 500 KLD

Sr No.	Descriptions	Currency	Amount
1	1. A. SEWAGE TREATMENT PLANT 500 KLD	Rs.	
2	1. B. UF PLANT 25 CUM/HR	Rs.	
3	1. C. SOFTENER FOR HVAC COOLING TOWER SOFT WATER	Rs.	
	TOTAL COST	**Rs.**	

Sr No.	Descriptions	Currency	Amount
1	2.0:-Earth Work	RS.	
2	4.0:-Concrete Work	RS.	
3	5.0:-Reinforced Cement Concrete	RS.	
4	6.0:-Brick Work	RS.	
5	8.0:-Cladding Work.	RS.	
6	10.0:-Steel Work	RS.	
7	11.0:-Flooring	RS.	
8	12.0:-Roofing	RS.	
9	13.0:-Finishing	RS.	
10	21.0:-Aluminum Work	RS.	
11	22.0:-Water Proofing	RS.	
12	24.0:-CONSERVATION OF HERITAGE BUILDINGS	RS.	
13	27.0:-MISCELLANEOUS	RS.	
	TOTAL Cost	**RS.**	

DETAILED COST ESTIMATE FOR THE CONSTRUCTION OF STP (500 KLD) FOR MANAGEMENT DEVELOPMENT INSTITUTE, MDI, GURUGRAM

CIVIL WORK

Sr. No.	Item	Description of Item	Unit	QTY	Rate	Amount
	REFERENCE NO					
	BLOCKS			1		
	AREA IN SQM			379.36		
1	2	3	4	5	6	7
		2.0:-Earth Work				
1	2.6	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including getting out and disposal of excavated earth lead upto 50 m and lift upto 1.5 m, as directed by Engineer-in-charge.				
	2.6.1	All kinds of soil	Cum.	3098.88		
2	2.25	Filling available excavated earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift upto 1.5 m.	Cum.	169.84		
3	2.26	Extra for every additional lift of 1.5 m or part thereof in excavation / banking excavated or stacked materials.				
	2.26.1	All kinds of soil	Cum.	5457.74		
		Total				
		4.0:-Concrete Work				
4	4.30	Centering and shuttering including strutting, propping etc. and removal of form work for :				
	4.3.1	Foundations, footings, bases for columns	Sqm	9.46		
5	4.20	Providing and laying in position ready mixed or site batched design mix cement concrete for plain cement concrete work; using coarse aggregate and fine aggregate derived from natural sources, Portland Pozzolana/Ordinary Portland /Portland Slag cement, admixtures in recommended proportions as per IS: 9103 to accelerate / retard setting of concrete, to improve durability and workability without impairing strength; including pumping of concrete to site of laying, curing, carriage for all leads; but excluding the cost of centering, shuttering and finishing as per direction of the engineer-in-charge; for the following grades of concrete.				
		Note: Extra cement up to 10% of the minimum specified cement content in design mix shall be payable separately. In case the cement content in design mix is more than 110% of the minimum specified cement content, the contractor shall have discretion to either re-design the mix or bear the cost of extra cement.				
(a)	4.20.1	All works upto plinth level:				
(i)	4.20.1.2	M-15 grade plain cement concrete (cement content considered @ 240 kg/cum)	Cum	2.21		
		Total				
		5.0:-Reinforced Cement Concrete				
6	5.9	Cantering and shuttering including strutting, propping etc. and removal of form				
(a)	5.9.1	Foundations, footings, bases of columns, etc. for mass concrete	Sqm	87.45		
(b)	5.9.2	Walls (any thickness) including attached pilasters, butteresses, plinth and string courses etc.	Sqm	2107.05		
(c)	5.9.3	Suspended floors, roofs, landings, balconies and access platform	Sqm	354.93		
(d)	5.9.4	Shelves (Cast in situ)	Sqm			
(e)	5.9.5	Lintels, beams, plinth beams, girders, bressumers and cantilevers	Sqm	91.29		
(f)	5.9.6	Columns, Pillars, Piers, Abutments, Posts and Struts	Sqm	14.40		
(g)	5.9.7	Stairs, (excluding landings) except spiral-staircases	Sqm	10.33		
(h)	5.9.15	Small lintels not exceeding 1.5 m clear span, moulding as in cornices, window sills, string courses, bands, copings, bed plates, anchor blocks and the like	Sqm	1.46		
i)	5.9.16	Edges of slabs and breaks in floors and walls				
	5.9.16.1	Under 20 cm wide	meter	91.40		
(j)	5.9.19	Weather shade, Chajjas, corbels etc., including edges	Sqm	2.00		

