Tender Ref.: NTC(WR)/Tech/ Sizing Waste Collection Tank/2017/1496 Date: 05.08.2017

NATIONAL TEXTILE CORPORATION LTD.,(WESTERN REGION)
NTC HOUSE, 15, N.M. MARG,
BALLARD ESTATE,
MUMBAI–400 001
TEL NO. 022-22686600,
FAX NO.022-22686631.
WEBSITE: www.ntcltd.org

TENDER DOCUMENT FOR

Design, Fabrication, Construction, Installation, Testing & Commissioning of Sizing Waste Collection System (10 KLD Effluent Treatment Plant)

FOR

FINLAY MILLS, ACHALPUR
Phone No. 07223-250616/613
Fax No. 07223-250612
Email : mmfinlayachalpur@gmail.com
gmfinlayachalpur@gmail.com

DATE FOR PURCHASE OF TENDER	05.08.2017 to 22.08.2017
DATE & TIME OF PREBID MEETING	16.08. 2017 at 11.30 AM
LAST DATE FOR SUBMITION OF TENDER	22.08.2017 up to 5.30 PM
DATE FOR OPENING OF TENDER (**Technical Bid**)	23.08.2017 at 12.00 PM

नेशनल टेक्सटाइल कॉरपोरेशन लिमिटेड (पश्चिम क्षेत्र)
NATIONAL TEXTILE CORPORATION LIMITED (WESTERN REGION)
(भारत सरकार का उपक्रम)
(A GOVERNMENT OF INDIA UNDERTAKING)

Tender Ref.: NTC(WR)/Tech/Sizing Waste Collection Tank/2017/1496 Date: 05.08.2017

Tender Notice

Sub: **Design, Fabrication, Construction, Installation, Testing & Commissioning of Sizing Waste Collection System (10 KLD Effluent Treatment Plant) at Finlay Mills , Achalpur**

National Textile Corporation Limited, Western Region, Mumbai (A Govt. of India Undertaking) are inviting sealed tender under two bid system from reputed manufacturers or Authorized Dealer / Distributors for Design, Fabrication, Construction, Installation, Testing & Commissioning of Sizing Waste Collection System (10 KLD Effluent Treatment Plant) at Finlay Mills **,** Achalpur.

1 ELIGIBILITY CRITERIA FOR PARTICIPATION IN TENDER.

a. The bidding firm should be manufacturers or authorized dealer / distributors. In case of authorized dealers / distributor a recent valid certificate of authorizations from their principal is required.

b. The bidding firm should have **Minimum annual turnover Rs. 1 CRORE** during last 3 financial year ending 31st March 2016, audited balance sheet / certificate from chartered accountant to be enclosed for the financial year , 2013-14, 2014-15, 2015-16

c. The bidding firm should have proven record for satisfactory installed minimum 3 numbers ETP system in any Industry during last 5 years and out of 3 numbers, at least 1(one) No package ETP with anaerobic and aerobic scheme. An evidence of proof needs to be submitted such as Purchase Order/ Work Order along with the report/Certificate from the end user/end users, stating that the bidder has successfully supply & Commissioned and performance is satisfactorily.

d. Bidder should submit PAN Card , GST registration Copy

Bidding firms who have not meeting all the above eligibility criteria (a to e) shall be disqualify in Technical Bid & tender shall be rejected summarily.

The original supporting Documents of all above eligibility criteria (a to e) of L-1 bidder may be verified by the Corporation before awarding the contract.

SCOPE OF WORK AND SPECIFICATION

1. SCOPE OF WORK

1.1 Design, Fabrication, Construction, Installation, Testing & Commissioning of Sizing Waste Collection System (10 KLD Effluent Treatment Plant at Finlay Mills , Achalpur

2. Scope of Equipment Supply

Design, Fabrication, Construction, Installation, Testing & Commissioning of Sizing Waste Collection System (10 KLD Effluent Treatment Plant) at Finlay Mills , Achalpur

3. DESIGN BASIS.

a LOCATION - Finlay Mills, Achalpur. Dist- Amravati
Maharashatra. (India) – Pin Code- 444805

5. INSPECTION AND TESTING

5.1 Mentioned in technical bid

6. DRAWINGS & DOCUMENTS

6.1 Along with the Technical Bid /Quotation, the Bidder shall submit 2 sets of the following documents for approval & records :

a. Technical data sheet duly filled in, as per format given in this tender.

b. General & Commercial condition duly filled in as per the format given in this tender.

c. Extra optional items.

d. Catalogue of Materials / Items.

7. SCHEDULE OF COST (Preamble)

a. The bidder should study the various items in bill of quantities (BOQ) in conjunction with technical specifications, tender drawings, general, special and Annexure to Conditions of Contract, all of which forms complete tender document.

b. Quantities mentioned are approximate and indicative and are subject to variation as required during execution and up to completion. Procurement of materials to be done by the contractor on the basis of working drawings

prepared by him and approved by the engineer with respect to site conditions.

c. Bidders are requested to study various items very carefully. In case of any doubt, the bidder shall intimate the same in writing to the DGM (Tech)/GM, Finlay Mills, Achalpur and get clarified in writing from them. Bidder should indicate any missing items and quote accordingly at the time of submission of offer. No extra will be entertained after execution of work.

d. For assessing proper quality and type of working involvement the bidder is advised to visit the site at his cost before filling the rates in tenders.

e. Contractor has to carry out the complete job and provide any items necessary as per actual site condition and good engineering practice and shall form part of scope of supply. The cost of such items are deemed to be included in the rates quoted by bidder in the tender.

f. The rates quoted for the bill of quantities shall be on the best Principle of Engineering analysis and the arithmetical extension for arriving at the amount shall be accurately carried out.

g. The rate quoted shall be for each item in the tender for fully completed item of work and shall include all the items necessary complete to the work to the full intent of specification, general trade practice, and to the full performance / working of the system.

The Corporation / Mills reserve the right to delete any part of works or add additional works at rates quoted by the bidder.

8. PRE-BID MEETING

A pre-bid meeting with prospective bidders shall be held at NTC Ltd., Western Regional Office, **Mumbai on 22.02.2017 at 11.30 AM.** The concern bidders are requested to present them self for any clarification on technical as well as commercial matters regarding to this tender.

Only the prospective bidders are required to submit their suggestions / clarifications during the pre-bid meetings in writing. The suggestions received and found reasonable and acceptable shall be incorporated as corrigendum. Management is not bound to accept any or all suggestions so given in pre-bid meeting. Any suggestions forwarded after the pre-bid meetings shall not be entertained at all by the management.

9. CORRIGENDUM/AMENDMENTS IN TENDER DOCUMENT

Amendments if any in tender document shall be uploaded in website www.ntcltd.org, bidders are requested to download the copy of Corrigendum /Amendments from website and attached the same with tender document.

10. **CONTACT DETAILS**

The prospective bidders are requested to contact the following officials for any clarifications / information regarding the tender documents etc.

Name of Official	Contact Number
Shri G. A. Shukla, Dy. General Manager, (Tech.), N.T.C. Ltd., (WR), Mumbai.	022-22686603/ 09969010333
Gen. Manager , Finlay Mills, Achalpur	07223-250617 +91-9146600882

11. **EARNEST MONEY DEPOSIT**

a. The prospective bidder who wishes to participate in tenders will have to submit **earnest money deposit of Rs. 60000/- (Sixty Thousands only)** by D.D/Pay Order from any Nationalized/ scheduled commercial bank (excluding co-operative / rural bank) notified by RBI.

b. D.D/Pay Order to be prepared in Name of **"National Textile Corporation Ltd.,Unit - Western Region"** , payable at Mumbai.

c. The tender received without earnest money deposit shall be rejected out rightly.

d. The earnest money of unsuccessful bidder will be refund within 15 days after finalization of Contract by at Par Cheque.

e. The earnest money of Successful Bidder will be converted into Security Deposit & will be refund after successful completion of contract.

12. **EMD EXEMPTION**

Concession/Exemption for MSME Entrepreneurs for granting the MSME necessary concession / exemptions as per Govt, directives, bidders are requested to submit the copies of registration certificates issued by the Concerned Authorities. The bidder has to specify whether they are Micro or Small Enterprises and if so, whether they are owned by SC/ST Entrepreneurs

13. **Implementation of Integrity Pact in NTC**

Bidders are requested to go through the implementation of integrity pact in NTC which is attached as annexure. This tender is hosted on our website: www.ntcltd.org along with the copy of the Integrity Pact, which may be downloaded and submitted dully signed with seal, along with the tender. "Only those venders / bidders, who commit themselves to Integrity Pact would be considered competent to participate in the bidding process.

The name of the independent External monitors (IEM) is Transparency International India. (TII). This tendering process is being monitored by Independent External Monitor, Shri Ashok Kumar Tripathi Retd. District Judge, at Corporation Office of NTC i.e. (5th floor, Core –IV Scope Complex, 7 Lodhi Road, New Delhi- 110003) M. No- 9029020548 / 9911566668, e-

mail: atipathi@yahoo.co.in If any party is aggrieved they are free to approach the said IEM in terms of Integrity Pact".

14. COST OF TENDER DOCUMENTS.

a. Interested bidders are requested to obtain the tender documents from Materials Department, NTC Office Mumbai by paying Rs. 1000/-(non-refundable) being the cost of tender documents by Bank Draft (D.D)/Pay order from any **Nationalized/ scheduled commercial Bank notified by RBI (excluding co-operative / rural Bank)** on any working day except holiday(Saturday & Sunday) from **05.08.2017 to 22.08.2017 from 10.00 AM to 5.30 PM.** Bank Draft/Pay order to be prepared in the Name of **"National Textile Corporation Ltd., Unit- Western Region",** payable at Mumbai

b. Bidders may also download the tender document from NTC Ltd., website i.e. www.ntcltd.org. If the Tender Document is downloaded than the cost of tender documents of Rs. 1000/- in form of D.D/Pay order drawn from any Nationalized/ scheduled commercial Bank (excluding co-operative / rural Bank) notified by RBI must be submitted along with tender.

c. **Tender shall not be accepted without tender fee in form of DD/Pay Order.**

15. SUBMISSION OF TENDER

a. Prospective bidder should submit their complete offer in three separate duly sealed envelope marked A,B,C complete bid should be submitted to Jt. Manager, Materials, at NTC Ltd, (WR) Office, Mumbai on or before **22.08.2017 up to 05.30 PM.**

b. Envelope 'A' should be marked **EMD** containing the D.D/Pay Order for EMD and cost of tender document in case of downloaded tender form.

c. Envelope 'B' should marked **Technical Bid** containing all documents required to meet qualification criteria and tender document with all the pages signed and stamped by the bidder firm.

d. Envelope 'C' should be marked **Financial Bid** containing financial bid.

e. All the three envelop A, B, C, duly completed should be placed in an outer envelope, which shall be sealed and should contain the following information clearly.

i. Tender document No. & Scope of work with due date.

ii. Name & address of the bidder on left corner of each envelop A, B, C.

f. If the envelops are not sealed and marked as stated above the NTC Ltd WRO, Mumbai assumes no responsibility for the misplacement or pre-mature opening of the contents proposal submitted.

g. Bids submitted by fax telegram, fax, email shall not be entertain and shall be rejected.

16. LATE TENDERS

Tenders received by the NTC Ltd. Western Region, Mumbai after the specified time and due date as per tender documents shall not be eligible for consideration and shall be summarily rejected.

17. REJECTION OF THE TENDER

a. NTC Ltd., Western Region, Mumbai reserve the right to accept or reject all or any of the tender without assigning any reason what so ever. It is not obligatory for the NTC Ltd. (WR), Mumbai to give any reason for their decisions.

b. NTC Ltd., (WR), Mumbai reserve the right not to proceed with the tendering process at any time without notice or liability, and to reject any tender without assigning any reasons. NTC ltd. (WR), Mumbai also reserves the right to retender without assigning any reason whatsoever.

