



INSTITUTE OF NANO SCIENCE AND TECHNOLOGY

Habitat Centre, Sector-64, Phase-X, Mohali-160062

Tender document for the Construction of 100KLD Sewage Treatment Plant for INST at Sector-81, Knowledge City, Mohali (Pb.)

Percentage Rate Tender for Works

PART A

Technical / Eligibility Bid

Notice Inviting Tender, Eligibility Criteria, General Conditions of Contract

PART B

Particular Specifications, Special Conditions of Contract,

Additional Conditions, Approved makes & Tender Drawings

PART C

Financial Bid

January 2019

Name of work: C/o Sewage Treatment Plant of 100KLD for INST Campus at Sector- 81, Knowledge City, Mohali

PART-A
TECHNICAL/ELIGIBILITY BID
NOTICE INVITING TENDER, ELIGIBILITY CRITERIA,
GENERAL CONDITIONS OF CONTRACT

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PART B For special conditions of contract, Additional conditions, particular specifications

Approved makes & tender drawings and

PART C for financial bid

INSTITUTE OF NANO SCIENCE & TECHNOLOGY

Habitat Centre, Sector-64, Phase-X, Mohali-160062

1.0. Press Notice

NOTICE INVITING TENDER

The Director, Institute of Nano Science & Technology, Mohali (INST), on behalf of Institute of Nano Science & Technology Mohali invites percentage rate bids from competent specialized agencies having experience in installation and commissioning sewage treatment plant of for the work of :

NIT NO: 3/INST/2018-19

Name of work: Construction of 100 KLD Sewage Treatment Plant at INST Campus at Sector-81, Knowledge City, Mohali (Punjab)-140306

Estimated cost put to tender	: ₹1, 94, 98,974/-
Earnest Money	: ₹3,90,000/-.
Period of Completion	: 05 (Five) Months (150 days)
Pre Bid conference on	: 11-02-2019 at INST

Last Date and Time for Submission of Tender : **On or before 26-02-2019 till 3.00 PM**

For NIT/Tender Documents Details/downloads or any other correction /amendments /modification / extension till the last date of submission of bids, can be downloaded free of cost from the website: www.inst.ac.in or www.eprocure.gov.in

2.0. PART-A: TECHNICAL/ELIGIBILITY BID

2.1 NIT/TENDER DOCUMENT

NIT

N.I.T.No.: 03/INST/2018-19

Name of work	Construction of 100 KLD Sewage Treatment Plant at INST Campus at Sector-81, Knowledge City, Mohali (Punjab)-140306
Estimated Cost	₹ 1,94,98,974/-
Period of Completion	05 (Five) Months
Earnest Money Deposit:	₹ 3,90,000/-
Performance Guarantee	5% of tendered value of schedule
Security Deposit	2.5% of tendered value
Tender to be uploaded on website	On 31-01-2019
Last Date of submission of pre-bid queries in excel sheet by e-mail only.	on 08-02-2019 Up to 5:00 PM
Date of Pre bid Meeting & Venue	on 11-02-2019 at 3:00 PM at INST Mohali
Uploading Pre bid Clarification/ amendments, if any	On 15-02-2019
Last Date and time of submission of Tender	26-02-2019 up to 3:00 PM INST shall not be responsible for any postal delay
Date and time of opening of Technical/Eligibility bid/Financial Bid	26-02-2019 at 3:30 PM
Validity of offer	60 days from the date of opening of Tender

Certified that this NIT contains Part - A from page 1 to 44, Part – B from page 1 to 56

, and Part - C from page 1 to 16.

(SAA)

(TCE)

This NIT amounting to Rs. 1,94,98,974/- (Rupees One Crore Ninety Four Lakh Ninety Eight Thousand Nine Hundred Seventy Four Only) is hereby approved.

Director,

(Institute of Nano Science & Technology)

2.2. INFORMATION AND INSTRUCTIONS FOR BIDDERS FOR TENDERING FORMING PART OF BID DOCUMENT.

The Director, Institute of Nano Science & Technology, Mohali (INST) invites percentage rate bids from competent specialized agencies having experience in installation and commissioning sewage treatment plant for the work of :

S. No.	NIT No.	Name of work & Location	4 Estimated cost put to Tender	5 Earnest Money	6 Period of Completion	7 Last date & time of submission of tender	8 Period during which EMD, and other Documents shall be submitted	9 Time and date of opening of tender
1	2	3	4	5	6	7	8	9
1	03/INST/2018-19	C/o Sewage Treatment Plant of 100 KLD for INST Campus at Sector-81, Knowledge City, Mohali.	₹1,94,98,974/-	₹ 3,90,000/-	150 days	26.02.2019	Up to 03:00 PM on 26.02.2019	03.30 PM on 26.02.2019

The bid document consisting of plans, specifications, the schedule of quantities of various types of items to be executed and the set of terms and conditions of the contract to be complied with and other necessary documents can be seen and downloaded from website www.inst.ac.in or www.eprocure.gov.in free of cost.

Three similar works each of value not less than ₹78.00 lakh or two similar work of aggregate value not less than ₹ 117.00 lakh or one similar work of value not less than ₹.156.00 lakh in last 7 years ending upto Previous day of last date of submission of tender. Similar works means the work of Sewage Treatment plant including Sewer lines”.

The intending bidder must read the terms and conditions of CPWD-6 carefully. He should only submit his bid if he considers himself eligible and he is in possession of all the documents required.

Information and Instructions for bidders posted on website shall form part of bid document.

Pre-Bid conference shall be held on 11.02.2019 at 3:00 PM at Institute of Nano Science and Technology, Habitat Centre, Sector-64, Phase-X, Mohali-160062 to clear the doubts of intending bidders, if any. The tenderers are requested to submit their questions/queries in writing (also in editable excel format) to the Director, Institute of Nano Science and Technology, Mohali and email to Niranjn.singh@inst.ac.in /Niranjn.singh1952@gmail.com up to 5:00 PM on 08.02.2019.

The EMD in the form of Demand Draft or Pay Order or Banker’s Cheque or Fixed Deposit Receipts and Bank Guarantee of any scheduled Bank towards EMD in favour of Director, INST, Mohali, be submitted along with the tender documents

List of Documents to be submitted along with the tender:

Treasury Challan/ Demand Draft/ Pay order or Banker's Cheque/ Deposit at call receipt/FDR/ Bank Guarantee of any scheduled Bank against EMD.

Enlistment Order of the Contractor.

Certificate of Registration for GST.

Copy of work experience

Certificates as specialized agency.

Integrity Pact of the bid document shall be signed between Authorized Signatory /Executive Engineer and the successful bidder after acceptance of bid.

It will be mandatory to constitute Dispute Redressal Committee (DRC) & contractor or INST can only seek arbitration if not satisfied with the decision of DRC.

If the contractor is found ineligible after opening of bids, his bid shall become invalid.

If any discrepancy is noticed between the documents at the time of submission of bid by the lowest contractor the bid shall become invalid.

Receipt of deposition of original EMD

(Receipt No...../ Date.....)

1	Name of work	C/o Sewage Treatment Plant of 100KLD for INST Campus at Sector-81, Knowledge City, Mohali.
2	NIT No	03/INST/2018-19
3	Estimated Cost	₹ 1,94,98,974/-
4	Amount of Earnest Money Deposit	₹ 3,90,000/-
5	Last date of submission of bid	Upto 3:00 PM on 26.02.2019

(# To be filled by EMD receiving Officer)

1	Name of Contactor		
2	Form of EMD		
3	Amount Earnest Money Deposit		
4	Date of submission of EMD		

Signature, Name and Designation of EMD

Receiving officer (FO. INST)

Along with Office Stamp

CPWD-6 FOR TENDERING

Percentage rate bids are invited on behalf of Institute of Nano Science and Technology, Mohali. Percentage rate bids from competent specialized agencies having experience in installation and commissioning sewage treatment plant for the work of “C/o Sewage Treatment Plant of 100 KLD for INST Campus at Sector-81, Knowledge City, Mohali.”

The enlistment of the contractors should be valid on the last date of submission of bids.

In case the last date of submission of tender is extended, the enlistment of contractor should be valid on the original date of submission of bids.