Sr. No.	Item	Description of Item	Unit	QTY	Rate	Amount
	REFERENCE NO					
	BLOCKS			1		
	AREA IN SQM			**379.36**		
1	2	3	4	5	6	7
7	5.11	Extra for additional height in cantering, shuttering where ever required with adequate bracing, propping etc., including cost of de-shuttering and decentering at all levels, over a height of 3.5 m, for every additional height of 1 metre or part thereof (Plan area to be measured).				
(a)	5.11.1	Suspended floors, roofs, landing, beams and balconies (Plan area to be measured)	Sqm	1835.60		
8	5.22	Steel reinforcement for R.C.C. work including straightening, cutting, bending, placing in position and binding all complete upto plinth level.				
(a)	5.22.6	Thermo-Mechanically Treated bars of grade Fe-500D or more.	Kilogram	65682.71		
9		Steel reinforcement for R.C.C. work including straightening, cutting, bending, placing in position and binding all complete above plinth level.				
(b)	5.22A.6	Thermo-Mechanically Treated bars of grade Fe-500 D or more.	Kilogram	989.48		
10	5.33A	Providing and laying in position ready mixed or site batched design mix cement concrete for reinforced cement concrete work; using coarse aggregate and fine aggregate derived from natural sources and using recycled concrete aggregate (RCA) as coarse aggregate and fine aggregate within permissible utilization of 20% each, Portland Pozzolana /Ordinary Portland/Portland Slag cement, admixtures in recommended proportions as per IS: 9103 to accelerate / retard setting of concrete, to improve durability and workability without impairing strength; including pumping of concrete to site of laying, curing, carriage for all leads; but excluding the cost of centering, shuttering, finishing and reinforcement as per direction of the engineer-in charge; for the following grades of concrete.				
		Note: Extra cement up to 10% of the minimum specified cement content in design mix shall be payable separately. In case the cement content in design mix is more than 110% of the specified minimum cement content, the contractor shall have discretion to either re-design the mix or bear the cost of extra cement.				
(a)	5.33A.1	All works upto plinth level				
	5.33A.1.1	Concrete of M25 grade with minimum cement content of 330 kg /cum	cum	867.84		
(b)	5.33A.2	All works above plinth level upto floor V level				
	5.33A.2.1	Concrete of M25 grade with minimum cement content of 330 kg /cum	cum	8.22		
		Total				
		6.0:-Brick Work				
		EXPOSED BRICK WALL				
11	6.26	Brick work with common burnt clay selected F.P.S. (non modular) bricks of class designation 7.5 in exposed brick work including making horizontal and vertical grooves 10 mm wide 12 mm deep complete in cement mortar 1:6 (1 cement : 6 coarse sand)				
	6.26.2	Above plinth level upto floor V level	cum	17.19		
		Total				
		8.0:-Cladding Work				
12	8.31	Providing and fixing Ist quality ceramic glazed wall tiles conforming to IS: 15622 (thickness to be specified by the manufacturer), of approved make, in all colours, shades except burgundy, bottle green, black of any size as approved by Engineer-in-Charge, in skirting, risers of steps and dados, over 12 mm thick bed of cement mortar 1:3 (1 cement : 3 coarse sand) and jointing with grey cement slurry @ 3.3kg per sqm, including pointing in white cement mixed with pigment of matching shade complete.	sqm	1267.74		
		TOTAL				
		10.0:-Steel Work				
13	10.50	Providing and fixing 1mm 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.				
	10.5.1	Using M.S. angels 40x40x6 mm for diagonal braces	sqm	2.52		

Sr. No.	Item	Description of Item	Unit	QTY	Rate	Amount
	REFERENCE NO					
	BLOCKS			1		
	AREA IN SQM			379.36		
1	2	3	4	5	6	7
14	10.11	Providing and fixing factory made ISI marked steel glazed doors, windows and ventilators, side /top /centre hung, with beading and all members such as F7D,F4B, K11 B and K12 B etc. complete of standard rolled steel sections, joints mitred and flash butt welded and sash bars tenoned and riveted, including providing and fixing of hinges, pivots, including priming coat of approved steel primer, but excluding the cost of other fittings, complete all as per approved design, (sectional weight of only steel members shall be measured for payment).				
	10.11.1	Fixing with 15x3 mm lugs 10 cm long embedded in cement concrete block 15x10x10 cm of C.C. 1:3:6 (1 Cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size)	kg	14.40		
15	10.13	Providing and fixing T-iron frames for doors, windows and ventilators of mild steel Tee-sections, joints mitred and welded, including fixing of necessary butt hinges and screws and applying a priming coat of approved steel primer.				
	10.13.1	Fixing with 15x3 mm lugs 10 cm long embedded in cement concrete block 15x10x10 cm of C.C. 1:3:6 (1 Cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size).	kg	20.16		
16	10.25	Steel work welded in built up sections/ framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer using structural steel etc. as required.				
	10.25.2	In gratings, frames, guard bar, ladder, railings, brackets, gates and similar works	kg	565.13		
		TOTAL				
		11.0:-Flooring				
17	11.26	Kota stone slab flooring over 20 mm (average) thick base laid over and jointed with grey cement slurry mixed with pigment to match the shade of the slab, including rubbing and polishing complete with base of cement mortar 1 : 4 (1 cement : 4 coarse sand) :				
(a)	11.26.1	25 mm thick	sqm	140.36		
18	11.27	Kota stone slabs 20 mm thick in risers of steps, skirting, dado and pillars laid on 12 mm (average) thick cement mortar 1:3 (1 cement: 3 coarse sand) and jointed with grey cement slurry mixed with pigment to match the shade of the slabs, including rubbing and polishing complete.	sqm	31.32		
19	11.32	Extra for Kota stone/ sand stone in treads of steps and risers using single length up t	sqm	9.00		
		CERAMIC GLAZED TILES				
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), jointing with grey cement slurry @ 3.3kg/sqm including pointing the joints with white cement and matching pigment etc., complete.	sqm	173.24		
		TOTAL				
		12.0:-Roofing				
14	12.22	Making khurras 45x45 cm with average minimum thickness of 5 cm cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate of 20 mm nominal size) over P.V.C. sheet 1 m x1 m x 400 micron, finished with 12 mm cement plaster 1:3 (1 cement : 3 coarse sand) and a coat of neat cement, rounding the edges and making and finishing the outlet complete.	each	8.00		
		Total				
		13.0:-Finishing				
15	13.4	12 mm cement plaster :				
(a)	13.4.1	1:4 (1 cement: 4 coarse sand)	sqm	842.81		