18. TENDER OPENING

a. The envelop A and B containing EMD draft and authorization certificate document shall be opened NTC Ltd. (WR), Mumbai at **11.30 AM on 23.08.2017** before the prospective bidders or their authorized representative who wish to be present and tender opening committee of NTC Ltd. (WR), Mumbai.

b. The price bid envelop "C" shall be kept unopened as it is.

c. The Financial Bid / Commercial Bid of those bidders who have been found qualified in technical bid as per the document submitted for claiming eligibility criteria shall be communicated by email / fax / telephone for the date and time of financial bid opening.

d. Management has the right to postpone the opening date of technical bid and financial bid on account of any reason in that case the next date and time of opening of technical bid and financial bid shall be communicated to the qualified bidder's representative by email / fax / telephone.

e. In the event of tender opening date as stated above falling on holiday the time of tender submission and opening shall be same on the next working days.

19. SITE VISIT

The prospective bidders are requested to visit the Finlay Mills, Achalpur for collecting all detail about scope of work and other constraints before submission of tender.

20. **PRICES**

The bidder should quote their prices in prescribed price bid format only clearly and distinctively for all components. The offer quoted in different format shall be liable for rejection.

TDS & other Taxes, if any will be deducted as per prevailing rules

21. **DELIVERY PERIOD AND COMPLETION OF WORK.**
4 months from date of LOI / Work Order.

22. PAYMENT TERMS

A. 70% of basic price of materials supply at mills site plus 100% duties & Taxes and other levies such as Transport & Insurance etc. will be release within 30 days after verification of materials and documents etc. physically and receipt certified from mills.

B. 20% of Basic Price of material value plus Supervision, installation and commissioning charges (including Service Taxes) within 15 days after successful completion of the work and receipt certified from mills.

C. Balance 10% of Basic price of material value shall be retained for the defect liability period of 12 months. The retention money may be release after submission of performance Bank Guarantee drawn from Nationalized / scheduled commercial Bank (excluding co-operative / rural bank) notified by RBI of equivalent amount,. The P.B.G. validity period should be valid till the completion of defect liability period of 12 months from the date of handing over. This performance Bank Guarantee will be released after successfully completion of defect liability period.

23. SECURITY DEPOSIT:

a. The earnest money deposit of successful bidder shall be converted into security deposit amount against the work order. This amount will not carry any interest.

b. The security deposit amount shall be refunded after the successful commissioning of the machinery.

24. GUARANTEE

Contractor has to guarantee of the machineries supply & commissioned including all its components/equipment/sub system for 12 months from the date of satisfactory completion report duly verified by nominated mill officers and approved by General Manager.

The scope of guarantee shall cover free replacement of all the parts/ components/ electronic components/ machinery / equipments found not functioning/under functioning/damaged free of cost including installation cost. Any defects found in the system/its sub system/machinery / equipments will have to be attended free of cost with minimum reasonable time period for arranging engineers/spares. No lodging, boarding, travel

expenses and service charges will be payable by the mill during guarantee period.

In the event of supplier failing to provide timely replacement spares/service engineer to the mill within the reasonable minimum period, management has right to engage other agencies/procure the parts from other sources the additional cost for the same shall be recovered from the suppliers.

25. PENALTY FOR DELAY IN COMPLETION

0.05% of contract value per week for delay. The delay shall be reckoned from the end of '4' months from the date of work order.

However, in the event of delay in providing clear site or delay in erection of machines or any other genuine reason or delay in project due to the factors beyond control of management penalty clause shall not be applicable.

For claiming waiver in such cases supplier has to inform to the management with complete detail for verification of their claim by Mills nominated officials and consultant.

Based on above verification of claim for waiver of penalty the General Manager of the Mills shall have the power for waiver of penalty.

26. VALIDITY OF OFFER

The offer given by the bidders for the entire turnkey work shall be valid for 120 days from the date of opening of the tender

27. VALIDITY OF RATE

The rate quoted by the suppliers for the entire turnkey work shall be valid till the completion of installation and commissioning.

28. CONTRACT RATES

The contractor shall not be entitled for any increase in the Price of machineries during the contract period.

29. RESOLUTION OF DISPUTES

The Terms & Condition of this tender document shall prevail in case of any dispute arising out of this contact and any dispute directly or indirectly connected with this contract will be referred to sole arbitration of the Chairman & Managing Director of National Textile Corporation Ltd. New Delhi or any other officer appointed by the Chairman-cum-Managing Director of the corporation for this purpose. The decision of the said arbitrator shall be final, conclusive and binding upon all concerned.

30. FORCE MAJURE

The General Manager, Finlay Mills, Achalpur shall not be liable for any failure or delay in execution of contract due to any cause beyond their control including fire, floods, strikes, go-slow, lock-out, closure, pestilence dissilience dispute with staff dislocation of normal working conditions, war riots epidemics political upheavals Government actions commotion, breakdown of machinery, shortage of labour, demands or otherwise or any other cause or conditions beyond the control of aforesaid causes or not and the existence of such cause or consequence may operate at the sole discretion of The General Manager, Finlay Mills, Achalpur. To extend the time of execution on the part of The General Manager Finlay Mills, Achalpur by such period as may be necessary to enable The General Manager Finlay Mills, Achalpur to affect execution after the cause of delays will have ceased to exist. The provisions aforesaid shall not be limited or abrogated by any other terms of the contract whether printed or written.

31. JURISDICTION

All suits or proceedings relating to any dispute or claim arising out of or in course of performance in this contract shall be filed in appropriate court having jurisdiction in the State of MAHARASHTRA as case may be.

32. ACCEPTANCE:

We have read all the terms and condition of tender documents and we agree to abide by the same. We will supply all machinery / equipments strictly as mentioned in tender document and corrigendum to tender document. We are aware that any additional condition will not be accepted and there will be no change in scope of work.

Name of the Firm _____

Address_____

_____

E-Mail ID _____

Contact No._____

Signature _____

ANNEXURE - A

TECHNICAL SPECIFICATIONS

TECHNICAL DOCUMENT

Tender Specification No. Finlay Mills/NTC/ETP/2016/----------

Part -II

Name of work: Tender for Design, Engineering, Supply, Construction, Fabrication, Testing, Installation & Commissioning of Sizing Waste Collection System (10 KLD Effluent Treatment Plant) at Finlay Mills , Achalpur

Tender issues to M/s / Shri ----------

On Payment of Rs . ---------- Only vide D.D/Pay Order /P.O/M.R No. and date ----------

----

Due date of Opening _____

Phone:
Gram:
Fax:
Telex:

General Manager
Finlay Mills, Achalpur

CONTENTS

1.0 SCOPE OF WORK

The Main Scope of work to be carried out under this contract shall comprise design, Engineering, supply, construction, fabrication, installation, testing and commissioning of 10 KLD Effluent Treatment Plant ancillary services required to obtain **approvals or liasoning** from **Local Pollution Control Board** and any type of field survey required for the job. The system installed at the site shall be capable of producing the treated water used for gardening as per MPCB norms. The treated water should be disposed off for gardening.

The contractor is responsible to carry out 12(twelve) months free operation & maintenance after successful commissioning of the plant. The detailed scope of work is as follows.

- ☐ Site Clearance, Site Surveys & Soil Investigation including shifting of Bench Marks from power house.
- ☐ Submission of process design, hydraulic design calculations, Process flow diagram, Process & Instrumentation diagram, Plant layout & hydraulic flow diagram.
- ☐ Preparation & submission of Civil Structural design calculations & drawings.
- ☐ Preparation & submission of detailed technical specifications for civil, mechanical & electrical works, necessary drawings, backup calculations
- ☐ Construction of effluent treatment plant as per the specifications.
- ☐ Fabrication & supply of all electromechanical items / machineries
- ☐ Receipt, Storage of manufactured items.
- ☐ Mobilization of all equipment, machineries.
- ☐ Installation of all electromechanical items / machineries including all cabling/ wiring (inside) etc.
- ☐ Testing, Pre Commissioning & commissioning of all equipment's plant with necessary civil works like excavation, pedestals, construction of manholes etc. complete
- ☐ Laying of treated water GI Pipelines & pumping of the same for gardening.
- ☐ All machineries, manpower, tools & tackles, consumables required for successful completion of project.
- ☐ Satisfactory completion of the contract & handing over of the plant
- ☐ Operation & maintenance of plant for a period of 12(Twelve) months from the date of commissioning with required chemicals, labour, tools, tackles etc., complete.

N**ote:** All any other civil works / building / structures / EM works required to complete the system & successful operation of the system not specifically indicated in the above scope shall be deemed to be included in the clause 1.00.

Contract drawings.

Drawings annexed to these specifications indicate only a suggested / indicative schematic arrangement and the extent of work envisaged in installing the effluent treatment plant and waste water recovery system. As such, the contractor is entitled to modify the arrangement suggested in the said drawing to suit his design approach. However, the contractor shall be solely responsible for the efficiency and adequacy of the performance of the system and collection network installed by him. The distances indicated in the network drawing are tentative and the contractor has to design the network as per the actual site condition.

2.0 Information to accompany tenders

Along with the offer, the contractor shall also submit details of the system and equipment offer by him. The details shall include the following particulars

- ☐ Process / Schematic diagram of ETP& Collection network
- ☐ Design calculations
- ☐ Details of civil works at site
- ☐ Details of mechanical and electrical components
- ☐ Details of piping arrangement
- ☐ Details of all instruments adopted
- ☐ Operating procedure
- ☐ Maintenance requirements
- ☐ Recommended list of spares
- ☐ Project completion schedule.

3.0 Design Criteria

Effluent Treatment Plant

Based on the water consumption, wastewater generation, production rate and their specific wastewater generation, the design flow and characteristics have been evolved as per the following details:

DESIGN PARAMETERS

Parameters	**Inlet**	**Treated Water**
Flow	10 m3/day	10 m3/day
pH	3-4	7.0-8.5
Total Dissolved Solids(TDS)	800-1000 mg/l	< 2100 mg/l
Total Suspended Solids(TSS)	400-500 mg/l	< 100 mg/l
Chemical Oxygen Demand(COD)	4000-5000 mg/l	<250 mg/l
Bio-chemical Oxygen Demand(BOD)	500-800 mg/lit	<100 mg/l
Oil& Grease	10 mg/lit	<10 mg/l
Chloride as Cl	200-300 mg/l	< 600 mg/l
Sulphate as SO_4	300-400 mg/l	<1000mg/l

MODE OF DISPOSAL OF TREATED WATER: Recycling in plant for gardening and /or domestic purpose.

4.0 PROCESS DESCRIPTION:

In order to meet the regulatory requirement and recycle the treated wastewater for fly ash handling and landscaping purpose, treatment schemes have been evolved:

The objective of wastewater treatment technology selected for the treatment of effluent generated from the industrial estate located in Finaly Mills, Achalpur is to provide:

- ☐ Discharge water quality standards by regulatory bodies.
- ☐ Cost Economic.
- ☐ Complete ETP system built-in in the available land area.
- ☐ Trouble-free in operation of ETP
- ☐ Reuse of treated water in plant for gardening and Landscaping
- ☐ ETP shall be compact, smell free and shall consume less power.