- 1.1 The work is estimated to cost ₹ 1, 94, 98,974/-. This estimate, however, is given merely as a rough guide.
- 1.2 CPWD & from specialized firm dealing in Sewage Treatment Plant contractors only are eligible to submit the bids.
 - 1.2.1 Conditions for Specialized Agencies as well as eligible CPWD contractors:

Three similar works each of value not less than ₹78.00 lakh or two similar work of aggregate value not less than ₹ 117.00 lakh or one similar work of value not less than ₹156.00 lakh in last 7 years ending upto Previous day of last date of submission of tender. Similar works means the work of Sewage Treatment plant including Sewer lines”
2. Agreement shall be drawn with the successful bidders on prescribed Form No. CPWD 7 (or other Standard Form as mentioned) which is available as a Govt. of India Publication and also available on website. Bidders shall quote his rates as per various terms and conditions of the said form which will form part of the agreement.
3. The time allowed for carrying out the work will be **150 days** from the date of start as defined in schedule ‘F’ or from the first date of handing over of the site, whichever is later, in accordance with the phasing, if any, indicated in the bid documents.
4. (i). The site for the work is available.
(ii). The architectural & structural drawing shall be made available in phased manner as per requirement of the same as per approved programme of completion submitted by the contractor after award of the work.
5. The bid document consisting of plans, specifications, the schedule of quantities of various types of items to be executed and the set of terms and conditions of the contract to be complied with and other necessary documents except Standard General Conditions of Contract Form can be seen from website www.eprocure.gov.in or www.inst.ac.in free of cost.
6. When tenders are invited in three stage system and if it is desired to submit revised financial bid then it shall be mandatory to submit revised financial bid. If not submitted then the bid submitted earlier shall become invalid.
7. Earnest Money ₹ 3,90,000/- can be paid in the form of Demand Draft or Pay order or Banker’s Cheque or Fixed Deposit Receipt (drawn in favour Director, INST, Mohali payable at Mohali) along with Bank Guarantee of any Scheduled Bank wherever applicable in accordance with the Form annexed hereto

having validity for 6 months or more from the last date of receipt of tenders shall be submitted with the tender.

A part of earnest money is acceptable in the form of bank guarantee also. In such case, minimum 50% of earnest money **or ₹ 20 lakh**, whichever is less, shall have to be deposited in shape prescribed above, and balance may be deposited in shape of Bank Guarantee of any schedule bank having validity for 6 months or more from the last date of receipt of bids.

The original EMD shall be deposited by the bidder before opening of Eligibility/ Technical Bid in the office of the **Director, Institute of Nano Science and Technology, Mohali,** failing which the tender shall be rejected.

The bank details of INST are as follows:

- 1. Account Name : Director, INST Mohali**
- 2. Name of Bank : Canara Bank**
- 3. Bank Address : Sector-34A, Chandigarh-160022**
- 4. Type of Account : Current Account**
- 5. Account No. : 2452201001102**
- 6. IFSC Code : CNRB0002452**
- 7. MICR Code : 160015003**

Copy of Enlistment Order and certificate of work experience and other documents as specified in the press notice shall be submitted with the tender. However, certified copy of all the documents as specified in press notice shall have to be submitted by the lowest bidder only within a week physically in the office of the tender opening authority.

Bid/ tender documents submitted by intending bidders shall be opened only of those bidders, whose original EMD deposited along with the tender and other documents placed envelope are found in order.

The bid submitted shall be opened at **03:30 PM on 26.02.2019.**

8. The bid/ tender submitted shall become invalid if:

The bidder is found ineligible.

The bidder does not submit GST registration as stipulated in the bid document including the EMD.

If any discrepancy is noticed between the documents submitted physically by the lowest tenderer with the tender.

The lowest bidder does not deposit physical EMD within a week of opening of tender

9. The contractor whose tender is accepted will be required to furnish performance guarantee of 5% (Five Percent) of the tendered amount within the period specified in Schedule F. This guarantee shall be in the form of cash (in case guarantee amount is less than ₹ 10000/-) or Deposit at Call receipt of any scheduled bank/Banker's cheque of any scheduled bank/Demand Draft of any scheduled bank/Pay order of any Scheduled Bank (in case guarantee amount is less than ₹ 1,00,000/-) or Government Securities or Fixed Deposit Receipts or Guarantee Bonds of any Scheduled Bank or the State Bank of India in accordance with the prescribed form. In case the contractor fails to deposit the said performance guarantee within the

period as indicated in Schedule 'F', including the extended period if any, the Earnest Money deposited by the contractor shall be forfeited automatically without any notice to the contractor. **The Earnest Money deposited along with tender shall be returned after receiving the aforesaid performance guarantee.**

10. Intending Bidders are advised to inspect and examine the site and its surroundings and satisfy themselves before submitting their bids as to the nature of the ground and sub-soil (so far as is practicable), the form and nature of the site, the means of access to the site, the accommodation they may require and in general shall themselves obtain all necessary information as to risks, contingencies and other circumstances which may influence or affect their bid. A bidder shall be deemed to have full knowledge of the site whether he inspects it or not and no extra charge consequent on any misunderstanding or otherwise shall be allowed. The bidders shall be responsible for arranging and maintaining at his own cost all materials, tools & plants, water, electricity access, facilities for workers and all other services required for executing the work unless otherwise specifically provided for in the contract documents. Submission of a bid by a bidders implies that he has read this notice and all other contract documents and has made himself aware of the scope and specifications of the work to be done and of conditions and rates at which stores, tools and plant, etc. will be issued to him by the Government and local conditions and other factors having a bearing on the execution of the work.
11. The competent authority on behalf of the President of India does not bind itself to accept the lowest or any other bid and reserves to itself the authority to reject any or all the bids received without the assignment of any reason. All bids in which any of the prescribed condition is not fulfilled or any condition including that of conditional rebate is put forth by the bidders shall be summarily rejected.

Canvassing whether directly or indirectly, in connection with bidders is strictly prohibited and the bids submitted by the contractors who resort to canvassing will be liable for rejection.
13. The competent authority on behalf of President of India reserves to himself the right of accepting the whole or any part of the bid and the bidders shall be bound to perform the same at the rate quoted
14. The contractor shall not be permitted to bid for works in the INST / CPWD Circle (Division in case of contractors of Horticulture/ Nursery category) responsible for award and execution of contracts, in which his near relative is posted a Divisional Accountant or as an officer in any capacity between the grades of Superintending Engineer and Junior Engineer (both inclusive). He shall also intimate the names of persons who are working with him in any capacity or are subsequently employed by him and who are near relatives to any gazetted officer in the Central Public Works Department or in the Ministry of Urban Development. Any breach of this condition by the contractor would render him liable to be removed from the approved list of contractors of this Department.
15. No Engineer of Gazetted Rank or other Gazetted Officer employed in Engineering or Administrative duties in an Engineering Department of the Government of India is allowed to work as a contractor for a period of one year after his retirement from Government service, without the prior permission of the Government of India in writing. This contract is liable to be cancelled if either the contractor or any of his employees is found any time to be such a person who had not obtained the permission of the Government of India as aforesaid before submission of the bid or before submission of the bid or engagement in the contractor's service.
16. The bid for the works shall remain open for acceptance for a period of **Sixty (60) days** from the date of opening of financial bids, if any bidders withdraws his bid before the said period or issue of letter of acceptance, whichever is earlier, or makes any modifications in the terms and conditions of the bid which are not acceptable to the department, then the Government shall, without prejudice to any other right or

remedy, be at liberty to forfeit 50% of the said earnest money as aforesaid. Further the bidders shall not be allowed to participate in the re-bidding process of the work.

17. This notice inviting Bid shall form a part of the contract document. The successful bidders/ contractor, on acceptance of his bid by the Accepting Authority shall within 15 days from the stipulated date of start of the work, sign the contract consisting of:
- a) The Notice Inviting Bid, all the documents including additional conditions, specifications and drawings, if any, forming part of the bid as uploaded at the time of invitation of bid and the rates quoted online at the time of submission of bid and acceptance thereof together with any correspondence leading thereto
 - b) Standard C.P.W.D. Form 7/8 or other Standard C.P.W.D. Form as applicable.
 - c) Standard General Condition of Contract for CPWD 2014 (amended upto last date of receipt of tender).