Sr. No.	Item	Description of Item	Unit	QTY	Rate	Amount
	REFERENCE NO					
	BLOCKS			1		
	AREA IN SQM			**379.36**		
1	2	3	4	5	6	7
16	13.5	15 mm cement plaster on rough side of single or half brick wall of mix:				
(a)	13.5.1	1:4 (1 cement: 4 coarse sand)	sqm	1264.21		
17	13.16	6 mm cement plaster of mix :				
(a)	13.16.1	1:3 (1 cement : 3 fine sand)	sqm	303.10		
18	13.62	Painting with synthetic enamel paint, having VOC (Volatile Organic Compound) content less than 150 grams/ litre, of approved brand and manufacture, including applying additional coats wherever required to achieve even shade and colour.				
(a)	13.62.1	Two or more coats on new work over an under coat of suitable shade with ordinary paint of approved brand and manufacture	sqm	25.79		
19	13.82	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.				
(a)	13.82.2	Two coats	sqm	2410.11		
		Total				
		21.0:-Aluminum Work				
20	21.3	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):				
(b)	21.3.2	With float glass panes of 5.50 mm thickness	sqm	1.44		
		Total				
		22.0:-Water Proofing				
21	22.7	Providing and laying integral cement based water proofing treatment including preparation of surface as required for treatment of roofs, balconies, terraces etc consisting of following operations:				
	(a)	Applying a slurry coat of neat cement using 2.75 kg/sqm of cement admixed with water proofing compound conforming to IS. 2645 and approved by Engineer-in-charge over the RCC slab including adjoining walls upto 300 mm height including cleaning the surface before treatment.				
		Laying brick bats with mortar using broken bricks/brick bats 25 mm to 115 mm size with 50% of cement mortar 1:5 (1 cement : 5 coarse sand) admixed with water proofing compound conforming to IS : 2645 and approved by Engineer-in-charge over 20 mm thick layer of cement mortar of mix 1:5 (1 cement :5 coarse sand) admixed with water proofing compound conforming to IS : 2645 and approved by Engineer-in-charge to required slope and treating similarly the adjoining walls upto 300 mm height including rounding of junctions of walls and slabs.				
		After two days of proper curing applying a second coat of cement slurry using 2.75 kg/ sqm of cement admixed with water proofing compound conforming to IS : 2645 and approved by Engineerin- charge.				
		Finishing the surface with 20 mm thick jointless cement mortar of mix 1:4 (1 cement :4 coarse sand) admixed with water proofing compound conforming to IS : 2645 and approved by Engineerin- charge including laying glass fibre cloth of approved quality in top layer of plaster and finally finishing the surface with trowel with neat cement slurry and making pattern of 300x300 mm square 3 mm deep.				
		The whole terrace so finished shall be flooded with water for a minimum period of two weeks for curing and for final test. All above operations to be done in order and as directed and specified by the Engineer-in-Charge :				
	22.7.1	With average thickness of 120 mm and minimum thickness at khurra as 65 mm.	sqm	447.00		