- ☐ **Collection Tank:** Collection tank for Raw water with Capacity 15m3/day are presently available at site.
- ☐ **UASB** :- Effluent will be pumped into UASB Digester where 80% organic load will get reduced.
- ☐ **Pre Aeration Tank**: The overflow of UASB will be collect in Pre aeration Tank.
- ☐ **Aeration Tank**: In the Aeration Tank effluent would be aerated for three days. 80 - 90% reduction in parameters would be carried out in Biological treatment
- ☐ **Settling Tank**: In the settling tank culture will get settled at the bottom of the tank, part of which would be recycled to the aeration tank and the excess sludge would be disposed off.
- ☐ **Intermediate Tank** : Clear supernatant would be collected into Intermediate Tank.
- ☐ **Media Filtration & Carbon Filtration System**: The clear water is pumped to Multigrade Filter to further polish the treated effluent. The Sand filter removes the suspended solids and the Carbon Filter removes color & odor.
- ☐ **Final Storage Tank** : Treated water will be collected in final storage tank.
- ☐ **Sludge drying bed**: We have proposed sludge holding tank to store the sludge. This Sludge tank is provided with Sludge Transfer pumps. The sludge can be transferred to Sludge Drying Beds for dewatering the sludge.
- ☐ **Foundations** : As per requirement for plant and machines

5.0 TECHNICAL SPECIFICATION

Effluent Treatment Plant

CIVIL / FABRICATION WORKS

5.1.1 COLLECTION PIT: Existing Unit

Type	Below ground
No. of Units	01 No
Structure	RCC

5.*1*.2 UASB Tank:	
Type	Above Ground
No. of Units	01 No
Structure	MS Epoxy

5.1.3 Pre Aeration Tank	

Type	Above Ground
No. of Units	01 No
Structure	MS Epoxy

5.1.4 Aeration Tank	
Type	Above ground
No. of Units	01 No
Structure	MS Epoxy

5.1.5 Settling Tank	
Type	Above ground
No. of Units	01 Nos
MOC	MS Epoxy

5.1.6 Intermediate Tank

Type	Above ground
No. of Units	01
MOC	MS Epoxy

5.1.7 Final Storage Tank

Type	Above ground
No. of Units	01
MOC	HDPE

5.1.8 Foundation

Type	Above ground
No. of Units	01
MOC	RCC/PCC

5.2 MECHANICAL ITEMS

➢ **ELECTRO MECHANICAL EQUIPMENTS**

Sr. No.	Description	Specifications / Make	Qty
5.2.1	Oil Skimmer	0 – 10 LPH, Make Premier/ Veeraja / equivalent	01
5.2.2	Effluent Transfer Pump	1 m3/Hr@ 8 m head, Self priming Make : Kirloskar/Grandfos/Equiv	02 (1 W + 1 S)
5.2.3	Air Blower	Capacity : 25 m3/Hr@ 0.3 kg/cm2 pressure Make : Everest/KPT/Equiv	02 (1 W + 1 S)
5.2.4	Diffusers	63ODX 1000MM Fine Bubble EPDM Membrane diffuser	01 Set

		Make: Green field/Scogen/Jagger/ Equivalent	
5.2.5	Sludge Recirculation Pump	0.5 m3/Hr @ 6 m head, Self priming Make : Kirloskar/Grandfos/Equiv	02 (1W+1S)
5.2.6	Tube Settler Media	Shape : Hexagonal Chevron/ Square Hydraulic Radius : 1.5 cm MOC of Media : PVC, Color : Black Thickness : 1.1 mm (+/- 0.1 mm) Make – Marvellous/Coodek Equivalent	01 Set
5.2.7	Pressure Sand Filter	Capacity : 1 m3/Hr, having different grade of sand & gravel MOC : FRP/MS	01
5.2.8	Activated Carbon Filter	Capacity : 1 m3/Hr, having different grade of sand & gravel and activated carbon MOC : FRP/MS	01
5.2.9	Filter Feed Pump	1 m3/Hr @ 25 m head , Centriifugal, Make : Kirloskar/Grandfos/Equiv	01
5.2.10	Chlorination	0-5 LPH, Auto dose type Make: E dose/Milton Roy/Equiv	01
5.2.11	Electrical Panel	As per guidelines given by NTC	01
5.2.12	Piping & Accessories	Internal piping of the plant battery limit of pumping MOC UPVC, HDPE as applicable with tee, bend, valves, reducers/expanders as applicable. Pressure would be 6 Kg/Cm2 or As per guidelines given by NTC	Set
5.2.13	Electromagnetic Flow meter	Make :- Forbes Marshall /Eumag Emerson / Equivalent	1
5.2.14	Treated Water Pump	1 m3 per hour Make :- Kirloskar / Grandfos / Equivalent	2
5.2.15	Treated water Line	MOC – UPVC make :- Astral / Finolex/ Equivalent	250 Meters

5.3 ELECTRICAL & INSTRUMENTATION WORKS

1.0 Scope

The bidder's /contractor's scope covers the design, shop testing, supply, transport, storing at site, erection, testing and commissioning of all electrical and instruments required for the plant, as per enclosed General Specification, Specific Requirement, typical power distribution scheme and typical control system architecture.

Where there is any contradiction between General Specification and Specific requirements mentioned in this document, the specific requirements will rule the project requirement.

Design Basis

The Bidder/ Contractor shall strictly follow the typical power distribution single line diagram which is to be proposed by him and approved and accepted by Employer. The incoming Power cable to the MCC shall be supplied, laid & terminated at both ends by the contractor at his own. Finaly Mills will provide 415V, 3 Phase, Supply feeder near effluent treatment plant and further all electrical equipment and accessories including cables shall be included in the scope of bidder. Bidder shall inform the Owner / Finaly Mills the size of the incomer cables at MCC, with proper justification of the maximum load connected at any time).

2.2 LT panels shall also have two EDO (Electrical Draw Out), ACB (Air Circuit Breakers) incomers and one no. EDO, ACB bus coupler. All the main pumps/drives and standby pumps shall be distributed between two LT bus section equally so that in case of failure of one bus section, other standby motors should get power supply from other bus section.

2.3 Bidders shall follow the BIS guideline for voltage rating of motors while designing and selection of electrical motors. All motors of 1to 2 HP (75 KW) and above shall be of slip ring type and below 75 KW shall be of squirrel cage type.

2.4 All HT & LT cables shall be designed and selected after considering a minimum de rating factor of 0.65. Exact de-rating shall be calculated taking into consideration designed ambient temperature, grouping and minimum size as per fault level calculations of synchronized DG with grid). Bidder shall carryout detailed fault level calculation of main generating station and up to all distribution points.

2.5 Bidder shall carry out the earth resistivity test on his own and based on this result they should design the total earthing system to maintain an overall resistance value less than one ohm.

2.6 The electrical and instrumentation in gas handling area like compressors etc. shall be flame proof type and strictly adhere to CPCB norms.

2.7 Noise level (db levels & insertion level) inside and outside blower room shall be strictly as per latest amended pollution control board norms applicable at installation time. Whatever extra equipment's required like scrubber, acoustic shall be provided to meet statutory guide lines as well as building should be able to accommodate all equipment's.

2.8 The Control system and instrumentation for the total plant shall be provided as per typical control system architecture provided with this tender.

2.9 HT cabling shall be done underground with top of HT cable minimum 1.0 meter below plant ground level. The protection above HT cable shall be provided as per latest revision of IS standard. LT cable/ control cable/ lighting cable inside the plant shall be done on overhead cable tray mounted on steel structure etc.

2.10 Bidder shall get the short circuit fault level data at 33 kV or 3.3 kV, from power distribution agency and shall do the fault level calculation and Relay co-ordination scheme for the entire plant accordingly. Bidder shall provide minimum protection on HT side as per standard relay protection scheme enclosed herewith.

2.11 Measuring instruments shall be provided by bidder as per standard measurement scheme enclosed herewith.

2.12 All the protection relay of 33kV7 6.6 kV/ 3.3 kV HT panel shall be of microprocessor based except master tripping relay and check supervision relay.

3.0 Bidder's Obligation

Bidder shall provide preliminary details for the items given below. However, if Employer requires any further details during technical bid evaluation stage, the bidder shall provide the same.

- ☐ Load list (as per enclosed typical format)
- ☐ Maximum demand in KVA with duration (period) of the plant.
- ☐ Minimum demand in KVA with duration (period) of the plant
- ☐ Normal demand in KVA of the plant.
- ☐ Detailed Bill of material for electrical as well as instrumentation scope of work.
- ☐ P & I diagram of the total plant.
- ☐ Instrument Data sheet for each tag No.
- ☐ Control system architecture.
- ☐ Uninterrupted power supply (UPS) capacity requirement.
- ☐ UPS capacity and its battery backup calculation sheet.
- ☐ Lighting fixture capacity and quantity calculation.
- ☐ Single line diagram for HT Power, LT Power, (main panel), L T distribution boards.
- ☐ Single line diagram for lighting and small power

4.0 Indian Standards / Other International Standards

For the benefit of bidders, a few Indian Standards and Codes of practices and other international standards are listed below. Unless otherwise noted, equipment/devices/accessories /installations/ testing etc. shall comply with relevant standards/codes mentioned herein. Where Indian Standards are not available equipment/ devices etc. complying with relevant British or IEC standard or ISO standards shall be proposed. While referring to any standard, the latest revision/edition shall govern. Bidders are advised to include in their bid a list of equipment/devices and corresponding standards to which they conform. Translation in English of standards, which are available in other languages, shall be furnished along with the bid, in such cases the English translation shall govern.

4.1 List of IS & Other International Codes (For Electrical Equipment / Accessories

IS 5	Colors for ready mixed paints and enamels
IS 3	Three phase induction motors
IS 374	Electric ceiling type fans and regulators
IS 694	PVC insulated cables for working voltages upped and including 1100V
IS 722	AC electricity meters
IS 1248	Direct acting indicating analogue electrical measuring instruments and their accessories
IS 1271	Thermal evaluation classification of insulating material
IS 1293	Plugs and socket outlets of rated voltage upped and including 250V and rated current upped and including
IS 1364	Hexagon head bolts, screws and nuts of product grades A and B
IS 1534	Ballast's for fluorescent lamps
IS 1554	PVC insulated (heavy duty) electric cables
IS 1777	Industries luminaries with metal reflectors
IS 1913	General and safety requirements for luminaries
IS 2086	Carrier and bases used in rewire able type electric fuses for voltages upped 650V
IS 2223	Dimensions of flange mounted AC induction motor
IS 2253	Designation for type of construction and mounting arrangement of rotating electrical machines
IS 2254	Dimensions of vertical shaft motors for pumps

5.0 Workmanship

The contractor shall ensure workmanship of good quality and shall assign qualified supervisor/ engineers and competent labour who are skilled, careful and experienced in

carrying out similar works. Employer shall reserve the right to reject non-competent person/s employed by the contractor, if the workmanship is found unsatisfactory.

6.0 Following protections for incomer feeders in main MCC location for each process area of the plant. Each MCC shall be provided with 4 Pole two incomers and bus section with draw out ACB/MCCB as incomer. MCC's shall be metal clad floor mounted, with cable entry from bottom (preferred) and environmentally protected to IP-52. MCC shall have fault rating of not less than the applicable fault levels. The two incomer neutral shall completely be isolated by using 4 pole ACB/MCCB.

Mechanical and electrical interlocking shall be provided between the incomers and the bus section ACB/MCCB to prevent parallel operation of main switchgear feeders. MCCs shall be housed within brick built buildings segregated from injurious effects of process fluids/gases are present. The major components of each starter shall comprise:

- Door interlocked isolator
- Fuse gear/ MCCB
- Contactor, overload relay with single phasing protection.
- Start/ Stop push button.
- Local/ remote selector switches (if applicable)
- Manual / off/ auto sector switch.
- Ammeter as per starter requirement
- Indication light for run, trip, emergency stop operated, power On, run dry protection operated (where such tanks are used)

i) Incomer feeder shall have electrostatic / microprocessor based control releases for over current, short circuit, earth fault with time delay and these releases shall directly work on tripping mechanism of draw out air circuit breaker. Outgoing feeder up to 630 Amps shall be switch fuse unit / MCCB and beyond 630 Amps shall be air circuit breaker. All Outgoing Air Circuits Breakers will be manual draw out type.

ii) Each motor up to 5 KW shall have DOL starter with O/C, short circuit protection, over load relay with single phasing protection along with ammeter, provision for remote start/stop. Overload relay shall be reset type from front of panel. All starters component shall follow type-II coordination chart of established manufactures with components of same make. Each starter shall have On/Off/Trip indication. All necessary selector switches like auto manual switch and local remote switches shall be installed.

7.0 Motor Control Centre

7.1 The MCC Panel shall feed power to all loads of the ETP including building, indoor and outdoor lighting, instrument power requirements etc., Motors up to and including 5 HP shall be provided with direct-on-line (DOL) starters and motors above 5 HP shall be provided with Star – Delta starters. For motors up to 5 HP CT shall be not be provided in the center phase complete with ammeter. For motors above 5 HP CT shall be provided in all three phases complete with ammeter and ammeter selector

switch. Each DOL starter feeder shall be complete with the following components (minimum).