Director, INST, Mohali

GOVERNMENT OF INDIA

INSTITUTE OF NANO SCIENCE, PUNJAB.

STATE:

Punjab

PERCENTAGE RATE TENDER & CONTRACT FOR WORKS

Tender for the work of: **C/o Sewage Treatment Plant of 100 KLD for INST Campus at Sector-81, Knowledge City, Mohali (Punjab)** to be submitted the by **3:00 PM on 26.02.2019** to the **Director, INST, Mohali** to be opened in presence of tenderers who may be present at 3:30 on **26.02.2019** in the office of Director, INST, Mohali.

TENDER

I/We have read and examined the Notice Inviting Tender, Schedule A, B, C, D, E & F, Specifications applicable, Drawings & Designs, General Rules and Directions, Conditions of Contract, Clauses of Contract, Special Conditions, Schedule of Rate and other documents and Rules referred to in the conditions of contract and all other contents in the tender document for the work.

I/We hereby tender for the execution of the work specified for the Director, INST, Mohali within the time specified in Schedule 'F', viz. Schedule of Quantities and in accordance in all respects with the Specifications, Designs, Drawings and instructions in writing referred to in Rule-1 of General Rules and Directions and in Clause 11 of the Conditions of Contract and with such materials as are provided for, by and in respects in accordance with, such conditions so far as applicable.

We agree to keep the tender open for **60 Sixty days** from the date of opening of tender and not to make any modifications in its terms and conditions.

A sum of **₹ 3,90,000/-** is hereby forwarded in Cash/ Receipt Treasury Challan/ Deposit at Call Receipt of a Scheduled Bank/ FDR of a Scheduled Bank/ Demand Draft of a Scheduled Bank/ Bank guarantee issued by a scheduled bank as earnest money. If I/we fail to furnish the prescribed Performance Guarantee within prescribed period, I/we agree that the said **Director, INST, Mohali** or his successor in office shall without prejudice to any other right or remedy be at liberty to forfeit the said Earnest Money absolutely. Further, if I/we fail to commence work as specified, I/we agree that **Director, INST, Mohali** or his successors in office shall, without prejudice to any other right or remedy available in law, be at liberty to forfeit the said **Performance Guarantee** absolutely. The said **Performance Guarantee** shall be a **guarantee** to execute all the works referred to in the tender documents upon the terms and conditions contained or referred to those in excess of that limit at the rates to be determined in accordance with the provision contained in Clause 12.2 & 12.3 of the tender form. Further, **I/We agree that in case of forfeiture of earnest money or Performance Guarantee as aforesaid, I/We shall be debarred for participation in the re-tendering process of the work.**

I/ We undertake and confirm that eligible similar work(s) has/ have not been got executed through another contractor on back to back basis. Further that, if such a violation comes to the notice of INST, Mohali, then I/we shall be debarred for tendering in INST, Mohali in future forever. Also, if such a violation comes to the notice of INST, Mohali before date of start of work, the Engineer-in-Charge shall be free to forfeit the entire amount of Earnest Money Deposit/ Performance Guarantee

I/We hereby declare that I/we shall treat the tender documents, drawings and other records connected with the work as Secret / Confidential documents and shall not communicate information / derived therefrom to any person

PERFORMA OF SCHEDULES (A TO F)

SCHEDULE 'A'

Schedule of quantities- As per Part –C of Page – 1-16

SCHEDULE 'B'

Schedule of materials to be issued to the contractor.

S. No.	Description of item.	Quantity.	Rate in figures & words at which the material will be charged to the contractor	Place of issue
(1)	(2)	(3)	(4)	(5)
NIL				

SCHEDULE 'C'

Tools and plants to be hired to the contractor

S.No.	Description.	Hire charges per day	Place of Issue
NIL			

SCHEDULE 'D'

Extra schedule for specific requirements/ documents for the work, if any.

- a) Special Conditions - Part –B, Page No – 3 to 24
- b) Particular/ Technical Specifications. - Part - B, Page No – 25 to 55
- c) Tender drawings List - Part –B—Page No. 56
- d) Proforma of Guarantee Certificate. - Part –A- Page No 32-33

SCHEDULE 'E'

Reference to General Conditions of Contract: **General Conditions of Contract 2014 with amendments issued up to the last date of submission of tender.**

- 1.1 Name of work : C/o Sewage Treatment Plant of 100 KLD for INST Campus at Sector-81, Knowledge City, Mohali.
- 1.2 Estimated Cost of work : ₹ 1, 94, 98,974/-
- 1.3 Earnest Money : ₹ 3,90,000/- (To be returned after receiving performance guarantee)
- 1.4 Performance Guarantee 5% of tendered value
- 1.5 Security Deposit 2.5% of tendered value

SCHEDULE 'F':

General Rules & Directions:

Officer Inviting Tender : **Director, INST, Mohali.**

Maximum percentage for quantity of items
work to be executed beyond which rates
are to be determined in accordance with

Clauses 12.2 & 12.3 Refer Clause-12 below

Definitions:

- 2(i) Engineer-in-Charge: **Consultant (Engg), INST**
- 2(ii) Accepting Authority: **Director, INST, Mohali (Pb)**
- 2(iii) Percentage on cost of materials and labour to cover all overheads and profits 15%
- 2(iv) Standard Schedule of Rates: Delhi Schedule of Rates 2016 with correction slips upto date of receipt of tender.
- 2(v) Department : Institute of Nano Science and Technology, Mohali.

2(vi) Standard CPWD Contract Form : Form GCC 2014, CPWD Form 7 modified & duly amended upto date of submission of tender.

Clause-1:

- (i) Time allowed for submission of performance guarantee after date of issue of letter of acceptance 10 days
- (ii) Maximum allowable extension with late fee @ 0.10% per day of performance guarantee amount beyond the period as provided in (i) above 1 to 5 days.

Clause-2: I. Authority for fixing compensation **Director, INST, Mohali**

Under Clause-2:.

- II.** Whether clause-2A shall be applicable. Not, Applicable

Clause-5: Number of days from the date of issue of letter of acceptable for reckoning date of start. 15 days

Mile Stone Table of Milestones (Refer Part–A, Page No.-26)

Time allowed for execution of work : **150 days**

Authority to decide

- i. Extension of time Director, INST, Mohali (Pb.)
- ii. Re-scheduling of Mile stone Director, INST, Mohali (Pb.)
- iii. Shifting of Date of Start in case of delay in handing over of site Director, INST, Mohali (Pb)

Clause-6, 6A:

Clause applicable- (6 or 6A): Clause-6A (Computerized Measurement to be submitted by agency)

Clause-7: Gross work to be done together
with net payment / adjustment of
advances for material collected, **₹. 32.00 Lakh**
for being eligible to interim payment

Clause-10A:
List of testing equipment to be
provided by the contractor at site lab. Refer Part –A, Page No.- 27-29

Clause-10-B (ii):
Whether clause 10-B (ii) shall be applicable **Yes**

Clause-10C:
Component of labour expressed as percent of
total value of work. **Not Applicable**

Clause-10 CA:

Not Applicable

S r . N o .	Materials covered under this clause	Nearest Materials (other than cement, reinforcement bars and structural steel) for which All India Wholesale Price Index to be followed:	Base Price and its corresponding period of all the materials covered under clause 10 CA
			*Base price (in ₹) per MT
1	Cement: (i) OPC (ii) PPC	----Nil----	₹ 4,453/- per MT ₹ 4,140/- per MT
2	TMT Reinforcement bars (Primary Producers)	----Nil----	₹ 41,833/- per MT
3	Structural Steel	----Nil----	₹ 46,581/- per MT

(* **Note:-** The Base Price rates taken are ex-stockyard (exclusive of GST) issued vide No.CE(NZ-1)/SE(P)/EE(P)/10CA/97 dated 16-01-2019.).

Clause-10-CC:

Clause 10CC to be applicable in contracts

Not applicable

with stipulated period of completion

exceeding the period shown in the next column

Schedule of component of other materials, Labour, POL etc. for price escalation:

Component of civil construction materials (except materials covered under clause 10CA) expressed as percent of total value of work.