Sr. No.	Item	Description of Item	Unit	QTY	Rate	Amount
	REFERENCE NO					
	BLOCKS			1		
	AREA IN SQM			379.36		
1	2	3	4	5	6	7
22	22.22	Providing and mixing integral crystalline admixture for waterproofing treatment to RCC structures like basement raft, retaining walls, reservior, sewage & water treatment plant, tunnels / subway and bridge deck etc. at the time of transporting of concrete into the drum of the ready-mix truck, using integral crystalline admixture @0.80% (minimum) to the weight of cement content per cubic meter of concrete) or higher as recommended by the manufacturer's specification in reinforced cement concrete at site of work. The material shall meet the requirements as specified in ACI-212-3R-2010 i.e. by reducing permeability of concrete by more than 90%, compared with control concrete as per DIN 1048 and resistant to 16 bar hydrostatic pressure. The crystalline admixture shall be capable of self-healing of cracks up to a width of 0.50mm. The work shall be carried out all complete as per specification and the direction of the Engineer-in-charge. The product performance shall carry guarantee for 10 years against any leakage.	kg	1948.00		
		Total				
		24.0:-CONSERVATION OF HERITAGE BUILDINGS				
23	21.3	Providing and applying antifungal wash treatment using 3% solution of sodium pentachlorophenate, of reputed brand and manufacturer, on cleaned sand stone surface at desired locations as per direction of Engineer-in-charge (The rate is inclusive of all materials & labours involved except scaffolding).	Sqm	129.28		
		Total				
		27.0:-MISCELLANEOUS				
24	MR	Providing and applying antifungal wash treatment using 3% solution of sodium pentachlorophenate, of reputed brand and manufacturer, on cleaned sand stone surface at desired locations as per direction of Engineer-in-charge (The rate is inclusive of all materials & labours involved except scaffolding).	Sqm	129.28		
		Total				
		Grand Total				

MDI GURUGRAM

SEWAGE TREATMENT PLANT BASED ON MBBR TECHNOLOGY

ELECTROMECHANICAL ITEMS

S.No.	Description	Unit	Qty	Rate	Amount
A	**SEWAGE TREATMENT PLANT - MBBR - 500 KLD**				
	Engineering, Providing, installation, testing and commissioning of Sewage Treatment Plant Capacity 500 m3 per day including all piping, valves, sleeves complete in all respects, including all equipments excluding consumables & excavation, back filling & disposal of surplus earth/Civil construction work as specified. Contractor shall ensure submission of detailed GA drawings (Plan & Section), P & I diagram, schematic diagram for the above mentioned component and additional component if so required for the complete working of the Sewage Treatment Plant and got it approved by the Owner's Architect / Project Manager / Consultants.				
	Incoming parameters:				
	pH - 6 - 8.5				
	BOD5 - upto 300-400 Mg/L				
	S. Solids - 300 - 400 Mg/L				
	COD - upto 400-800 Mg/L				
	Oil & Grease - 50 Mg / L				
	Total Nitrogen (TN)- 40 Mg / L				
	Total Phosphoras (TP)- 10 Mg / L				
	Final effluent discharge standard after treatment				
	pH - 6.0 - 8				
	BOD5 - Less than 5 Mg/L				
	S. Solids - Less than 5 Mg/L				
	COD - Less than 30 Mg/L				
	Oil & Grease - Nil				
	Total Nitrogen (TN)- <2 Mg / L				
	Total Phosphoras (TP)- <1 Mg / L				
	E Coli - Nil				
	Sewage treatment plant shall include the following items:				
-	Bar Screen Chamber				
-	Oil & Grease chamber				
-	Sewage equalization tank/sump				
-	Anoxic Tank				
-	MBBR Tanks				
-	Tube Settler Tank				
-	Chlorine Contact Tank				
-	Sludge Holding Tank				
-	Treated Water Tank				
-	Raw Sewage Transfer Pumps				
-	MBBR Media				
-	Tube Deck Media				
-	Sludge Transfer Pumps				
-	Screw Pumps				
-	Screw press with Poly Dosing system and Sludge Trolley				

S.No.	Description	Unit	Qty	Rate	Amount
-	Submersible sump Pumps				
-	Chlorination				
-	Filter Feed Pumps				
-	Treated water transfar Pumps (H.P.N)				
-	Filtration through MGF & ACF				
-	U.V. System				
-	Air Blowers, Pumps, diffusers & equipment				
-	Piping, valves etc				
-	Electrical Panel & Cabling				
-	Ultra Filtration System				
	(Scope shall not include civil construction for RCC tanks, waterproofing & testing, manholes (covers & frames), PVC coated rungs, Vents, CI gratings for drain channel, hand railing, ladders, staircases, fixing of puddle flanges, and Supply & Fixing of doors, grills & ventilators, lighting & ventilation, external finishing, the foundation of equipment's.)				
	Note: STP contractor has to provide necessary details regarding the above-said works.				
1.1	Supply of MS puddle flanges as required to be provided (in the structural slab and wall) of various diameters. Puddle flanges shall be provided for all the structural component of the STP. The installation of the puddle flanges shall be carried out by the Civil contractor in accordance with Civil GA drawing (to be prepared by the STP contractor) at the required levels & position; under the supervision of the STP contractor.	lot	1		
1.2	Supply, installation, testing & commissioning of 2 Nos Stainless Steel Perforated Type, corrugated Screen SS 304 Sheet , with suitable garbage lifting arrangement. Size 1000mmx 1200mm	Set	1		
1.3	Supply, installation, testing & commissioning of Oil SKimmer, complete in all respects Type - Belt type	Nos	1		
1.4	Supply, installation, testing & commissioning of Non Submersible, non clogging type pumps capable of handling solids upto 35-50mm having CI Casing & impeller complete with mechanical seal & all accessories, motor of required capacity. Delivery header with isolation valve, pressure gauge on delivery line with isolation cock. Pumps shall have following duty				
	Raw Sewage Transfer Pumps from Sump to Equilization Tank				
	Flow Rate (each) = 50 m^3 / hr	1W+1S			
	Head = 40 Mtr	Nos.	2		
1.5	Supply, installation, testing & commissioning of ANOXIC MIXER for Anoxic Tank (Submersible Mixer)				
	Quantity: 02 Numbers (01 operational + 01 standby)				
	MOC: SS 304	Set	1		