1 No	4 pole MCB/TRNSFU /MCCB
3 Nos	HRC Fuses link with fuse bases
1 No	Air break contactor of suitable rating with coil rated for 230 V AC and provided with 2 NO + 2 NC auxiliary contacts. Suitable for minimum AC 3 duty application
1 No	6 A auxiliary contactor with 4NO + 4NC contacts, suitable for minimum AC 3 duty application
1 No	Microprocessor based overload relay (MR) with built in single phasing prevention relay (SPPR).
1 No	Red indicating lamp with series resistor (for motor "ON" indication)
1 No	Green indicating lamp with series resistor (for motor "OFF" indication)
1 No	Yellow indicating lamp with series resistor (For Motor "Trip" indication)
1 No	Start Push button
1 No	BMR reset push button
1/3 Nos	Class 1.0, 7.5 VA current transformer along with 96 x 96 mm ammeter and ammeter selector switch (as applicable) set of power and control terminals

Each star – delta starter feeder shall be complete with the following components (minimum)

1 No	TPNSFU / 4 Pole MCCB
3 Nos	HRC fuses link with fuse bases
1 No	Air break contactor of suitable rating with coil rated for 230 VAC and provided with 2 NO + 2 NC auxiliary contacts.
1 No	Timer 0 – 30 seconds
1 No	Microprocessor based overload relay (MR) with built in single phasing prevention relay (SPPR).
1 No	Red indicating lamp with series resistor (for motor "ON" indication
1 No	Green indicating lamp with series resistor (for motor "OFF" indication)
1 No	Yellow indicating lamp with series resistor (for motor "Trip" indication)
1 No	Auto Manual Selector switch
1 No	Auto Manual Off Selector switch
3 Nos	Class 1.0, 7.5 VA current transformer along with 96 x 96 mm ammeter and ammeter selector switch (as applicable) set of power and control terminals

☐ The quantities of DOL and Star delta starters shall be based on the number of motors of each rating in the ETP. In addition to the starter feeders actually required for feeding power to the drives of ETP, 20% spare feeders of each rating (subject to a minimum of 1 No) shall be provided in the MCC by contractor. Control supply of the complete MCC's feeders (DOL & STAR-DELTA) shall be provided by 230 VAC.

☐ Depending on inductive load to be fed from the MCC the contractor shall size the requirement of power factor improvement capacitor for improving the power factor improvement capacitor for improving the power factor to 0.95 lag. Contractor shall provide necessary switch fuse feeder for this purpose in the MCC

The incomer feeder to the MCC shall be rated for the total load of the MCC considering the load of 20% of the spare feeders provided therein. The incomer shall be provided with the following:-

1 No	415V, 4P MCCB
3 Nos	Class 1.0, 15VA current transformers
1 No	Ammeter with ammeter selector switch
1 No	Voltmeter with voltmeter selector switch and control fuses (2/4A)with neutral link
1 No	KWH meter with max. demand indicator
1 No	KWH meter with max. demand indicator
1 No	Power factor Meter
3 Nos	R, Y, B indicating lamps with series resistors and control fuses.

8.0 Cables

☐ Local Control stations shall be provided near each motor in the field for starts and stop operation of the motors. Cables to motors shall be sized based on the derated ampere capacity of cables as well as based on the voltage available at the motor terminals. The voltage available at motor terminals should not be less than 94% of the rated value during start up or re acceleration. The voltage drop in supply cables feeding lighting distribution board / panels of maximum design load shall be limited to 1% and in supply cables feeding lighting point with all lighting cables to motors.

☐ Control cable shall be with 2.5 mm2 copper stranded. Minimum size of lighting cable shall be 1.5sq.mm. Single phase power wiring will be with 2.5sq.mm and that of 3 phase 20 A power wiring will be with 4 sq.mm.

8.1 Cable Lying

a. The entire cabling required for the ETP shall be in the scope of work of the contractor. The incoming Power cable to the MCC required for permanent electricity connection shall be supplied, laid and terminated at both ends by the contractor at his own. However cost of incoming cable will be reimbursed by Finlay Mills on production of documentary evidences to the Finlay Mills, Achalpur.

b. Cables shall be laid on GI cable trays which shall be supported from the walls / columns /ceiling of the building. In areas where the numbers of cables are less than four, these may be clamped onto walls / columns etc. using spacers and saddles. Spacing between the spacers shall be restricted to 300 mm for horizontal runs and 500 mm for vertical runs of the cables.

c. Cables lay in cable trays shall be laid neatly and dressed after laying. These cables shall be clamped on the cable trays.

d. Cables running in outdoor open areas shall be laid in excavated trenches. For such cabling, after excavating a layer of sand shall be placed over which the cables shall be laid neatly. On top of this, a further layer of sand (75mm depth above and below the cable) shall be provided over which a layer of refractory, bricks shall also be provided. The trench shall then be backfilled and the backfilled earth shall then be tamped. Cable markers shall be placed every 25m along the route of the buried cables. Also cable markers shall be provided at every turn in the run of buried cables.

e. All cables shall be provided with cable tags at both ends of the cable.

f. Cables entering buildings below ground level, if any, shall be taken through pipe sleeves which shall be sealed with compounds after laying of cable for waterproofing.

h. Cables on platforms etc where the number of cables in a section is less than four may be cleated on platform sides, supports, etc. as per good engineering practices.

i. Cables of different voltages generally lay on separate trays where if this is not possible cables can be laid on same rack with suitable barriers. At least 20% spacing on each rack shall be kept reserved for future installation.

j. All LT cables and control cables laid on trays / racks shall have identification at every 5m length.

8.2 Cable tray

The cable tray/ rack shall be designed, fabricated, supplied and installed suitably as required. The rack shall be fabricated as ladder type made of MS angles & flats. These shall be properly painting with high epoxy paint. The rack shall be of standard width of 300mm or 600mm suitably wherever required and shall be flushed with walls etc. complete. All 1.1 KV grade power & control cable run on rack shall be laid touching each other but shall be in one layer only

8.3 Earthing & Earth Pit

Earthing & Earth pit for all installations as per IS 3043 – 1966 shall be included in the contractor's scope. The earthing shall include all the motor controls, Centre control post, cable rack/ tray, illumination & ventilation. Earth electrodes shall be 3000mm long and 500mm diameter perforated GI pipes in accordance with the code of practice for earthing IS 3043. The size the safety earthing system for the STP shall be in the scope of work of the contractor. An earthing grid shall be formed for the entire area which shall basically comprise of GI earth strips and GI

plate earth electrodes interconnected so as to form a continuous loop below ground.

- ☐ The quantity of earth electrodes and size of earth conductors shall be decided by the contractor.
- ☐ The contractor shall ensure that the resistance value of the entire earthing system in the plant shall not exceed 1 ohm. However, it shall be the responsibility of the contractor to size the actual earth conductor requirements based on resistivity of the soil and submit calculations of the same for owner's approval prior to installation.
- ☐ Earthing connection from the main earth loop to individual equipment shall be made through earth bus. Sufficient quantity of earth bus shall be provided in the earthing network for this purpose by the contractor.

9.7 Drawings & Documents

Four sets of following (minimum) drawings / documents shall be submitted by contractor for owner's approval within 20 days of order.

- o Equipment layout drawings
- o .GA drawings of equipment complete with dimensions, weight and foundation details
- o Safety earthing layout drawings
- o Lighting layout drawings
- o Main single line diagram indicating complete details of the power, lighting and instrument distribution.

Switches / sockets of piano type shall be used in general and in offices of staff, control room, MMI room, decorative modular switches shall be used. Suitable fans shall be provided in rooms/ plant areas as per Employer/CPWD standards. For exhaust fans it must be provided in panel rooms, pump rooms, chemical rooms, stores, toilets and at least 20 air changes per hour must be maintained.

6.0 INSTRUMENTATION

6.1 Flow Meter

Flow meter should be electromagnetic type with capacity of 10 cum/day. The flow meter should be installed at the delivery line of ETP plant to calculate the total flow outlet of the plant. The flow meter shall be flanged connection.

Capacity	1KL/Hr
Make	Forbes Marshall /Eumag Emerson /Equivalant
Quantity	01 Nos

6.2 Pressure gauges:

Pressure gauges of suitable range should be provided in all the pumps as required. The specifications of pressure gauges are as follows-

Pressure range	As required
Dial size	2″
Make	Monometer India/ H guru
Quantity	04 Nos

All pressure gauges should be provided with necessary needle valve arrangements.

IMPORTANT NOTE: The details / sizes furnished above in the technical specifications for civil & mechanical items are tentative and indicative based on our internal assessment. However the contractor has to take up the various components in accordance with his design for efficient functioning of the plant. If the contractor is including or excluding the component, he shall be supposed to provide the sufficient design calculations & specifications accordingly.

7.0 INTERCONECTING PIPES AND VALUES

All Interconnecting Pipes & valves should follow proper IS codes. Piping details for all collection pits are as under -

Treated water line with pump	250 MTR	UPVC Pipe [2″ Dia]

Materials of Construction for various applications are –

- ☐ Air Line : GI B Class
- ☐ Sludge Pipes : UPVC
- ☐ Clear Water Pipes : UPVC/HDPE
- ☐ Effluent Incomer : UPVC
- ☐ Treated water Outlet : UPVC

All valves can be ball type, Non-return type; gate valves globe valves etc. as per the requirement .The standard for pipe line are as follows-

☐☐☐UPVC Pipes : IS 4985:2000

☐ GI Pipes : IS 1239Part –II
☐ HDPE Pipes : IS 4984:95 Grade PE 100

The installation shall conform in all respects to the following standard in general

IS 7558-194	Code of Practice for domestic hot water installation
IS 5329-1983	Code of Practice for sanitary pipe work above ground for building
IS12251-1987	Code of Practice for drainage of building basement
IS 783-1959	Code of practice for laying of concrete pipes
IS 1200 (Part 19)	Method of measurement of water supply, Plumbing and drains
IS 13592-1992	Specification for un- plasticized PVC pipes for soil and waste discharge system inside including ventilation and rain water
IS 12235 (Part 1 to 11)	Methods of test for un-plasticized PVC pipes for portable water Supplies
BS 4515	Specification for un-plasticized PVC pipe fitting
IS 1536-1976	Specification for centrifugally cast (spun) iron pressure pipes for water, gas and sewage

DETAILED TECHNICAL SPECIFICATION

8.0 CIVIL WORKS:

8.1 SITE SURVEY

Before quoting the tender, the bidder can visit the site and take necessary precautions. The contractor shall establish, maintain and assume responsibility for grades, lines, levels and bench marks. He shall report any error or inconsistencies regarding grades, lines, levels and dimensions to Finaly Mills, Achalpur before commencing the work. Commencement of work will be regarded as the contractor's acceptance of such grade, lines, levels and dimension and no claim will be entertained at a later date for any errors found. Such survey shall be carried out by qualified surveyors. All bench marks to be erected by the contractor in connection with the work, shall be co – related to the permanent bench marks established at the site.

8.2 **DESIGN SUBMISSION**

The contractor shall be responsible for the safety of structures, correctness of design and drawings, even after the approval of the same by Finaly Mills, Achalpur. Complete detailed design calculations of foundation and superstructure together with general arrangement drawings and explanatory sketches shall be submitted to the consultant and Finaly Mills, Achalpur separately. Separate calculation for foundations or superstructures submitted independent of each other shall be deemed to be incomplete and will not be accepted by the Engineer-in-Charge. The design considerations described hereunder establish the minimum basic requirements of plain and reinforced concrete structures, masonry structures and structural steel works. However, any particular structure shall be designed for the satisfactory performance of the functions for which the same is being constructed.