Component of labour expressed as percent of total value of work.

Component of P.O.L. expressed as percent of total value of work.

} Not Applicable

Clause-11: Specifications to be followed for : C.P.W.D. Specifications 2009 Vo. I & II

execution of work

with upto date correction slips till receipt of tender.

Clause-12:

Type of Work

Project and original works

12.2 & 12.3

Deviation limit beyond which

clause 12.2 & 12.3 shall apply

30%

for Building work.

12.5(i)

Deviation limit beyond which

clause 12.2 & 12.3 shall apply

100%

for foundation works

(except earth work)

(ii)

Deviation limit for items in earth

100%

work subhead of DSR or related items

Clause-16:

Competent Authority for

deciding reduced rates.

Director, INST, Mohali

Clause-17:

Defect Liability Period	12 Months (As per detail given in Part-B on page no. 11)
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Clause-18: List of mandatory machinery tools
& Plants to be deployed by the
Contractor at site

As per Annexure -II

Clause-25: Dispute Redressal Committee (DRC)

Constitution of Dispute Redressal Committee (DRC)	Competent Authority to appoint DRC.
Constitution of DRC shall be uploaded in due course	Director, INST, Mohali

Clause-36 (i)

S r . N o	Minimum Qualification of Technical Representative	Discipline	Designation (Principal Technical/ Technical Representative)	Minimum Experience	Number	Rate at which recovery shall be made from contractor in the event of non-deployment.	
						Figures	Words
1	Graduate Engineer	Civil	Principal Technical representative	5 Years	1 No	₹ 25,000/- per month	₹ Twenty Five thousand only per month
2	Graduate/Diploma Engineer	Civil	Project/Site Engineer	4/3 Years	1 No	₹ 20,000/- per month	₹ Twenty thousand only per month

Note:

1. Foremen, Supervisors and Safety Stewards with basic qualification and SHE certificate as per requirement and instruction of Engineer in Charge at site.
2. The recovery, if any, for non-deployment of project manager shall be done from date of start of the project and the recoveries for non-deployment of other staff including technical representatives for E&M works starts 'After 60 days' or 'As per site requirement to be mutually decided in consultation with the EIC', whichever is earlier.
3. Assistant Engineers retired from Government services who are holding Diploma will be treated at par with Graduate Engineers. Diploma holder with minimum 10 year relevant experience with a reputed construction company can be treated at par with Graduate Engineers for the purpose of such deployment subject to the condition that such diploma holders should not exceed 50% of requirement of degree engineers.
4. The contractor shall submit a certificate of employment of the technical representative(s) (in the form of copy of Form -16 or CPF deduction issued to the Engineers employed by him) along with every account bill/final bill and shall produce evidence if at any times so required by the Engineer-in-charge.

5. The CV of technical persons shall be presented to Engineer in charge before deployment in above work for approval. Once inducted they will not be transferred or removed without the permission on Engineer in Charge.

Clause-42:

- i) a) Schedule/ Statement for determining theoretical quantity of cement & bitumen Delhi Schedule of Rates 2016 with correction slips issued up to the date of receipt of tender and as per nomenclature of the items.
- ii) Variations permissible on theoretical quantities.
- a) Cement 2% plus/ minus.
- b) Steel Reinforcement and structure steel sections for each diameter, section and category. 2% plus/ minus.
- c) Bitumen for all work. 2.5% Plus only & Nil on minus side.
- d) All other materials Nil

RECOVERY RATES FOR QUANTITIES BEYOND PERMISSIBLE VARIATION

Sr. No.	Description of item	Rates in figures and words at which recovery shall be made from the contractor	
		Excess beyond Permissible Variation	Less use from the permissible variation
1.	Cement:	Nil	
	(i) OPC		₹ 4,453/- per MT
	(ii) PPC		₹ 4,140/- per MT
2.	TMT Reinforcement bars	Nil	₹ 41,833/- per MT
	(i) Primary Producers		

The recovery rates as above are excluding GST & Cartage from Stock Yard to site.

TABLE OF MILE STONE (S)

Name of work: C/o Sewage Treatment Plant of 100 KLD for INST Campus at Sector-81, Knowledge City, Mohali (Pb.)

S l . N o .	Description of Milestone (Physical & Financial)	Time Allotted in days (From date of start)	Amount to be withheld in case of non-achievement of milestone (% of Tendered Amount)
1	Approval of Designs of Drawings	20 days	1.00%
2	Work upto 1/8th of the tendered amount	45 days	1.00%
3	Work upto 3/8th of the tendered amount	75 days	1.00%
4	Work upto 3/4th of the tendered amount	115 days	1.00%
5	Full Work Completed in all respect.	150 days	1.00%

SH: Sewage Treatment Plant**MECHANICAL / ELECTRICAL & PIPING WORK:**

- | | | |
|----|---|------|
| a) | On receipt of material at site | 50% |
| b) | On erection of the material at site | 70% |
| c) | On testing & commissioning of the plant | 100% |

STAGE WISE BREAKUP OF PAYMENT FOR SH II: OPERATION & MAINTENANCE:

Payment during Operation & Maintenance Period shall be made after three months. The contractor has to raise bill for the same as per the rate allotted to him.

ANNEXURE – I

ANNEXURE-I: EQUIPMENT FOR TESTING OF MATERIALS & CONCRETE AT SITE LABORATORY

All necessary equipment for conducting all necessary tests shall be provided at the site in the well furnished site laboratory by the contractor at his own cost. The site lab shall be sufficient to conduct all the tests at site as required as per mandatory requirement mentioned in the CPWD specification. It may include but not limited to the following:

Sl. No.	Equipment	Numbers (Minimum)
1.	2000 KN compression testing machine, electrical-cum-manually operated)	1
2.	Slump cone, steel plate, tamping rod, steel scale, scoop	1
3.	Vicats apparatus with Desk pot	1
4.	Megger & earth resistance tester	2
5.	Pumps and pressure gauges for hydraulic testing of pipes	2
6.	Weighing scale platform type 300 Kg capacity	1
7.	Graduated glass measuring cylinder	As per requirement
8.	Sets of sieves of 450mm internal dia for coarse aggregate [100mm, 80mm, 40mm; 20mm; 12.5mm, 10mm; 4.75mm complete with lid and pan]	2
9.	Sets of sieves of 200mm internal dia for fine aggregate [4.75mm; 2.36mm; 1.18mm; 600 microns; 300 microns & 150 micron , with lid and pan]	2
10.	Sieve Brushes and sieve shaker capable of 200mm and 300mm dia sieves , manually operated with timing switch assembly	1
11.	Cube moulds size 70mmx70mmx70mm	6
12.	Cube moulds size 150mmx150mmx150mm	24
13.	Ultrasonic Test Equipment (For concrete)	1
14.	Hot air oven temp. Range 50 ⁰ c to 300 ⁰ c- sensivity 1 degree	1
15.	Electronic balance 600gx0.1g., 10kg and 50 kg	2
16.	Physical balance weight upto 5 kg	1
17.	Digital thermometer upto 150oc	2
18.	Air Content of concrete testing machine	1
19.	Measuring jars 100ml, 200ml, 500ml	3 nos each size
20.	Gauging trowels 100mm & 200mm with wooden handle	2