S.No.	Description	Unit	Qty	Rate	Amount
1.6	Supply, installation, testing & commissioning of level Switch to control Sewage Pumps for automatic operation of the complete system complete with auxillary NO/NC contacts. (Required in equalization tank, Sump Pump)	Nos.	3		
1.7	Supply, installation, testing & commissioning of level Indicator Led Display 25% ,50%, 75%, 100% along With Controler for automatic operation of the complete system complete with auxillary NO/NC contacts. (Required in EQ. Tank, Clear water tank, TWT Tank & UF Tank)	Set	4		
1.8	Supply, installation, testing & commissioning of Non Submersible, non clogging type pumps capable of handling solids upto 35-50mm having CI Casing & impeller complete with mechanical seal & all accessories, motor of required capacity. Delivery header with isolation valve, pressure gauge on delivery line with isolation cock. Pumps shall have following duty				
	Raw Sewage Transfer Pumps				
	Flow Rate (each) = 25 m^3 / hr	1W+1S			
	Head = 10-12 Mtr	Nos.	2		
1.9	Supply, installation, testing & commissioning of Plant room sump pump with CI body & impeller pump (2 Nos – 1W+1S). Plant Room sump pumps of centrifugal submersible type suitable for 415 ± 10% voltage variation or 230 ± 10% volts 50Hz AC supply. The pump shall be suitable for handling 10 to 12 mm solids.				
	Flow Rate (each) = 25 m^3 / hr	1W+1S			
	Head = 12-15 Mts	Nos.	2		
1.10	Supply , installation, testing & commissioning of twin lobe, rotary Air blower capable of delivering 550 cum/hr t 0.5 kg/cm2 of free air at required pressure driven through "V" belt or directly coupled through flexible coupling to a TEFCmotor of suitable HP Suitable for 415 ± 10% volts, 3 phase, 50 cycles A/C supply.				
	Air Blowers	1W+1S			
	Flow Rate (each) = 550 m^3 / hr	Nos.	2		
1.11	Air piping shall comprise of SS 304 all submerged piping and MS 'C' class pipes in plant room complete with all fittings such as tees, crosses, plugs, sockets, elbows, reducers, paint,supports & clamps, puddle flanges etc cutting chases & making good the wall wherever required. Contactor to submit detailed P & I indicating their proposal.	Lot	1		
1.12	Supply Non-clog type air dispersion system capable of handling required 8-10 cfm of air with oxygen transfer efficiency. Air dispersion grid shall be assembled in modular form so that they can be replaced / repaired easily from plat form at the top. (Coarse bubble membrane diffusers)	Lot	1		

S.No.	Description	Unit	Qty	Rate	Amount
	Note :				
	Air dispersion system shall be provided for MBBR Tank, Equalization Tank,and Sludge Holding Tank.				
1.13	Providing and fixing all interconnecting piping (as described below) and isolation control valves for making the system complete. The piping material shall be MS 'C' class.				
	All piping submerged in sewage waste/pumping sewage waste. SS 304	Lot	1		
1.14	Supply, installation, testing & commissioning of Chlorine dosing system with dosing solution and a 200 ltrs HDPE tank with 0-10 lph dosing pump.	Set	1		
1.15	Supply, installation, testing & commissioning of PP/HDPE MBBR biodeck media. the media shall be enough for proper functioning of STP. Surface Area -500sqm/cum[MBBR System to be in two reactors]	Lot	1		
1.16	Supply, installation, testing & commissioning of PVC tube deck settling media to be installed in Tube Settler Tank .	Lot	1		
1.17	Supplying, installing, testing & commissioning of centrifugal Filter Feed pumps, CI body, CI impeller. motor, pressure gauge with isolation cock, Isolation valve, NRV on delivery line. Isolation valve, stainer at suction. The pump shall be suitable for 415±10% volts 3 phase AC supply				
	Filter feed pumps:				
	Capacity : 30 Cum/hr.	1W+1S			
	Head : 30-35 Mtrs	Nos.	2		
1.18	Supply, Installation, testing and commissioning of Vertical Multigrade Sand Filter fabricated out of 8mm thick M.S. plate as per IS Code with 8mm dished ends, manholes and side holes with cover, under drains, supporting legs flanged piping, valves , strainer plate of 12mm thickness,etc. complete including frontal piping and intially charge with media like pebbles, gravels, sand etc. It shall be internally coated with red iron oxide primer and two coats of epoxy paint and externally with red iron oxide primer and two coats of approved synthetic enamel paint. Filter media shall be included in cost and shall include standard fittings like pressure gauges on inlet and outlet, sampling cocks,air vent , bolts, nuts and rubber gasket etc. complete.				
	Capacity 30 M3 / Hr				
	Filtration rate - 15M³/M²/hr				
	Height of shell - 1.8 mtrs				
	Max. operating pressure - 3.5kg/sq.cm.				
	Test pressure - 5.5kg/sq.cm.				
	Shell Thickness -8mm				
	Dished ends Thickness -10mm				
	Frontal piping -80 mm				
	dia of filter 1.6 mtrs.	Set	1		