8.3 DESIGN LOADING

All Buildings and structures shall be designed to resist the worst combination of the following loads/stresses under test and working conditions: dead load, live load, wind load, seismic load, stresses due to temperature changes, shrinkage and creep in materials dynamic load and uplift pressure etc.

i) Dead Load

This shall comprise all permanent construction including walls, floors, roofs, partitions, stairways fixed, service equipment's and other items of machinery. In estimating the loads of process equipment for the purpose of design, the empty weight of the equipment including all fixtures and attached piping, but excluding contents, shall be considered. Dead load shall be taken as per relevant BIS codes.

ii) Live Load

Live load shall be in general as per BIS: 86.925. However, the following minimum loads shall be considered in the design of structures:

Live load

Building (non – plant)	250 Kg/Sq. M
Roof Building structures	150 Kg/Sq .M
Live load on floors supporting as pumps, blowers, compressors, etc.	1000 Kg/Sq .M
Live load on roof of tanks/plant	1000 Kg/Sq .M
Live load on all other floors and walkways / cable trench covers.	250 Kg/Sq. M
Live load on stairway Surcharge load for undergo Structures, if any	500 Kg/Sq. M
Equipment load	As per actual condition As per manufacturers specification

In the absence of any suitable provisions for live loads in BIS codes or as given above for any particular type of floor of structure, assumptions made must receive the approval of the department / prior to taking up the design work. Apart from the specified live loads or any other load due to material stored, any other equipment load or possible overloading during maintenance or erection shall be considered and shall be partial or full whichever causes the most critical condition

iii) Wind Load

Wind loads shall be as per BIS: 86.925.

iv) Earthquake Load

Earthquake load shall be computed as per B.I.S. 1893 taking into consideration soil foundation system, importance factor appropriate to the type of structure, basic horizontal seismic coefficient / seismic zone factor & average acceleration coefficient as applicable. An importance factor of 1.5 shall be considered for design of all the structures. The soil foundation system coefficient shall be considered as 1.2.

V) Dynamic Load

Dynamic loads due to working of machines / equipment's such as pumps, blowers, compressors, switch gears, travelling cranes, etc., shall be considered in the design of structures as given by the manufactures or in BIS code, whichever is more.

IRC Class AA (wheeled vehicle) loading shall be considered for design of structures under or by the side of roads.

8.4 **Earth Work**

The excavated earth, blasted rubble etc. shall be conveyed and deposited in suitable places as directed by Engineer in charge within 150m of plant site on one side of the trench only. The excavated soil which is surplus to that required for refilling and after allowing for settlement will have to be removed, spread and sectioned at places shown on the site during execution shown by the employer within a radius of 3km from the site. Sectioning is to be done as per the general engineering practice. It is to be understood that no extra payment, will be made for this. The cost of removal of surplus earth after spreading / leveling / sectioning at site approved by the Engineer– in – charge to the disposal site will be borne by the contractor by himself. While bailing out water during excavation, care should be taken to see that the bailing out water is properly channelized to flow away without stagnation or inundating the adjoining road surfaces and properties. All costs towards shoring, shuttering and bailing out of water will be borne by the contractor.

9.0 CONDITION FOR CEMENT AND STEEL BROUGHT BY THE CONTRACTOR:

9.1 CEMENT

The contractor shall procure ordinary Portland cement 43 grade (conforming to IS269-1989/IS8112-1989 respectively), as required in the work, from reputed manufacturers of cement having a production capacity of one million tons per annum or more, such as

ACC, Ultratech, Manikgarah, Ambuja, Birla Gold, Cement Corporation of India as approved by the Ministry of industry, Government of India and holding license to use ISI certification mark for their product whose name shall be get approved from the Engineer-in Charge. Supply of cement shall be taken in 50 kg bags bearing manufacturers name and ISI marking and Batch no. along with the invoice copy/bill and test certificate issued by manufacturer / producer. Samples of cement taken from the consignment of cement arranged by the contractor shall be got tested in accordance with provision of relevant BIS codes. In case, test results indicate that the cement arranged by contractor do not conform to the relevant BIS codes, the same shall stand rejected and shall be removed from the site by the contractor at his own cost within a week's time of written order from the Engineer-in- Charge to do so. The cement shall be of the best normal setting quality unless especially rapid hardening or quick setting quality if expressly instructed by Engineer to be supplied. Each bag shall bear ISI certification mark.

The cement shall be tested in nearby laboratories of Engineering College by the contractor in accordance with Engineer in charge suggestion. Two samples should be taken by the Engineer in charge in the presence of the contractor or his authorized representatives or the technical personnel employed by the contractor. The contractor shall without extra cost provide samples and cooperate in the testing of the cement. One sample shall be got tested and the other sample shall be retained by making clear identification in the sample by the Engineer in charge so as to identify at a later date. The cost of such test shall be borne by the contractor. All cement shall be procured in bags and shall be stored in a dry place for which the contractor shall be responsible. Consignment of bagged cement shall be properly stacked in a manner which will permit easy access for inspection and definite identification.

Cement shall be used in approximately in the chronological order in which it is received, but cement that has been stored for a period longer than 4 months from the date of initial sampling shall not be used unless it has been retested at the expenses of the contractor and passed by the Engineer in charge as good quality on the retest. Cement aged more than 180 days from the date of initial sampling shall be rejected. Cement which has become caked or perished shall on no account be used on the works and shall be rejected. Although the Engineer may have passed any consignment, he shall however have the power at the subsequent time to reject such consignment if he finds that any deterioration in the quality thereon has taken place.

A record of the quantity of cement procured with the name of the dealer, bill number and date shall be maintained by the contractor. This should be produced for examination by the Engineer in charge at any time. The age of the cement shall be reckoned from the date of manufacture and it shall be verified by the Engineer in charge. The rejected consignment of cement and steel should be removed from the site within two days.

9.2 STEEL

The contractor shall be procure steel reinforcement bars TATA Steel or SAIL of Fe-500 conforming to relevant BIS codes from main producers as approved by the ministry of steel. For TMT bars, conforming to relevant BIS code procurement shall be made from main producers. Steel (reinforcement/structural) shall not be procured from re-rolling producers. The contractor shall render necessary assistance for taking samples and sending the samples to the authorized testing laboratory. In case, test results indicate that the steel arranged by contractor do not conform to the relevant BIS codes, the same shall stand rejected and shall be removed from the site by the contractor at his own cost within a week's time of written order from the Engineer-in-Charge to do so at his own risk and cost. All reinforcing steel shall be clean and free from oil, grease, loose scales or

rust or other coatings of any character which would reduce or destroy the bend. Each bundle containing the bars shall bear the ISI certification mark. The steel shall be tested in nearby laboratories of Engineering College by the contractor in accordance with the suggestion of Engineer in charge. Two samples should be taken by the Engineer in charge in the presence of the contractor or his authorized representatives or the technical personnel employed by the contractor. The contractor shall without extra cost provide samples and cooperate in the testing of the steel. One sample shall be got tested and the other sample shall be retained by making clear identification in the sample by the Engineer in charge so as to identify at a later date. The cost of such test shall be borne by the contractor. For checking nominal mass, tensile strength, bend test, re-bend test, etc. specimen of sufficient length shall be cut from each size of the bar at random at required frequency as directed by the Engineer-in-Charge.

9.3 **AGGREGATES**

Sand for use in masonry and plaster works shall confirm to relevant specification & IS standards IS 2116 / 1985, IS 1542 / 196.926.92. The coarse and fine aggregates for concrete shall confirm to IS 383 / 196.920 and as specified in the relevant clauses of IS 456 / 2000. Other aggregates free from deleterious materials shall be used at the concurrence and approval of the Engineer after sufficient tests have been carried out at the contractor's cost. The maximum quantities of deleterious materials in the aggregates, as determined in accordance with IS 2386 (Part II) / 1963 shall not exceed the limits given in IS 383. Unless otherwise specified all coarse aggregate in RCC shall be graded aggregate of 20mm nominal size. All aggregates shall be stored in hard impervious surface to ensure exclusion of all foreign materials and as per IS 4082 / 1996. Aggregates having a specific gravity below 2.6 (saturated surface dry basis) shall not be used without special permission of the engineer.

9.4 BRICK WORKS – FLY ASH BRICKS:

9.4.1 MATERIAL

All bricks used for the construction of units shall be carried out with fly ash bricks confirming to IS 12894 or relevant latest IS codes and General engineering practice.

9.4.2 LAYING

Brickwork shall be uniformly bedded, bricks being laid upwards. Each brick shall be floated and rubbed in upon such sufficient quantity of mortar that the mortar is squeezed up into the joints but if such joints are not filled with the mortar from the next succeeding bed. The courses shall be laid truly and strictly to line and horizontal level. Brick work with 200mm thick fly ash bricks shall be taken up.

9.4.3 BOND

Brickwork courses shall be alternately laid in stretcher bond and header bond. Damaged bricks shall not be used. The greatest care shall be taken to prevent mortar dropping on to or in any other way disfiguring or discolouring the bricks and all edges and sides shall be kept strictly plump and square, in-line and flush with the required finished face.

9.4.4 CONSTRUCTION

Walls shall be carried up in a uniform manner and on one portion raised more than 1 m above another at any one time, the open end being racked out. Over -hang work shall be in no case being permitted. Brickwork shall be cleaned down after each day's work and newly laid brickwork shall be protected by suitable means.

9.4.5 DRY WEATHER

In dry weather the suction rate of clay bricks shall be adjusted by wetting as necessary before use.
Bricks shall be stored in a free draining area and protected from rain.

9.4.6 LINTELS

Where brickwork rests upon lintels or supporting ribs of concrete, the bricks shall be cut as necessary and carefully bedded so that proper support to the outer leaf of brickwork is obtained.

9.4.7 POINTING

At the time of laying, all joint of exposed brickwork shall normally be racked out neatly and pointed to 15mm depth.

9.4.8 SAMPLES

The contractor shall deliver samples of each type of brick to the Engineer, and no orders shall be placed without written approval of the Engineer. All the bricks used in the works shall be of the same standard as the approved samples. The samples shall be preserved on site, and subsequent deliveries shall be checked for uniformity of shape, colour and texture against the samples. If in the opinion of the Engineer any deliveries vary from the standard of the samples, such bricks shall be rejected and removed from the site.

9.4.9 TESTING

Samples of bricks shall be tested in accordance with IS 3495 by the contractor for compliance with the aforesaid, before any order is placed, and soon after receipt of a consignment. Tests shall be carried out as and when required by the Engineer on samples selected by the Engineer's representative.

9.4.10 APPROVAL

All workmanship shall be strictly in accordance with the foregoing. The engineer or the engineer's representative reserves the right to reject any of the work on grounds of shabby workmanship. Such rejected work shall be removed and rebuilt to the Engineer's satisfaction.

9.5 QUANTITY OF MORTAR

Quantity of mortar to be used in one cum of masonry shall vary from 0.3 cum for thin masonry to 0.32 cum for massive masonry of fly ash bricks.

9.5.1 CEMENT MORTAR

The cement mortar to be used on the work should be generally conforming to IS specification. Only sufficient mortar shall be mixed as required for immediate us.

9.5.2 FORM WORK AND CENTERING:

Steel/wooden form centering shall be used. If wooden form work is used, it shall consist of planks not less than 40mm thick and strong props. This shall be provided complying with clause 10 of IS 456/2000. The timber for form works shall be best hard wood and got approved by Engineer in charge.

9.6 PLASTERING:

Plastering would be 15mm; 20mm and 25mm thick cement plaster either plain or with water proof cement as may be specified. The plastering items shall be executed in thickness and cement mortar of proportion as required. Similarly plastering shall be either ordinary or with water proof for components as required. In case of water proof plaster standard and approved water proofing compound shall be mixed in cement mortar in required percentages as directed and then the plaster is applied. The finishing shall be either smooth or rough as may be directed by the engineer unless otherwise specifically mentioned in the specifications/drawings. Neeru finish wherever directed by the engineer shall be done at no extra cost. Curing and watering shall be done as directed and plaster shall be done as directed and plaster shall be in alignment and level. Any substandard work is liable to be rejected and shall have to be re-done at contractors cost. Sand to be used shall be of approved quality only.

9.7 FLOORING:

If cement concrete shall be provided for flooring, it shall be with minimum M30 grade with 40mm thickness. The size of metal shall not be more than 12mm and it shall be properly graded. A thin coat of very fine plaster shall be provided on top to give a smooth finish. The marking of false grooves to surfaces shall be made as directed.