Sl. No.	Equipment	Numbers (Minimum)
21.	Spatula 100mm & 200mm with long blade wooden Handle	2
22.	Vernier calipers 12" & 6" size	2 each
23.	Digital PH meter least count 0.01mm	1each
24.	Digital Micrometer least count. 0.01mm	1 each
25.	Digital paint thickness meter for steel 500 micron range	2
26.	GI tray 600x450x50mm, 450x300x40mm,300x250x40mm	2 nos each
27.	Electric Motor mixer 0.25 cum capacity	1
28.	Rebound hammer test digital rebound hammer	1
29.	Screw gauge 0.1mm-10mm, least count 0.05	4
30.	Water testing kit	2
31.	Motorized sieve shaker	1
32.	Pruning Rods 2 Kg weight length 40 cm and ramming face 25 mm ²	2
33.	Extra Bottom plates for 15 cm cube mould	10
34.	Standard Vibration Table for gauging the cubes	1
35.	Pocket concrete penetrometer 0 to 50kg/ sq.cm	1
36.	Concrete temperature measuring thermometer with Brass protection sheath 0- 100 degree centigrade	2
37.	Mortar Cube vibrator	1
38.	Dial type spring balance preferable with zero correction knob capacity 100 kgs reading to ½ kg.	1
39.	Counter scale capacity 1 kg and 10 kg	1
40.a	Iron W eight of 5 kg, 2 kg, 1 kg, 500 gm, 200 gm, 100 gm	1 each
40 .b	Standard Weights up to 2000 kg for calibration of Batching Plant at site	1 Set
41.	Brass Weight of 50 gm, 20 gm, 10 gm, 5 gm, 2 gm, 1 gm	1 each
42.	Measuring cylinder TPX or Poly propylene capacity 100 ml, 500 ml, 250 ml, 100 ml	1 each
43.	Pyrex, corning or Borosil beakers with cover capacity 500 ml, 200 ml, 50 ml	2 each
44.	Wash Bottles capacity 500 ml	3
45.	Thermometers 1-100 degree centigrade/ max. and Min/ Dry and wet with table	3

Sl. No.	Equipment	Numbers (Minimum)
46.	Set of box spanner ratchet	2
47.	Hammer 1lb& 2lb	2 each
48.	Rubber Hammer	2
49.	Hacksaw with 6 blades	2
50.	Measuring tape 3 mtrs, 5 Mtrs, 15 Mtrs, 30 Mtrs	5 Nos Each
51.	Depth gauge 20cm	3
52.	Shovels& Spade	3
53.	Steel plates 5 mm thick 75x75 cm	4
54.	Plastic or G.I. Buckets 15 ltr, 10 ltr, 5 ltr	1 each
55.	Wheel Barrow	3
56.	Floor Brushes, hair dusters, scrappers, wire brush, paint brushes, shutter steel plat oil, kerosene with stove etc.	5 each
57.	Any other equipment for site tests as outlined in BIS codes and as directed by the Engineer-in-charge.	
58.	Equipment for testing of soil compaction by Sand Replacement and Core Cutting Method.	1 set each

Note : The above list is only indicative and not exhaustive. The contractor is required to establish necessary testing facility for achieving the progress as per Milestone Schedule given in Schedule F Clause 5 and the completion of Entire Work within 5 Months' time from the date of start of work. These testing facilities shall be brought at site in advance as directed by the engineer in charge. In case of non-compliance/delay in compliance in this, a penalty @ Rs. 500/- per day will be imposed which will be recovered from the immediate next R/A Bill of the Contractor.

ANNEXURE-II

ANNEXURE-II: PLANT AND EQUIPMENT REQUIRED TO BE OWNED / TAKEN ON LEASE BY THE CONTRACTOR

S. No.	Machinery	Nos.
1	Excavator cum loader (JCB 3 D Model or equivalent)	1
2	Concrete pump(Minimum capacity 30 Cum Per hour and Head 90 M)	1
3	Boom Placer	1
4	Needle vibrators	2
5	Transit Mixers	1
6	Automatic Concrete Batching plants with silo electrically operated with DG Backup, Automatic Load Cell Weigh batching system (Minimum Capacity 10 Cu. M. per hour)	1
7	Earth Compactors	1
8	Total Stations/Auto levels	1/2
9	Electric pump/Centrifugal mono block water pump for curing and dewatering	As required on site
10	Dumpers	2
11	Plate vibrators	1
12	Bar bending machine	2
13	Bar cutting machine	2
14	Water Tanker	2
15	Mortar Mixers	1
16	Steel Shuttering	150 sqm
17	Any other machinery required for completion of the Work as per decision of Engineer-in-charge	As per requirement

Note : The above list is only indicative and not exhaustive. The contractor is required to deploy necessary equipment for achieving the progress as per Milestone Schedule given in Schedule F Clause 5 and the completion of Entire Work within 5 Months' time from the date of start of work. These resources are minimum for peak period of each activity. All plants and equipments need not to be mobilized simultaneously, plants and equipments as required as per the progress of work shall be brought at site in advance as directed by the engineer in charge.

FORM OF EARNEST MONEY DEPOSIT

(BANK GUARANTEE BOND)

WHEREAS, contractor..... (Name of contractor) (hereinafter called "the contractor") has submitted his tender dated (date) for the construction of (name of work) (hereinafter called "the Tender")

KNOW ALL PEOPLE by these presents that we (name of bank) having our registered office at (hereinafter called "the Bank") are bound unto (Name and division of Executive Engineer) (hereinafter called "the Engineer-in-Charge") in the sum of ₹ (₹ in words) for which payment well and truly to be made to the said Engineer-in-Charge the Bank binds itself, his successors and assigns by these presents. SEALED with the Common Seal of the said Bank this day of..... 20..... .

THE CONDITIONS of this obligation are:

- (1) If after tender opening the Contractor withdraws, his tender during the period of validity of tender (including extended validity of tender) specified in the Form of Tender;
- (2) If the contractor having been notified of the acceptance of his tender by the Engineer-in-Charge:
 - (a) fails or refuses to execute the Form of Agreement in accordance with the Instructions to contractor, if required; OR
 - (b) fails or refuses to furnish the Performance Guarantee, in accordance with the provisions of tender document and Instructions to contractor,

We undertake to pay to the Engineer-in-Charge either up to the above amount or part thereof upon receipt of his first written demand, without the Engineer-in-Charge having to substantiates his demand, provided that in his demand the Engineer-in-Charge will note that the amount claimed by him is due to him owing to the occurrence of one or any of the above conditions, specifying the occurred condition or conditions.

This Guarantee will remain in force up to and including the date* after the deadline for submission of tender as such deadline is stated in the Instructions to contractor or as it may be extended by the Engineer-in-Charge, notice of which extension(s) to the Bank is hereby waived. Any demand in respect of this Guarantee should reach the Bank not later than the above date.

DATE

SIGNATURE OF THE BANK

WITNESS

SEAL

(SIGNATURE, NAME AND ADDRESS)

*Date to be worked out on the basis of validity period of 6 months from last date of receipt of tender.

FORM OF PERFORMANCE SECURITY

BANK GUARANTEE BOND

In consideration of the President of India (hereinafter called "The Government") having offered to accept the terms and conditions of the proposed agreement between _____ and _____ (hereinafter called "the said contractor(s)" for the work _____ (hereinafter called "The said agreement") having agreed to production of a irrevocable Bank Guarantee for ₹ _____ (Rupees _____ only) as security/guarantee from the contractor(s) for compliance of his obligations in accordance with the terms and conditions in the said agreement.

We _____ (hereinafter referred to as "the Bank) hereby undertake to (indicate the name of the bank) pay to the Government an amount not exceeding ₹ _____ (Rupees _____ only) on demand by the Government.

We _____ do hereby undertake to pay the amounts due and payable (indicate the name of the bank) under this Guarantee without any demure, merely on a demand from the Government stating that the amount claimed is required to meet the recoveries due or likely to be due from the said contractor(s). Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the bank under this Guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding ₹ _____ (Rupees _____ only).

We, the said bank further undertake to pay to the Government any money so demanded notwithstanding any dispute or disputes raised by the contractor(s) in any suit or proceeding pending before any court or Tribunal relating thereto, our liability under this present being absolute and unequivocal.

The payment so made by us under this bond shall be a valid discharge of our liability for payment there under and the contractor(s) shall have no claim against us for making such payment.

We _____ further agree that the guarantee herein contained shall (indicate the name of the Bank) remain in full force and effect during the period that would be taken for the performance of the said agreement and that it shall continue to be enforceable till all the dues of the Government under or by virtue of the said agreement have been fully paid and its claims satisfied or discharged or till Engineer-in-Charge on behalf of the Government certified that the terms and conditions of the said agreement have been fully and properly carried out by the said contractor (s) and accordingly discharges this guarantee.