S.No.	Description	Unit	Qty	Rate	Amount
1.19	Supply, installation, testing and commissioning of Vertical Activated Carbon Filter fabricated out of 8mm thick M.S. plate as per IS Code with 8mm dished ends, manholes and side holes with cover, under drains, supporting legs flanged piping, valves, strainer plate of 12 mm thickness ,etc. complete including frontal piping and intially charge with activated carbon media. It shall be internally coated with red iron oxide primer and two coats of epoxy paint and externally with red iron oxide primer and two coats of approved synthetic enamel paint. Filter media shall be included in cost and shall include standard fittings like pressure gauges on inlet and outlet, sampling cocks,,air vent , bolts, nuts and rubber gasket etc. complete.				
	Capacity 30 M3 / Hr				
	Filtration rate - 15M³/M²/hr				
	Height of shell - 1.8 mtrs				
	Max. operating pressure - 3.5kg/sq.cm.				
	Test pressure - 5.5kg/sq.cm.				
	Shell Thickness -8mm				
	Dished ends Thickness -10mm				
	Frontal piping -80 mm				
	dia of filter 1.6 mtrs.	Set	1		
1.20	Supply installation, testing & commissioning of of Disinfection system comprising of U.V. Reactor in a close circuit chamber suitable for waste water application. Max. operating pressure at 80 psi, UV Transmission 65%, electronic ballast type operating frequency 30 kHz – 50 kHz, cabinet safety standard rating IP54, material of treatment chamber SS 316L and UV dosage (uQ-sec/cm2) = >60000. Flow rate of 30 cum / hr. Qty. = 1 Set	Set	1		
1.21	Supply, installation, testing & commissioning of Screw press of Suitable Capacity 2 m3 alongwith interconnecting piping ,poly dosing system, sludge trolley complete.	Set	1		
1.22	Supply, installation, testing & commissioning of positive displacement type screw slurry pump with MS casing, SS-strator with internal rubber lining, gland packing seal, solid handling capacity upto 7 to 10% of the effective percentage of sludge and direct drive with motor.				
	Capacity : 3 m^3/hr	1W+1S			
	Head : 40 mtrs. (1W+ 1S)	Nos.	2		
1.23	Providing, fixing, testing and commissioning of inline flage mounted magnetic flow meter with IP65 protection, fulll base, rubber/PTEF liners, SS316L/Hostelloy B,C/Ti/Ta electrodes, SS-304 flow tube, 0.3% in 0.5% of accuracy 220VAC, 50Hz/optional 24VDC supply 20 to 180oC as per model/selection, suitable for sewagw & water including all fitting & accessories complete with bypass arrangement.	Nos.	2		

S.No.	Description	Unit	Qty	Rate	Amount
1.24	Supply, installation, testing & commissioning of D.O. Meter & pH Meter of suitable capacity for 500 kld plant.	No.	1		
1.25	Providing and Fixing of Online pH Meter	No.	1		
1.26	Providing, fixing, testing and commissioning of horizontal, centrifugal Sludge recirculation pump (MBBR to Anoxic) . The pumps shall have CI casing, SS Impeller & SS shaft & sleeve with mechanical rotary shaft seal connected by a flexible tier type coupling to TEFC induction motor suitable for 415+10% Volts, 3 Phase, 50Hz, AC Power Supply mounted on a common channel base-plate with coupling guard, 150 mm dia pressure gauge with GM isolation cock, suitable vibration eliminator pads of approved design. Motor to be suitable for including all necessary piping, valves and other accessories and concrete foundation complete as required.				
	Capacity - 35 cum/hr@10-12 mtr head				
	Solid Handling capacity - 10 mm.				
	Self priming				
	Qty - 2 Nos (1 W +1S)	No.	2		
1.27	Providing, fixing, testing and commissioning of horizontal, centrifugal Sludge recirculation pump (Tube Settler to MBBR tank) . The pumps shall have CI casing, SS Impeller & SS shaft & sleeve with mechanical rotary shaft seal connected by a flexible tier type coupling to TEFC induction motor suitable for 415+10% Volts, 3 Phase, 50Hz, AC Power Supply mounted on a common channel base-plate with coupling guard, 150 mm dia pressure gauge with GM isolation cock, suitable vibration eliminator pads of approved design. Motor to be suitable for including all necessary piping, valves and other accessories and concrete foundation complete as required.				
	Capacity - 10 cum/hr@10-12 mtr head				
	Solid Handling capacity - 10 mm.				
	Self priming				
	Qty - 2 Nos (1 W +1S)	No.	2		
1.28	Providing, fixing, testing and commissioning of on-line monitoring system as comply to Local PCB standards, complete in all respects.	Job	Rate Only		
1.29	Approval from pollution board for construction and operation etc complete as required including arranging raw sewage for testing and commissioning Contractor shall include the cost of all chemicals consumed during testing & commissioning and the cost of such items of works which are not explicitly mentioned above but are mandatory to have pollution board approval.	Job	1		