9.8 PAINTING:

The painting work shall be carried out as directed by Engineer in charge. It shall be white washing, Oil bound distempering inside the room & ace exterior emulsion of Asian make outside. For tanks, the outer surface should be provided with ace exterior emulsion of Asian make and / or cement painting. Shade and make shall be as directed by the Engineer and for decorative purpose, Engineer may ask for different shades to be provided for different components or different parts of the same component which the contractor shall have to do at no extra cost to the Employer. The priming coat as directed, scaffolding etc shall be included in the estimate as per the specifications of Painting

9.9 SEPARATOR (Cover Block):

For bottom cover of beams, slabs etc., separators of pre-cast cement mortar blocks of suitable size with embedment as directed shall be used and tied to the reinforcement. Between layers of reinforcements, separators consisting of pieces of bars of suitable diameter shall be used. The required cover shall be provided as per IS 456 / 2000

9.10 CONCRETE

Concrete for use in the works shall generally comply relevant with BIS standards. The concreted mix design shall be in specified proportions satisfying the maximum aggregate size, water cement ratio and required cube strength and workability as per IS 456-2000. Such concrete must be adequately vibrated to form solid mass without voids. The entire concreting works should be done only with the prior approval and in the presence of Engineer in charge. The concrete shall be proportioned as far as cement and aggregates are considered by volume.

The amount of water required being measured either by weight or volume. The adjustments must be made at frequent intervals at the discretion of the Engineer or his assistant to account for the moisture content of the aggregates. The mixing operation shall be performed only in a mechanical concrete mixer and shall continue until the whole batch of uniform consistency and color is achieved. Transporting, placing and compaction of concrete mix by mechanical vibrators shall be done accordance with clause 12 of IS 456-2000. It is imperative that all concreting operations are done rapidly and efficiently with minimum re-handling and adequate manpower shall therefore be employed to ensure this. The forms shall be first cleaned and moistened before placing concrete. The mix should not be dropped from such a height as it may cause segregation and air entrainment. When the mix is placed in position, no further water shall be added to provide easier workability. No concrete mix shall be used for the work if it has been left for a period exceeding its initial setting time before being deposited and vibrated into its final position in the member while one concrete is being placed in position it shall be immediately spreader and ramped sufficiently to attain dense and complete filling of all spaces between and around the reinforcement and in to the corners of form work for ensuring a solid mass entirely free from voids.

Construction joints required in any of the structural members shall be provided generally complying with clause 12.4 of IS 456 – 2000 and as directed by the Engineer in charge. The efficiency of tempering and consolidation will be judged by complete absence of air pockets, voids and honey combining after removal of form works. Curing shall be done to avoid excess shrinkage or harmful effort to the members general complying with clause 12.5 of IS 456 – 2000. The method adopted shall be effective and any special method used must be approved by the Engineer and be subject to complete supervision. Any deficiency in concreting such as cracking, excessive honey combing, exposure of reinforcement or other fault which entail replacement of the defective part by fresh concrete and whatsoever remedy reasonable required without hampering the structural safety and architectural concept, all the cost of contractor.

9.11 Testing of concrete

During the course of construction works, preparation of test specimens, curing and casting of concrete shall be done in accordance with IS 1199 and IS 516 to ascertain the strength requirements and acceptance criteria indicated in IS 456 – 2000. The contractor shall provide all apparatus, labour and arrange to test the cubes at his own cost at the test laboratory decided by the Employer.

In addition to the above tests, any other test which may if desired by the Engineer in charge be carried out from time to time as per relevant specifications at the cost of the contractor. In case the concrete does not meet the strength required, all corrective measures shall be taken at once at the contractor's cost. The inspection and testing of structures shall be done in accordance with clause 16 of IS 456 – 2000.

9.12 Water required for construction

The water used in the construction shall be potable quality and shall be tested at the contractor's cost. The contractor has to make his own arrangements at his cost of water required for construction, testing, filling, etc., either from local bodies or from elsewhere, by paying the charges directly and arranging tanker etc., as per necessity. No claim for extra payment on account of non-availability of water nearby or extra lead for bringing water shall be entertained. All required piping arrangements and pumping if required for water shall be made by the contractor at his cost. Water for mortar, mixing and curing of concrete shall be from harmful matter or other substances that may be deleterious to concrete or steel and taken from a source approved by the Engineer. Ground water for mixing and curing shall conform to the provisions in the class 4.3 of IS 456 – 2000.

9.13 Admixtures

Only where a beneficial effect is produced shall any admixture be used and that too after test has been carried out to convince the Engineer that no harmful effect will be produced by the use of such admixture and after approval by the Engineer. The admixture shall conform to IS 1903 / 196 -922.

10.0 ELECTROMECHANICAL WORKS

10.1 Material

All materials incorporated in the work shall be the most suitable for the service conditions and duty concerned. They shall be new and of reputed make / approved quality, free from imperfections and selected for long life and minimum maintenance. Non-destructive tests, if called for in the specification shall be carried out. All submerged moving parts of the plant, shafts and spindles or faces etc. in contact with them shall be of corrosion resistant materials. All parts in direct contact with various chemicals shall be completely resistant to corrosion or abrasion by these chemicals and shall maintain their properties without aging due to the passages of time, exposure to light or any other cause. All materials shall conform to the material standards as per BIS or any equivalent standard.

10.2 Workmanship

Workmanship and general finish shall be of first class quality and in accordance with best workshop practice. All welds shall be as per IS, BS, ASME standards. All tolerances and clearances shall be as per good and sound engineering practices. Should the Employer's representative not consider any material acceptance, it shall be replaced.

10.3 Design features

As far as practicable, all designs shall be as per latest concept and practices. The equipment shall be new, of robust design for a long reliable operating life. These shall be capable of 24 hours per day continuous operation for prolonged period in the climatic and working conditions prevailing at the site and with a minimum of maintenance. Particular attention shall be given to extra temperature and the rating of electrical and mechanical equipment, cooling systems and the choice of lubricants shall be for the temperatures as specified. Paints used shall be the manufacturers' standard and shall be suitable for duty as described. The equipment shall be designed to provide easy access to and replacement of component parts which are subject to wear without the need to replace of whole units. All parts in contact with water shall have a life from new to replacement for 15 years minimum and new to repair of not less than 5 years. Design features shall include the protection of equipment against damage caused by vermin, dirt, dust and dampness and to reduce risk of fire. Equipment shall operate without undue vibration. Noise reduction measures shall be adopted such that levels of 7.5 dB (A) at 3 meters are not exceeded. Parts shall be designed to withstand the maximum stresses under the most severe conditions of normal service. Materials shall have a high resistance to change in their properties due to the passage of time, exposure to light, temperature and any other cause which may have a detrimental effect upon the performance or life of the plant. All rotating elements shall be dynamically and statically balanced. All equipment shall have name plates specifying the makes, model, rating and other pertinent information.

10.4 Lubrication

The equipment shall be lubricated by long life lubricants such that working life is not less than 3000 operation hours or as recommended by the equipment manufacturer. A complete schedule of recommended oils and other lubricants shall be furnished by the contractor. The number of different types of lubricants shall be kept to a minimum. The schedule and the name of the supplier of the lubricants shall be submitted to the Employer's representative for approval. Lubricants shall be oil and grease. The contractor shall indicate indigenously available equivalent lubricants, with complete specification. Where the lubricant is grease, preference shall be given to a pressure system which does not require frequent adjustment or recharging. Preferably, life fabricated grease packed bearings shall be used. Where more than one special grease is required, a grease gun for each special type shall be supplied and permanently labeled.

10.5 Painting

The contractor shall be responsible for the cleaning, preparation for painting and priming or otherwise protecting, as specified, all parts of the plant/Equipment at the place of manufacture prior to packing. Parts may be cleaned but surface defects may not be filled in before testing at the manufacturer's works. Parts subject to hydraulic test shall be tested before any surface treatment. After testing, all surfaces shall be thoroughly

cleaned and dried out, if necessary by washing with an approved de-watering fluid prior to surface treatment.

10.6 Erection at site

Immediately on arrival at the site, all items of plant shall be examined for damage to the paint coat applied at the manufacturer's works. Any damaged portions shall be cleaned down to the bare metal, all rust removed, and the paint coat made good with similar paint. After erection, such equipment's which are not finish painted shall be done so. Items that have been finish painted at the manufacturer's works shall be touched up for any damaged paint work. For finish painting, two coats of synthetic enamel confirming to IS 2932 shall be applied. Dry film thickness of each coat shall be at least 25 microns. The dry paint film thickness shall be measured by Elcometer or other instruments approved by the Employer's representative. In order to obtain the dry film thickness specified, the contractor shall ensure that the coverage rate given by the paint manufacturer will enable this thickness to be obtained. Strength of adhesion shall be measured with an adhesion tester and this value shall not be less than 10 kg/cm2. Painted fabricated steel work which is to be stored prior to erection shall be kept clear of the ground and shall be laid out or stacked in an orderly manner that will ensure that no water or dirt can accumulate on the surface. Suitable packing shall be laid between the stacked materials. Where cover is provided, it shall be ventilated.

10.7 Supports for Pipes & Valves

All necessary supports shall be provided to support the pipe work. Valve and other equipment mounted in the pipe work shall be supported independently of the pipes to which they connect. All valves to be installed in straight lines shall be installed between the flanges with a dismantling joint. The dismantling joint must allow a minimum clearance of 20mm. The pressure rating of the dismantling joint shall be same as that of the valve.

11.0 PRELIMINARY COMMISSIONING CHECKS

1. Ensure that all equipment is thoroughly cleaned, lubricated and checked for serviceability before setting to work. Particular attention is drawn to the removal of building debris from the pipe work systems.

2. All automatic controls and safety devices shall be inspected and checked for service ability before the working fluid or electricity is applied to the system.

12.0 TESTING & COMMISSIONING (ETP & Collection Network)

The contractor shall pay for and arrange without any extra cost to the owner all necessary testing equipment, instruments, materials, accessories, power, water, fuel and the requisite labour for testing the installation. Any defects in materials and or in workmanship detected in the course of testing shall be rectified by the contractor entirely

at his own cost to the satisfaction of Engineer in charge. The installation shall be tested again after the removal of the defects and shall be commissioned only after the approval by Engineer in charge. All tests shall be done in the presence of the Engineer in charge. When the effluent treatment plant and collection network is ready to receive the raw effluent for the purpose of testing and commissioning of the plant the contractor shall commission the plant and operate the plant to the satisfaction of the Engineer in charge for 12 months. In collection network, if any of the lines get broken or under fault, the same has to be corrected within the guarantee period. Hydro test & pressure test for showing the gravity flow should be shown in front of the Engineer in charge.

Special attention shall be paid to the following items:

☐ 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.

13. FINAL ACCEPTANCE TEST

Following commissioning and inspection of the entire installation and prior to issue of the completion certificate, the contractor shall carry out final acceptance tests in accordance with a program to be agreed with the owner's representative. Should be 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 contractor shall adjust, modify and if necessary replace the equipment without further payment in order that the required performance is obtained.

Where the acceptance tests are required by the relevant authorities having jurisdiction, these tests shall be carried out by the contractor prior to the issue of completion certificate to the acceptance of the authorities.

14.0 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 owner's representative either in whole or in part as he considers necessary appropriate. Adjustment and / or modification work as required by the owner's representative so as to comply with the authority's requirements and the intent of the specification shall be carried out by the contractor at his own expense and to the satisfaction of the authority / owner's representative. After works have been accepted, the contractor may be required to carry out assist in carrying out additional performance tests as reasonably required by the owner

15.0 HANDING OVER OF DOCUMENTS

All testing and commissioning shall be done by the contractor to the entire satisfaction of the owner and all testing and commissioning documents shall be handed over to the Owner. The contractor shall also handover all maintenance and operation manuals, all certificates including test certificates, warranty & guarantee certificates and all other documentation as per the terms of the contract to the owner.