We _____ further agree with the Government that the government (indicate name of the bank) shall have the fullest liberty without our consent and without effecting in any manner our obligations hereunder to vary any of the terms and conditions of the said agreement or to extend time of performance by the said contractor(s) from time to time or to postpone for any time or from time to time any of the powers exercisable by the Government against the said contractor(s) and to forbear or enforce any of the terms and conditions relating to the said agreement and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said contractor(s) or for any forbearance, act of omission on the part of the Government or any indulgence by the Government to the said contractor(s) or by any such matter or thing whatsoever which under the law relating to sureties would, but for this provision, have effect of so relieving us.

This guarantee will not be discharged due to the change in the constitution of the Bank or the contractor(s).

We _____ lastly undertake not to revoke this guarantee except (indicate the name of Bank) with the previous consent of the Government in writing.

This guarantee shall be valid upto _____ unless extended on demand by Government. Notwithstanding anything mentioned above, our liability against this guarantee is restricted to ₹ _____

(Rupees _____ only) and unless a claim in writing is lodged with us within six months of the date of expiry or the extended date of expiry of this guarantee all our liabilities under this guarantee shall stand discharged.

Dated the _____ day of _____ for _____.

(Indicate the name of Bank)

**GUARANTEE BOND TO BE EXECUTED BY THE CONTRACTOR
FOR REMOVAL OF DEFECTS AFTER COMPLETION IN RESPECT OF
WATER-PROOFING WORKS (All Water – Proofing Items).**

The agreement made this..... day of (Two Thousand _____ only) betweenS/o(hereinafter called the GUARANTOR of the one part) and the PRESIDENT OF INDIA (hereinafter called the Government of the other part)

WHEREAS THIS agreement is supplementary to a contract (Hereinafter called the Contract) dated and made between the GUARANTOR OF THE ONE PART AND the Government of the other part whereby the contractor inter alia undertook to render the building and structures in the said contract recited completely water and leak-proof.

AND WHEREAS THE GUARANTOR agreed to give a guarantee to the effect that the said work will remain water and leak proof, for ten years from the date of completion of work.

NOW THE GUARANTOR hereby guarantee that work executed by him will render the structures completely leak proof and the minimum life of such water proofing treatment shall be ten years to be reckoned from the date after the expiry of maintenance period prescribed in the contract.

The decision of the Engineer-in-charge with regard to nature and cause of defect shall be final and binding on Guarantor.

During this period of guarantee, the guarantor shall make good all defects and in case of any defect being found render the building water proof to the satisfaction of the Engineer-In-Charge calling upon him to rectify the defects failing which the work shall be got done by the Department by some other contractor at the Guarantor's cost and risk. The decision of the Engineer-in-charge as to the cost payable by the Guarantor shall be final and binding.

That if the guarantor fails to execute the water proofing or commits breach thereunder, then the guarantor will indemnify the principal and his successor against all loss, damage, cost expense or otherwise which may be incurred by him by reason of any default on the part of the GUARANTOR in performance and observance of this supplementary agreement. As to the amount of loss and/or damage and / or cost incurred by the Government, the decision of the Engineer-in-charge will be final and binding on both the parties.

IN WITNESS WHEREOF these presents have been executed by the obligator..... and by for and on behalf of the PRESIDENT OF INDIA on the day, month and year first above written.

SIGNED, sealed and delivered by OBLIGATOR in the presence of :-

1. 2.

SIGNED FOR AND BEHALF OF THE PRESIDENT OF INDIA BY in the presence of:

1. 2.

GUARANTEE BOND TO BE EXECUTED BY THE CONTRACTOR

FOR REMOVAL OF DEFECTS AFTER COMPLETION

IN RESPECT OF SANITARY INSTALLATIONS / WATER SUPPLY / DRAINAGE WORK.

The agreement made this..... day of (Two Thousand only) betweenS/o(hereinafter called the GUARANTOR of the one part) and the PRESIDENT OF INDIA (hereinafter called the Government of the other part)

WHEREAS THIS agreement is supplementary to a contract (Hereinafter called the Contract) dated and made between the GUARANTOR OF THE ONE PART AND the Government of the other part, whereby the contractor inter alia, undertook to render the work in the said contract recited structurally stable, leak proof and sound material, workmanship, anodizing, colouring, sealing.

AND WHEREAS THE GUARANTOR agreed to give a guarantee to the affect that the said work will remain structurally stable, leak proof and guaranteed against faulty material and workmanship, and finishing for two years from the date of completion of work.

NOW THE GUARANTOR hereby guarantee that work executed by him will be free from any leakage, seepage, cracks in pipes and guaranteed against faulty material and workmanship, defective galvanizing for two years to be reckoned from the date after the expiry of maintenance period prescribed in the contract. The decision of the Engineer-In-Charge with regard to nature and cause of defect shall be final.

During this period of guarantee, the guarantor shall make good all defects and in case of any defect to satisfaction of Engineer-in-charge at his cost and shall commence the work for such rectification within seven days from the date of issue of the notice from the Engineer-in-charge calling upon him to rectify the defects failing which the work shall be got done by the Department by some other contractor at the guarantor's cost and risk. The decision of the Engineer-in-Charge as to the cost payable by the Guarantor shall be final and binding.

That if the guarantor fails to make good all defects or commits breach thereunder, then the guarantor will indemnify the principal and his successor against all loss, damage, cost expense or otherwise which may be incurred by him by reason of any default on the part of the GUARANTOR in performance and observance of this supplementary agreement. As to the amount of loss and/or damage and or cost incurred by the Government, the decision of the Engineer-in-charge will be final and binding on both the parties.

IN WITNESS WHEREOF these presents have been executed by the obligatorand by for and on behalf of the PRESIDENT OF INDIA on the day, month and year first above written.

SIGNED, sealed and delivered by OBLIGATOR in the presence of :-

- 1.
- 2.

SIGNED FOR AND ON BEHALF OF THE PRESIDENT OF INDIA BY..... in the presence of:

- 1.
- 2.

**GUARANTEE BOND TO BE EXECUTED BY THE CONTRACTOR
FOR REMOVAL OF DEFECTS AFTER COMPLETION IN RESPECT OF
STONE WORK/ TILE WORK.**

The agreement made this..... day of (Two Thousand _____ only) betweenS/o(hereinafter called the GUARANTOR of the one part) and the President of India (hereinafter called the Government of the other part)

WHEREAS THIS agreement is supplementary to a contract (Hereinafter called the Contract) dated and made between the GUARANTOR OF THE ONE PART AND the Government of the other part whereby the contractor inter alia undertook to render the work in the said contract recited structurally stable workmanship, finishing and use of sound materials.

AND WHEREAS THE GUARANTOR agreed to give a guarantee to the effect that the said work will remain structurally stable and guaranteed against faulty workmanship, finishing and materials.

NOW THE GUARANTOR hereby guarantee that work executed by him will remain structurally stable after the expiry of maintenance period prescribed in the contract for the minimum life of five years to be reckoned from the date after the expiry of maintenance period prescribed in the contract. The decision of the Engineer-in-charge with regard to nature and cause of defect shall be final.

During this period of guarantee, the guarantor shall make good all defects to the satisfaction of the Engineer-in-charge calling upon him to rectify the defects failing which the work shall be got done by the Department by some other contractor at the Guarantor's cost and risk. The decision of the Engineer-in-charge as to the cost payable by the Guarantor shall be final and binding.

That if the guarantor fails to make good all the defects, commits breach thereunder, then the guarantor will indemnify the principal and his successor against all loss, damage, cost expense or otherwise which may be incurred by him by reason of any default on the part of the GUARANTOR in performance and observance of this supplementary agreement. As to the amount of loss and/or damage and or cost incurred by the Government, the decision of the Engineer-in-charge will be final and binding on both the parties.

IN WITNESS WHEREOF these presents have been executed by the obligator..... and by for and on behalf of the President of India on the day, month and year first above written.

SIGNED, sealed and delivered by OBLIGATOR in the presence of:-

1. 2.

SIGNED FOR AND BEHALF OF THE PRESIDENT OF INDIA BY in the presence of:

1. 2.