S.No.	Description	Unit	Qty	Rate	Amount
1.30	Contractor shall operate the plant for Two Year from the date of commissioning of the STP including the cost of consumables. Contractor shall give the training to personnel of the employer for operation and maintenance During Commissioning of the plant. Operation and maintenance contract shall after from the date of commissioning of the STP. (INCLUDING chemicals and consummables). The operating staff shall be skilled 1-2 years experience in running STP. To operate and maintain the entire STP under available load conditions on round the clock basis. 1.0 Engineer visit once in a week 3.0 Operator one in each shift. 1.0 Reliver when required	Year	2		
1.31	**ELECTRICAL PANEL**				
	Supply, installation, testing & commissioning of the control panel with interlocking arrangement with supply pumps,suction pumps, modulating or shut-off valves including necessary wiring, magnetic switches & sensors complete to make the system functional, fabricated out of 14 gauge CRCA sheet steel. Cable gland plates shall be provided on top as well as at the bottom of the panels. Panels shall be treated with all anticorrosive process before painting as per specifications with 2 coats of red oxide primer and final approved shade of powder coated paint. 2 Nos. earthing terminals shall be provided for 3 phase, 4 wire, 50 Hz supply system. Lifting hooks shall also be provided in case of large panels. Make: Any CPRI Approved Company				
	Motor Control Centre				
	Incoming				
	100 amps TPN MCCB with the following accessories:				
	a. 0-500 volts 96 x 96 mm square electronic voltmeter with selector switch shall be protected by 2 amps TP MCB. 1 Set				
	b. 0-200 amps 96 x 96 mm square electronic ammeter with selector switch and 125./5 amps 10 VA CL:1 CTs. 1 Set				
	c. Phase indicating lamps shall be protected by 2 amp SP MCB 3 Sets				
	Bus Bar				
	200 amps TPN (15 KA) copper bus bar with heat shrinkable insulation sleeves.				
	a. Required Nos of required capacity TPN MCB for direct on line starter/star delta starters and out going feeders to all the pumps/blowers etc. (including standbies). Each compartment shall contain auto / manual selector switch and indicating lamp with MCB's for 'ON/OFF/TRIP' status of motor				
	b. Spare MCB's of following capacities:				
	i. 32 amps TPN MCB's 4 Nos.				
	c. Necessary cable alleys, internal / cabling, wiring, cabling from MCC to various pumps / equipment and interlocking, earthing for all equipment shall also included				
Notes	Both Streem Electrical Stater Come in First Stage STP				

S.No.	Description	Unit	Qty	Rate	Amount
	a. All MCCBs / MCBs shall be of 15 KA breaking capacity and suitable for motor duty application.				
	b. All motor starters shall be provided with Automatic level controller				
	c. DOL starters shall be used for mototrs below 10HP and Star-Delta Starters for other motors .				
	d. Provision shall be made for providing potential free contacts to all pumps starters				
	MCC for all STP equipments/pumps as described in sub head II				
	e. All MPCB, Contactor,Overload Relay Shall be L&T & Schinder	Set	1		
1.32	Supplying, installing, testing & commissioning of Cables , Conector, Cable Trays, to make Electrical Installation Complete.				
	a) Cable				
	Type - Copper Cable only				
	Capacity - As per the control panel and machines to connected.				
	Size of cable - 1-4 core x 1-10 sqmm or as required.				
	b) Cable Tray				
	Qty - As required				
	Type - Slotted GI				
	Size - 2" x 4" x 6" or as required.				
	c) Cable Tray Support				
	Quantity - As per site requirment of approved quality.	Lot	1		
	TOTAL SUMMARY FOR STP (1 A)				
B	**ULTRA FILTRATION SYSTEM (UF Plant)**				
	Engineering, supplying of on Ultra Filtration Plant of Capacity 25m3/hr (excluding excavation, back filling & disposal of surplus earth MS/Civil construction work) for the following duty:				
	Supplying of Horizontal centrifugal Water Pumps, CI Casing, & Impeller along with motor, pressure gauge with isolation cock, Isolation valve, NRV on delivery line. Isolation valve, Mechanical seal, sdrain pipe with valve for the pump. The pump shall be suitable for 415±10% volts 3 phase AC supply				
1.1	Ultra-filtration Feed Pumps				
	Capacity : 28m3/hr				
	Head :20-25M				
	RPM : 2900				
	No. of Pumps (1W+1S)	No	2		
1.2	Ultra-filtration Back wash Pumps				
	Capacity : 75m3 /hr As required				
	Head : 20-25 M				
	RPM : 2900				
	No. of Pumps (1W+1S)	No	2		
1.3	Supplying, installing, testing & commissioning of Bag Filter or Disk Filter Housing SS 304 /PVC				