16.0 APPROVAL

On completion of the installation, the contractor shall arrange to obtain approval certificate from the concerned authorities including Finaly Mills Achalpur to commission the plant and operate it. The contractor shall bear all expenses in connection with the same.

17.0 GUARANTEE

Besides guarantee required elsewhere, the contractor shall guarantee the work in general for one year. All required guarantee shall be submitted to the owner by the contractor whom requesting certification for payment. All required guarantees shall be submitted the owner in the form approved by him.

After the plant is commissioned, a performance guarantee shall be provided in the form given in the tender. The guarantee shall be valid for a period of one year from the date of commissioning of the plant. The guarantee shall clearly indicate the efficiency of the plant to achieve the design parameter. Any defects and deficiencies discovered in this period should be made good immediately.

18.0 CONTRACT DRAWINGS

Drawings annexed to these specifications indicate only a suggested / indicative schematic arrangement and the extent of work envisaged in installing the effluent treatment plant & Collection network. As such, the contractor is entitled to modify the arrangement suggested in the said drawing to suit his design approach. However, the contractor shall be solely responsible for the efficiency and adequacy of the performance of the system and collection network installed by him, whichever design system he may adopt. The distances indicated in the network drawing are tentative and the contractor has to design the network as per the actual site conditions. All works to be installed at site shall only be commenced after the approval for shop drawings is received. The work to be installed shall strictly confirm the approved drawings. Notwithstanding the fact that the drawings are approved by the EE (CIVIL ENGG.), the contractor shall be solely responsible to ascertain that the work installed at site yields the designed performance.

20.0 COMPLETION DRAWINGS

Upon completion of the whole work, the contractor shall furnish the Engineer In charge in triplicate copies of the final drawings (as built) showing position of various units, piping and wiring diagrams. All design & drawings submitted by the contractor for the subject work shall be exclusive property of Finlay Mills, Achalpur.

21.0 INDIAN STANDARDS & CODES

All materials & equipment's as well as construction / installation work shall confirm to relevant Indian Standard and MPPCB norms even though no such reference is included in these specifications. In case these specifications call for plant performance exceeding relevant Indian Standards, the contractor shall accordingly install suitable equipment to obtain higher performance. Also all plant and equipment shall be newly manufactured items of approved make. A reference made to any Indian standard specifications in these documents, shall imply reference to the latest revision of that standard, including such revision / amendments as may be issued by Indian Standards Institution during the currency of contract and the corresponding clauses / therein shall hold in place of those referred to.

22.0 PROGRAMME CHART

The contractor shall prepare integrated PERT charts for the execution of work including detailed charts for all activities from the start of work to completion, with details of manpower and equipment required for the fulfillment of the programme and submits the same for approval to the owner within 15 days of the award of contract. The chart shall also indicate the scheduling of sample shops drawing and approvals. Thereafter, on the first day of each month, for purposes of comparison, the contractor shall submit the identical chart showing the actual rate of progress to date. In the event of the actual rate of progress fails behind the scheduled progress as indicated in the charts. The contractor shall accelerate the works to the satisfaction of the Engineer in charge.

23.0 OPERATION & MAINTENANCE OF THE PLANT

The contractor shall operate and maintain the effluent treatment plant and all other allied works under this contract for a period of 12(twelve) months @rate finalized by Finlay Mills, Achalpur. Salient features of work are as follows:

- ☐ To operate and maintain the effluent treatment plant & collection network, all instruments, and mechanical, electrical equipment's in accordance with the aim and purpose of treatment. The plant & equipment's covered under the above contract will be totally attended to, by the contractor including any "Trouble shooting" to ensure smooth operation.

- ☐ The contractor will monitor the performance of the effluent treatment plant & collection network; conduct the analysis of the inlet wastewater quality after treatment. Contractor shall intimate and take adequate actions to ensure smooth and satisfactory performance / running of the plants on a 24 hours / round the clock basis.

- ☐ The contractor shall prepare and implement an effective plant maintenance programme in consultation with the Employer. It is an absolutely contractor's responsibility to look after all sorts of maintenance whether preventive, only minor, break down.
- ☐ The contractor will determine operating parameters, select settling (Chemical doses etc.) and generally optimize the process, and working of the treatment plant & collection network. Excessive chemical dosing i.e. dose more than normal should be avoided otherwise penalty shall be levied and recovered from the contractor.
- ☐ The contractor should plan & procure all spares, consumables including chemicals, grease, lubricating oil, cleaning agents, laboratory reagents etc within this contract period. Further the contractor will plan about the requirement well in advance and procure the material from the market.
- ☐ The contractor shall maintain and update logbook, in which details of operational parameters are recorded in every shift and at regular interval say hourly or as decided mutually.
- ☐ The contractor shall prepare and submit a daily report of plant performance and will assist the Employer in preparing the necessary documents for their purpose and records.
- ☐ The contractor will be responsible to carry out day to day periodic maintenance, necessary to ensure to smooth and efficient performance / running of all equipment's / instruments comprising the sewage treatment plant and maintaining the record of the same.
- ☐ During the Operation & maintenance period, one skilled operator is to be engaged for each shift and the work shall be carried out in all the shifts. The cost of chemicals & consumables during the O & M period should be borne by the contractor.

- ☐ Contractor will comply with all safety rules and regulations and all inter disciplinary as followed by the Employer.
- ☐ The Employer will not be responsible for any accident / injury to the staff of the contractor. Further the Employer will not provide any insurance or medical facility to the staff of contractor.
- ☐ The contractor will provided the necessary tools and tackles required for day-to-day maintenance.
- ☐ The scope of work also includes cleaning and maintaining of entire premises of the plant area regularly.
- ☐ The contractor will employ no offence, guilty person or indiscipline man.
- ☐ Electricity expenditure for operation & maintenance of the plant & collection network will be borne by Finlay Mills, Achalpur. The contractor shall provide all necessary consumables like chlorine, oil & grease etc.
- ☐ The contractor shall have to test the treated water at his own cost till the contract period. The same will be verified and checked by Engineer- in- charge whenever required.
- ☐ The treated water quality should be complying the MPCB standards.
- ☐ Any services required for smooth running of the scheme should be borne by the contractor during the O & M period.
- ☐ The most important feature is that the contractor shall provide necessary job training to the local body staffs during the O & M period and provide them all the details pertaining to the equipment's and operation of equipment's. The contractor should also train the local staffs in maintaining all relevant documents like log book, sample reports etc and the same should be handed over to the Engineer-in-charge at the end of the contract.

24.0 APPROVED MAKE LIST

A. MECHANICAL ITEMS

S.N.	DESCRIPTION	APPROVED MAKES
1	Raw Sewage Transfer Pump	Sharp / Kirloskar / Grundos / KSB
2	Gear Box	Elecon / Greaves
3	Motors	Kirloskar / ABB / Siemens/ CG
4	Return Sludge Pump	Kirloskar / Grandfos/ Equivalent
5	Filter Feed Pump	Sharp / Kirloskar / Grundos / KSB
6	Pressure Sand Filter	Proprietary
7	Activated Carbon Filter	Proprietary
8	Treated Water Pump	Sharp / Kirloskar / Grundos / KSB
9	UPVC Pipe and accessories	Finolex / Supreme / Astral
10	HDPE Pipe and accessories	Sangir / Reliance
11	GI Pipe and accessories	Jindal
12	Valves	Intervalve / Audco
1	Flow Meter	Eureka/Endress+Hauser/Forbes Marshall
15	Pressure Gauge	Warree/ H- Guru

B.	ELECTRICAL EQUIPMENT	SUPPLIER, MANUFACTURER, VENDOR, AGENCY
S.No.	MATERIAL, WORK	
1	S.F.U., Breakers	L&T, Siemens, GE, Schneider
2	Distribution Boards	MDS, Siemens, Schneider, Hager
3	Indicating DigitalMeters	AE, Meco, L&T, Conzerv
4	Crimping Lugs, Glands of Double Compression Type	Dowells, Jainson, Lotus, Braco
5	Jelly filled Telephone Cables	Finolex, Universal, RPG
6	Tag Block with Boxes	Krone
7	Rossets	ITL, Tele Connectors India
8	MCB, RCCB	MDS, Siemens, Schneider, Hager
9	Main L.T Panels, PDB, LDB	L&T, Siemens, GEC, Schneider Switchgear Components, C & S, ABB, system honsus of OEM indicated.
10	Switches and Sockets	MDS (Leagrand),Schneider, Anchor, Cona, ROMA
11	PVC Copper Wires (FRLS Grade)	Sundeep, Finolex, RR Kabel, LAPP, Polycab
12	Motors	Siemens, ABB, Bharat Bijlee, Crompton, Kirloskar, Texmo, NGEF, Alstom
13	Cable Glands and Lugs	Dowell, Lotus, A.G. Electricals, Siemens
14	Cat-6 Lan Wire	Lucent, LAPP, AMP
15	PVC Pipe	Diamond, Precision (PPI), Asian
16	Lighting Fixtures	Wipro, Phillips, Clipsal, Crompton, Bajaj, K-Lite, Keselec Shredder
17	Fans & Air-Circulators	Crompton, Bajaj, Almonard, Usha, Cinni, Rallies, Orient, Khaitan
18	Distribution Transformer 33 kV or 3.3 kV,/ 433 V	Crompton, Kirloskar, Emco, BHEL, Bharat Bijlee, Voltas, Andrew Xule, Pactil, NGEF, Voltamp,PETE, ESSANAR.
19	33 kV or 3.3 kV, VCB Breaker & Panel	ABB, Schneider, Siemens, Jyoti, Kirloskar, Crompton,Areva
20	Relays	ABB, Siemens, Alstom (AREVA), Schneider, L&T
21	33 kV or 3.3 kV, SF6, Insulated 3- Panel, 4-Panel extensible type RMU	Crompton, ABB, Siemens, Alstom, Schneider, L&T
22	ACB 8-Way, Feeder Pillar 6-Way, 4 Way & Mini Pillars	Popular Brass Metal Works, ABAK, Manish, Fitwell, Super Panel, Control & Switchgear, Chavare Engineering Pvt. Ltd.

23	Fuse Base	Siemens, L&T, Popular Brass Metal
24	Control Cables	LAPP, Finolex

C. **CIVIL ITEMS**

S.N	**DESCRIPTION**	**APPROVED MAKES**	
1	Cement	Ultratech / Chettinad / Ramco / Shankar / Dalmia /	
		ACC/ L&T/JP Rewa/Vikram/Shree Cement	
2	Steel	TATA / Vizag / Tulsyan / SAIL / Kanishk/ Jindal	
3	Admixures	FOSROC / Pidilite / Sika latex / RBR of Roffe / BASF	
4	Water proofing materials	FOSROC / BAL / IWL	

SCHEDULE-I DEVIATIONS FROM TECHNICAL

SPECIFICATIONS

NIL

We undertake that our bid is strictly as per the technical specifications, where given in the bid document.

Signature of Bidder **Company Seal**

Signature of Tenderer

SCHEDULE - II DEVIATIONS FROM CONDITIONS OF CONTRACT

NIL

We undertake that our bid is strictly as per the conditions and requirements of the bid documents.

Signature of Bidder **Company Seal**

Signature of Tenderer

SCHEDULE - III
WORK SCHEDULE

The bidder shall submit the following along with the bid in sufficient details to enable evaluation of their grasp of the work and ability to execute it within the Time of Completion.

1.0 Construction Schedule

This shall consist of a detailed Bar Chart showing in sufficient details completion of various sections of Work and the date and order in which the Bidder proposes to carry out different part of the Works.

2.0 Employment Schedule

This shall consist of a chart showing deployment of monthly manpower (including skilled and unskilled labour of various categories) commensurate the Construction Schedule.

3.0 Equipment Use Schedule

This shall consist of a chart showing deployment of monthly construction equipment (under various categories) commensurate with the Construction Schedule.

Signature of Bidder **Company Seal**

SCHEDULE- IV

DESCRIPTION OF WORK

The bidder shall submit a detailed Description of Work i.e. Technical Write-up with Process Calculations, Process & Instrumentation Diagram, Layout, Hydraulic Flow Diagram, Electrical Load List, Power Consumption & Chemical Consumption etc.