**GUARANTEE BOND TO BE EXECUTED BY THE CONTRACTOR
FOR REMOVAL OF DEFECTS AFTER COMPLETION
IN RESPECT OF ALUMINIUM DOORS, WINDOWS VENTILATOR WORK.**

The agreement made this..... day of (Two Thousand only)..... betweenS/o(hereinafter called the GUARANTOR of the one part) and the PRESIDENT OF INDIA (hereinafter called the Government of the other part)

WHEREAS THIS agreement is supplementary to a contract (Hereinafter called the Contract) dated and made between the GUARANTOR OF THE ONE PART AND the Government of the other part, whereby the contractor inter alia, undertook to render the work in the said contract recited structurally stable, workmanship, powder coating, anodizing, colouring and sealing etc.

AND WHEREAS THE GUARANTOR agreed to give a guarantee to the affect that the said work will remain structurally stable and guaranteed against faulty material and workmanship, defective anodizing/ powder coating for five years from the date of completion of work.

NOW THE GUARANTOR hereby guarantee that work executed by him will remain structurally stable and guaranteed against faulty material and workmanship, defective anodizing/ powder coating for five years to be reckoned from the date after the expiry of maintenance period prescribed in the contract. The decision of the Engineer-In-Charge with regard to nature and cause of defect shall be final.

During this period of guarantee, the guarantor shall make good all defects and in case of any defect to satisfaction of Engineer-in-charge at his cost and shall commence the work for such rectification within seven days from the date of issue of the notice from the Engineer-in-charge calling upon him to rectify the defects failing which the work shall be got done by the Department by some other contractor at the guarantor's cost and risk. The decision of the Engineer-in-Charge as to the cost payable by the Guarantor shall be final and binding.

That if the guarantor fails to make good all defects or commits breach there under, then the guarantor will indemnify the principal and his successor against all loss, damage, cost expense or otherwise which may be incurred by him by reason of any default on the part of the GUARANTOR in performance and observance of this supplementary agreement. As to the amount of loss and/or damage and or cost incurred by the Government, the decision of the Engineer-in-charge will be final and binding on both the parties.

IN WITNESS WHEREOF these presents have been executed by the obligator and by for and on behalf of the PRESIDENT OF INDIA on the day, month and year first above written.

SIGNED, sealed and delivered by OBLIGATOR in the presence of:-

1. 2.

SIGNED FOR AND ON BEHALF OF THE PRESIDENT OF INDIA BY..... in the presence of:-

1. 2.

INTEGRITY PACT

To,

.....,

.....,

.....

Sub: NIT No.: 3/INST/2018-19 for the work “ Construction of 100KLD Sewage Treatment Plant for INST at Sector-81, Knowledge City, Mohali (Pb.)

Dear Sir,

It is hereby declared that Institute of Nano Science & Technology, Mohali is committed to follow the principle of transparency, equity and competitiveness in public procurement.

The subject Notice Inviting Tender (NIT) is an invitation to offer made on the condition that the Bidder will sign the integrity Agreement, which is an integral part of tender/bid documents, failing which the tenderer/bidder will stand disqualified from the tendering process and the bid of the bidder would be summarily rejected.

This declaration shall form part and parcel of the Integrity Agreement and signing of the same shall be deemed as acceptance and signing of the Integrity Agreement on behalf of the Nano Science & Technology, Mohali.

Yours faithfully,

Director,

Nano Science & Technology, Mohali

INTEGRITY PACT

To,
The Director,
Institute of Nano Science & Technology Habitat
Centre, Sector-64, Phase-X, Mohali-160062

Sub: NIT No.: 3/INST/2018-19 for the work “ Construction of 100KLD Sewage Treatment Plant for INST at Sector-81, Knowledge City, Mohali (Pb.)

Dear Sir,

I/We acknowledge that Nano Science & Technology, Mohali is committed to follow the principles thereof as enumerated in the Integrity Agreement enclosed with the tender/bid document.

I/We agree that the Notice Inviting Tender (NIT) is an invitation to offer made on the condition that I/We will sign the enclosed integrity Agreement, which is an integral part of tender documents, failing which I/We will stand disqualified from the tendering process. I/We acknowledge that **THE MAKING OF THE BID SHALL BE REGARDED AS AN UNCONDITIONAL AND ABSOLUTE ACCEPTANCE**

of this condition of the NIT.

I/We confirm acceptance and compliance with the Integrity Agreement in letter and spirit and further agree that execution of the said Integrity Agreement shall be separate and distinct from the main contract, which will come into existence when tender/bid is finally accepted by Nano Science & Technology, Mohali. I/We acknowledge and accept the duration of the Integrity Agreement, which shall be in the line with Article 1 of the enclosed Integrity Agreement.

I/We acknowledge that in the event of my/our failure to sign and accept the Integrity Agreement, while submitting the tender/bid, Nano Science & Technology, Mohali shall have unqualified, absolute and unfettered right to disqualify the tenderer/bidder and reject the tender/bid in accordance with terms and conditions of the tender/bid.

Yours faithfully,

(Duly authorized signatory of the Bidder)

**To be signed by the bidder and same signatory competent / authorized to sign
the relevant contract on behalf of Institute of Nano Science & Technology,
Mohali.**

INTEGRITY AGREEMENT

This Integrity Agreement is made at on thisday of 20.....

BETWEEN

Institute of Nano Science & Technology (Hereinafter referred as the **Principal/Owner**’, which expression shall unless repugnant to the meaning or context hereof include its successors and permitted assigns)

AND

.....(Name and Address of the Individual/firm/Company) through..... (Hereinafter referred to as the (Details of duly authorized signatory)

“**Bidder/Contractor**” and which expression shall unless repugnant to the meaning or context here of include its successors and permitted assigns)

Preamble

WHEREAS the Principal / Owner has floated the Tender (NIT No. 3/INST/2018-19) (hereinafter referred to as “**Tender/Bid**”) and intends to award, under laid down organizational procedure, contract for “**Construction of 100KLD Sewage Treatment Plant for INST at Sector-81, Knowledge City, Mohali (Pb.)**.” hereinafter referred to as the “**Contract**”.

AND WHEREAS the Principal/Owner values full compliance with all relevant laws of the land, rules, regulations, economic use of resources and of fairness/transparency in its relation with its Bidder(s) and Contractor(s).

AND WHEREAS to meet the purpose aforesaid both the parties have agreed to enter into this Integrity Agreement (hereinafter referred to as “Integrity Pact” or “Pact”), the terms and conditions of which shall also be read as integral part and parcel of the Tender/Bid documents and Contract between the parties.

NOW, THEREFORE, in consideration of mutual covenants contained in this Pact, the parties hereby agree as follows and this Pact witnesses as under:

Article 1: Commitment of the Principal/Owner

(1) The Principal/Owner commits itself to take all measures necessary to prevent corruption and to observe the following principles:

(a) No employee of the Principal/Owner, personally or through any of his/her family members,

will in connection with the Tender, or the execution of the Contract, demand, take a promise for or accept, for self or third person, any material or immaterial benefit which the person is not legally entitled to.

(b) The Principal/Owner will, during the Tender process, treat all Bidder(s) with equity and reason. The Principal/Owner will, in particular, before and during the Tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential / additional information through which the Bidder(s) could obtain an advantage in relation to the Tender process or the Contract execution.

(c) The Principal/Owner shall endeavour to exclude from the Tender process any person, whose conduct in the past has been of biased nature.

(2) If the Principal/Owner obtains information on the conduct of any of its employees which is a criminal offence under the Indian Penal code (IPC)/Prevention of Corruption Act, 1988 (PC Act) or is in violation of the principles herein mentioned or if there be a substantive suspicion in this regard, the Principal/Owner will inform the Chief Vigilance Officer and in addition can also initiate disciplinary actions as per its internal laid down policies and procedures.

Article 2: Commitment of the Bidder(s)/Contractor(s)

(1) It is required that each Bidder/Contractor (including their respective officers, employees and agents) adhere to the highest ethical standards, and report to the Government / Department all suspected acts of fraud or corruption or Coercion or Collusion of which it has knowledge or becomes aware, during the tendering process and throughout the negotiation or award of a contract.

(2) The Bidder(s)/Contractor(s) commits himself to take all measures necessary to prevent corruption. He commits himself to observe the following principles during his participation in the Tender process and during the Contract execution:

(a) The Bidder(s)/Contractor(s) will not, directly or through any other person or firm, offer, promise or give to any of the Principal/Owner's employees involved in the Tender process or execution of the Contract or to any third person any material or other benefit which he/she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the Tender process or during the execution of the Contract.