S.No.	Description	Unit	Qty	Rate	Amount
	Size : 50 micron				
	Capacity : 35m3/hr	No	1		
1.4	Supplying, installing, testing & commissioning of Ultrafiltration Unit with MSEP Skid Membrane are made from a PVDF /Poly Norbit material with Excellent low Fouling Characterstics.				
	Capacity : 25 m3/hr				
	Membrane Type : Hollow Fiber				
	Nominal Membrane Pore Size : 0.02 micron				
	No. of Membrane : According to System Provider				
	Skid : 1no. MSEP				
	Membarne Surface Area : 52-55m2				
	No. Of Membrane 12 no. Minimum				
	Membrane	Set	1		
1.5	Supplying, installing, testing & commissioning of CEB System				
	Capacity Pump: 0-40 LPH				
	Capacity Tank : 200 Ltr	Set	1		
1.6	Providing and fixing all piping (as described below) and isolation control valves for making the system complete.				
	UPVC : Interconnecting pipe line after delivery header of pump/ Membrane	Lot	1		
1.7	Supplying, installing, testing & commissioning of SS 304 Actuated Butterfly Valve of Different Size to complete the System in Automation Along With Air Compressor				
	Size : 2.5" /3" As Req.	Set	1		
1.8	Engineering, fabrication, assembling, wiring, supply, installation, testing and commissioning of PLC based motor control centre shall be fabricated with reinforcement of suitable size angle iron, channel 'T' sections irons and/or flats wherever necessary. Cable gland plates shall be provided on top as well as at the bottom of the panels. Panels shall be treated with all anticorrosive process before painting as per specifications with 2 coats of red oxide primer and final approved shade of powder coated paint. Marge in STP Panel	No	1		
1.9	Supplying, installing, testing & commissioning of Cables , Conector, to make Electrical Installation Complete.	Lot	1		
1.10	Supply, installation, testing & commissioning of Electromegnatic type Flow Meter having acrylic body coupled with MS Flanges, of suitable capacity for 30 m3/h plant. Size 80mm.	No.	1		
	TOTAL SUMMARY FOR UF Plant (1 B)				
C	**SOFTENER FOR HVAC COOLING TOWER SOFT WATER**				

S.No.	Description	Unit	Qty	Rate	Amount
1.1	Supplying, installing, testing & commissioning of centrifugal Softenr Feed pumps,CI body, CI impeller. motor, pressure gauge with isolation cock, Isolation valve, NRV on delivery line. Isolation valve, stainer at suction. The pump shall be suitable for 415±10% volts 3 phase AC supply				
	Filter feed pumps:				
	Capacity : 10 Cum/hr.	1W+1S			
	Head : 30-35 Mtrs	Nos.	2		
1.2	Supply, Installation, testing and commissioning of Vertical Water Softener fabricated out of 6mm thick M.S. plate as per IS Code with 8mm dished ends, manholes and side holes with cover, under drains, supporting legs flanged piping, valves , strainer plate of 12mm thickness,etc. complete including frontal piping and intially charge with Resin gravels, etc. It shall be internally coated with FRP Lining and two coats of epoxy paint and externally with red iron oxide primer and two coats of approved synthetic enamel paint. Resin shall be included in cost and shall include standard fittings like pressure gauges on inlet and outlet, sampling cocks,air vent , bolts, nuts and rubber gasket etc. complete.				
	Capacity 10 M3 / Hr				
	Filtration rate - 15M³/M²/hr				
	Height of shell - 1.8 mtrs				
	Max. operating pressure - 3.5kg/sq.cm.				
	Test pressure - 5.5kg/sq.cm.				
	Shell Thickness -6mm				
	Dished ends Thickness -8mm				
	Frontal piping -50 mm				
	dia of filter 1 mtrs.	Set	1		
1.3	Supply, Installation, testing and commissioning of Brine Tank along with Salt Mixter Assembly MS TANK FRP Cotaed 600 Ltr	Set	1		
	TOTAL SUMMARY FOR SOFETNER (1 C)				