Signature of Bidder **Company Seal**

Signature of Tenderer

SCHEDULE- V LIST OF RECOMMENDED SPARE PARTS

The bidder shall give below a list of spare parts recommended for the **One year's** trouble free performance (after one year warranty period) of the equipment offered by him.

- All unused spare parts shall become employer's property at the end of 1 years operation and maintenance period.
- Prices of all above items are deemed to be considered in lump sum prices and no separate payment shall be made.
- Any additional spare parts required for O & M but not covered in the above list shall be supplied by the contractor free of cost to the employer.
- The Contractor will keep Employer informed time to time the details of using of spare parts.
- During the 1 years O&M period the contractor will give the list of major replacements proposed by him year wise.

Signature of Bidder Company Seal

SCHEDULE – VII LIST OF MAINTENANCE TOOLS AND TACKLES

The bidder shall give below a list of special maintenance tools and tackles offered by him and included in the prices quoted by him.

i. In case any additional tools & tackles is required by the contractor for O & M but not included in the above will be supplied by the contractor free of cost to the employer.

ii. The contractor shall hand over all the maintenance tools & tackles in good condition to the employer at the time of handing over the works on expiry of O & M Contract of 1 years.

iii. The Contractor shall keep Employer informed time to time about the usages of Tools and Tackles.

Signature of Bidder Company Seal

SCHEDULE- VIII

MANPOWER KEY PERSONNEL

The technical qualification and experience of key staff will form an important part of the evaluation process. A CV should be attached for each of the staff categories with areas of responsibilities as follows:

During Construction Period

Site-in-charge (Civil) Site-in-charge (Mechanical) Site-in-Charge (E & I) Planning Engineer

The resume for each key person available to be assigned to the project should indicate the following information:

1. Proposed Position
2. Name
3. Date of Birth
4. Nationality
5. Education
6. Language Capability
7. Experience

Signature of Bidder

SCHEDULE- IX EQUIPMENT SPECIFICATIONS

I. DATASHEET FOR PROCESS EQUIPMENTS

Sr No	Description	Qty	MOC	Capacity
1.	Oil & Grease Trap	01	RCC	
2.	Collection Tank (Existing)	01	RCC	
3.	UASB	01	MSEP	
4.	Pre Aeration Tank	01	MSEP	
5.	Aeration Tank	01	MSEP	
6.	Settling Tank	01	MSEP	
7.	Intermediate Tank	01	MSEP	
8.	Final Storage Tank	01	Syntex	
9.	Foundations	01 Set	PCC	

Signature of Bidder

Company Seal

III. **INTERCONNECTING PIPING**

(Bidder to furnish details for all pipes considered for ETP)

Sr. No.		
1.	Connecting Structures (From - To)	
2.	Type of fluid handled	
3.	Whether above/below water	
4.	Size (mm NB)	
5.	Material of Construction	

Note: To be provided separately for each pipe.

Signature of Bidder **Company Seal**

IV. GATES & VALVES Bidder to furnish details of all types of valves considered for ETP)

Sr.no.		
1	Location	
2	Type	
3	Size (mmNB):	
4	Quantity (Nos.)	
5	Material of Construction	
6	Make	

Signature of Bidder Company Seal

V. DATASHEET FOR ELECTRICAL ITEMS

A	**MCC**	
1.	**General**	
a.	Manufacturer / type	
b.	Whether single front or double front	
c.	Fully draw out semi-draw out/ fixed type	
d.	Bus Bar Material (Al/Cu) continuous rating , A	
2.	**Circuit Breaker**	
a.	Manufacturer / type	
b.	Rated Voltage , V	
c.	Rated current for various circuit breakers Normal, A De-rating factor for site conditions, A When installed within cubicles, A	
d.	Method of closing Normal Emergency	
e.	Type of closing mechanism	
f.	Normal ratting of closing mechanism (VAV)	
g.	Type of tripping mechanism	
h.	Normal rate of tripping mechanism (VAV)	
i.	Spring changing motor details output rating (KW) rated Voltage(V) spring charging time (sec)	
3.	**Isolating switches**	
a.	Manufacturer Type	
b.	No. of poles Rated voltage, V	
c.	Rated continuous current, A Manufacturer	
4.	**FUSES (FOR PT'S)**	
a.	Manufacturer	
b.	Rated voltage & current , V	
5.	**Motor Contactors**	
a.	Manufacturer	
b.	Type	
c.	Utilization Category	

6. TYPE OF PUMP

d.	No. of poles	
e.	Rated Voltage for main contacts	
f.	Rated voltage of coil, V	

g.	Rated voltage of auxiliary contacts, V	
h.	Rated (thermal) current, A	
i.	Rated duty	
j.	Rated making capacity, KA (rms)	
B	**LIGHTING FIXTURES**	
a.	Manufacturer/ type	
b.	Nominal working voltage, V	
c.	Power loss per ballast at nominal working voltage and frequency, W	
d.	Temperature within fixture housing (°C)	
e.	Guaranteed maximum hot spot temperature of ballast case under site conditions (°C)	
f.	Average total light output per fixture as percentage of combined lamp light output at nominal working voltage and	
C	**POWER & CONTROL CABLES**	
1.	**33 kV** or **3.3 kV, Earthed Grade Power Cables**	
a.	Manufacturer	
b.	Type	
c.	Rated Voltage, V	
d.	Continuous current rating with cable laid in air under specified ambient temperature for specified maximum conductor temperature, A	
e.	Specify various applicable Derating factors	
2.	**1100V Grade Power Cables**	
a.	Manufacturer	
b.	Type	
c.	Rated Voltage, V	
d.	Continuous current rating with cable laid in air under	
e.	Specify various applicable Derating factors	
3.	**1100V Grade Power Cables**	
a. b.	Manufacturer Type	
c.	Rated Voltage, V	
d.	Conductor	
e.	Material	
f.	Cross section, mm2	
g.	No. of dia. of strands	

VI. DATA SHEETS FOR INSTRUMENTATION

Sr. No	DESCRIPTION	VALUE
A	**PRESSURE GAUGE**	
1	**GENERAL**	
A	Tag No.	
B	Quantity	
C	Service	
D	Type	
E	Range	
F	Pressure (Nor./ Max.) Kg/ Cm g	
G	Temperature (Nor./ Max.) °C	
H	Case material	
I	Bezel Gasket	
J	Zero Adjustment	
1	Window material	
M	Accuracy	
N	Below Out Protection	
0	Over Range Protection	
2	**DIAL**	
A	Size	
B	Color	
3	**ELEMENT**	
A	Sensor	
B	Sensor material	
C	Movement material	
4	**CONNECTION**	
A	Gauge End Connection	
B	Connection Location	
C	Process Connection	
D	Rating Connection	
5	**ACCESSORIES**	
A	Snubber/ Syphon	
B	Snubber/ Syphon Conn.	
C	Snubber/ Syphon material	
6	**DIAPHRAGM SEAL**	
A	Primary Element	
B	Primary Element Material	
c	Other Wetted part	
D	Upper Body material	
e	Lower Body material	

f	Seal Fluid	
7	**REMARKS**	
a	Enclosure Protection	
b	Mounting	
c	Area Classification	
d	Ambient Temp	
B	**Ultrasonic flow meter**	
1	**GENERAL**	
a	Tag No	
b	Meter Size	
c	Quantity	
d	Accuracy	
2	**DESIGN DATA**	
a	Fluid	
b	Press. (Nor./ Max) Kg/ Cm2g	
c	Temp. (Nor/ Max) ° C	
d	Flow Rate (Nor/ Max) m3/ hr	
e	Velocity m/sec	
f	Range m3/ hr	
g	SP. GR.	
h	Viscosity CP	
i	Min. Conductivity S/Cm	
3.	**MATERIAL**	
a	Body	
b	Tube	
c	Electrode	
d	Liner	
e	Grounding Ring	

SCHEDULE- X EFFLUENT TREATMENT PLANT - OPERATING DETAILS

Sr. no.	ITEM	UNIT	VALUE
I.	**Electrical Loads**		
1	Total connected load	KVA	
2	Maximum running load	KW	
3	Average running load	KW	
4	Average power factor		
5	Daily average power requirement	KWH/day	
6	Annual average power requirement	KWH/year	
II.	**Chemical Usage**		
1	Average dose for Chlorine	mg/1	
2	Maximum dose for Chlorine	mg/1	
3	Average dose for Dewatering Polyelectrolyte	mg/1	
4	Maximum dose for Dewatering Polyelectrolyte	mg/1	

SCHEDULE - XI

FORMAT FOR ELECTRICAL LOAD LIST & POWER CONSUMPTION

s.n	Description of Equipment	Eff. %	Calculated KW	Actual KW	Working KW				Standby KW		Total KW		Average Operation hrs/day	Energy consumed BKWH /day	Energy consumed BKWH / year
					No. of Motors	Total KW	Eff. of Motor	Absorbed Power BKW	No. of Motor	Total KW	No. of Motor	Total KW			
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															

	Box, Oil Seals for set of Bearing Housing		
6	**11 kV Switchgear**		
	Bus bar support insulator	No.	1
	Shunt trip coil	No.	1
	Closing Coil	No.	1
	Indicating lamp assembly complete with series resistors	No.	1
	Indicating Lamps	No.	1
	Red, Green and Amber cover for indicating lamps	No. each	1
	Primary, secondary fuses for VTS	No. each	1
	Vacuum Bottles	No.	1

7	**415 V Switchgear**		
	CB Closing Coil	No.	1

	CB Trip Coil	No.	1
	CB Arching Contacts	Set	1
	Indicating Lamp assembly complete with series resistors	No.	5
	Indicating Lamps	No.	5
	Red, Green and Amber cover for indicating lamps	No. each	5
	Coils for each rating of motor starters	No. each	1
	HRC fuses of each rating	No. each	6

List of Chemical required for one year O&M

S.N	Name of Chemicals	Dosing Rate	Quality	Quantity Kg/ Month	Quantity per Annum
1	H202	1.5 PPM	30% solution	150.0 kg	1800.0 kg
2	Activated Carbon	One Time	600 Iodine value	200 kg	200 kg
3	Sand	One Time	--	300 kg	300 kg

NATIONAL TEXTILE CORPORATION LTD.,(WESTERN REGION)
NTC HOUSE, 15, N.M. MARG,
BALLARD ESTATE,
MUMBAI–400 001
TEL NO. 022-22686600,
FAX NO.022-22686631.
WEBSITE: www.ntcltd.org

TENDER DOCUMENT (FINANCIAL BID)

Construction,Fabrication,Testing,Installation & Commissioning of Sizing Waste Collection System (10 KLD Effluent Treatment Plant) at Finlay Mills , Achalpur

FOR

FINLAY MILLS,

ACHALPUR (MAHARASHTRA)

PIN CODE-444805

Phone No. 07223-250616/613.

Fax No. 07223-250612

Email : mmfinlayachalpur@gmail.com

gmfinlayachalpur@gmail.com

NATIONAL TEXTILE CORPORATION LTD (WR)

FINANCIAL BID

(BILL OF QUANTITY)

Sr. No.	Description	Qty.	Basic Rate per unit.).	Total value in Rs.
A	**Design, Fabrication, Construction, Installation, Testing & Commissioning of Sizing Waste Collection System (10 KLD Effluent Treatment Plant) at Finlay Mills , Achalpur**	1		
A	**Sub Total**			
B	**other levies**			
1	Packing & forwarding charges			
2	Transportation charges			
3	Transit insurance			
4	Others if any			
B	**Sub Total (1 to 4)**			
C	**MATERIAL COST (A + B)**			
D	**TAX – GST on MATERIAL COST**			
E	**G. TOTAL (MATERIAL COST)**			
F	1 Supervision charges for installation and commissioning			
	2 **TAX – GST on Supervision charges**.			
F	**Sub Total (F(1+2))**			
G	**GRAND TOTAL (E + F)**			

Total quoted value in Words. (Rs._____)

Signature and Stamp of Bidder