(b) The Bidder(s)/Contractor(s) will not enter with other Bidder(s) into any undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to cartelize in the bidding process.

(c) The Bidder(s)/Contractor(s) will not commit any offence under the relevant IPC/PC Act. Further the Bidder(s)/Contractor(s) will not use improperly, (for the purpose of competition or personal gain), or pass on to others, any information or documents provided by the Principal/Owner as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.

(d) The Bidder(s)/Contractor(s) of foreign origin shall disclose the names and addresses of agents/representatives in India, if any. Similarly Bidder(s)/Contractor(s) of Indian Nationality shall disclose names and addresses of foreign agents/representatives, if any. Either the Indian

agent on behalf of the foreign principal or the foreign principal directly could bid in a tender but not both. Further, in cases where an agent participates in a tender on behalf of one manufacturer, he shall not be allowed to quote on behalf of another manufacturer along with the first manufacturer in a subsequent/parallel tender for the same item.

(e) The Bidder(s)/Contractor(s) will, when presenting his bid, disclose any and all payments he has made, is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the Contract.

(3) The Bidder(s)/Contractor(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.

(4) The Bidder(s)/Contractor(s) will not, directly or through any other person or firm indulge in fraudulent practice means a willful misrepresentation or omission of facts or submission of fake/forged documents in order to induce public official to act in reliance thereof, with the purpose of obtaining unjust advantage by or causing damage to justified interest of others and/or to influence the procurement process to the detriment of the Government interests.

(5) The Bidder(s)/Contractor(s) will not, directly or through any other person or firm use Coercive Practices (means the act of obtaining something, compelling an action or influencing a decision through intimidation, threat or the use of force directly or indirectly, where potential or actual injury may befall upon a person, his/her reputation or property to influence their participation in the tendering process).

Article 3: Consequences of Breach

Without prejudice to any rights that may be available to the Principal/Owner under law or the Contract or its established policies and laid down procedures, the Principal/Owner shall have the following rights in case of breach of this Integrity Pact by the Bidder(s)/Contractor(s) and the Bidder/ Contractor accepts and undertakes to respect and uphold the Principal/Owner's absolute right:

(1) If the Bidder(s)/Contractor(s), either before award or during execution of Contract has committed a transgression through a violation of Article 2 above or in any other form, such as to put his reliability or credibility in question, the Principal/Owner after giving 14 days notice to the contractor shall have powers to disqualify the Bidder(s)/Contractor(s) from the Tender process or terminate/determine the Contract, if already executed or exclude the Bidder/Contractor from future contract award processes. The imposition and duration of the exclusion will be determined by the severity of transgression and determined by the Principal/Owner. Such exclusion may be forever or for a limited period as decided by the Principal/Owner.

(2) Forfeiture of EMD/Performance Guarantee/Security Deposit: If the Principal/Owner has disqualified the Bidder(s) from the Tender process prior to the award of the Contract or terminated/determined the Contract or has accrued the right to terminate/determine the Contract according to Article 3(1), the Principal/Owner apart from exercising any legal rights that may have accrued to the Principal/Owner, may in its considered opinion forfeit the entire amount of Earnest Money Deposit, Performance Guarantee and Security Deposit of the Bidder/Contractor.

(3) Criminal Liability: If the Principal/Owner obtains knowledge of conduct of a Bidder or Contractor, or of an employee or a representative or an associate of a Bidder or Contractor which constitutes corruption within the meaning of Prevention of Corruption Act, or if the Principal/Owner has substantive suspicion in this regard, the Principal/Owner will inform the same to law enforcing agencies for further investigation.

Article 4: Previous Transgression

(1) The Bidder declares that no previous transgressions occurred in the last 5 years with any

other Company in any country confirming to the anticorruption approach or with Central Government or State Government or any other Central/State Public Sector Enterprises in India that could justify his exclusion from the Tender process.

(2) If the Bidder makes incorrect statement on this subject, he can be disqualified from the Tender process or action can be taken for banning of business dealings/ holiday listing of the Bidder/Contractor as deemed fit by the Principal/ Owner.

(3) If the Bidder/Contractor can prove that he has resorted / recouped the damage caused by him and has installed a suitable corruption prevention system, the Principal/Owner may, at its own discretion, revoke the exclusion prematurely.

Article 5: Equal Treatment of all Bidders/Contractors/Associate Agencies

(1) The Bidder(s)/Contractor(s) undertake(s) to demand from all subcontractors a commitment in conformity with this Integrity Pact. The Bidder/Contractor shall be responsible for any violation(s) of the principles laid down in this agreement/Pact by any of its Associate agencies.

(2) The Principal/Owner will enter into Pacts on identical terms as this one with all Bidders and Contractors.

(3) The Principal/Owner will disqualify Bidders, who do not submit, the duly signed Pact between the Principal/Owner and the bidder, along with the Tender or violate its provisions at any stage of the Tender process, from the Tender process.

Article 6- Duration of the Pact

This Pact begins when both the parties have legally signed it. It expires for the Contractor/Vendor 12 months after the completion of work under the contract or till the continuation of defect liability period, whichever is later and for all other bidders, till the Contract has been awarded.

If any claim is made/lodged during the time, the same shall be binding and continue to be valid despite the lapse of this Pacts as specified above, unless it is discharged/determined by the Competent Authority, i.e. Institute of Nano Science & Technology.

Article 7- Other Provisions

(1) This Pact is subject to Indian Law, place of performance and jurisdiction is the head quarters of the division of the Principal/Owner who has floated the tender.

(2) Changes and supplements need to be made in writing. Side agreements have not been made.

(3) If the Contractor is a partnership or a consortium, this Pact must be signed by all the partners or by one or more partner holding power of attorney signed by all partners and consortium members. In case of a Company, the Pact must be signed by a representative duly authorized by board resolution.

(4) Should one or several provisions of this Pact turn out to be invalid; the remainder of this Pact remains valid. In this case, the parties will strive to come to an agreement to their original intentions.

(5) It is agreed term and condition that any dispute or difference arising between the parties with regard to the terms of this Integrity Agreement / Pact, any action taken by the Owner/Principal in accordance with this Integrity Agreement/ Pact or interpretation thereof shall not be subject to arbitration.

Article 8- LEGAL AND PRIOR RIGHTS

All rights and remedies of the parties hereto shall be in addition to all the other legal rights and remedies belonging to such parties under the Contract and/or law and the same shall be deemed to be cumulative and not alternative to such legal rights and remedies aforesaid. For the sake of brevity, both the Parties agree that this Integrity Pact will have precedence over the Tender/Contact documents with regard any of the provisions covered under this Integrity Pact.

IN WITNESS WHEREOF the parties have signed and executed this Integrity Pact at the place and date first above mentioned in the presence of following witnesses:

.....

(For and on behalf of Principal/Owner)

.....

(For and on behalf of Bidder/Contractor)

WITNESSES:

1.....

(signature, name and address)

2.

(signature, name and address)

Place:

Dated :



INSTITUTE OF NANO SCIENCE AND TECHNOLOGY
Habitat Centre, Sector-64, Phase-X, Mohali-160062

PART-B

SPECIAL CONDITIONS OF CONTRACT,
ADDITIONAL CONDITIONS,
PARTICULAR SPECIFICATIONS,
APPROVED MAKES
LIST OF TENDER DRAWINGS

C/o Sewage Treatment Plant of 100 KLD for INST Campus at Sector-81, Knowledge City, Mohali.

INDEX

Name of Work : Proposed Construction & Development of Campus of Institute of Nano Science & Technology at knowledge City, Sector-81, Mohali (Punjab)- 140306

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1.0 SPECIAL CONDITIONS OF CONTRACT

1.1. Special Conditions – General

- 1.1.1. The contents of special conditions take precedence over the general 'Clauses of Contract.
- 1.1.2. The Contractors are advised to inspect and examine the site and its surroundings and satisfy themselves with the nature of site, the means of access to the site, the constraints of space for stacking material / machinery, labour etc., constraints put by local regulations, if any, weather conditions at site, general ground/subsoil conditions etc. or any other circumstances which may affect or influence their tenders. No claim whatsoever on account of site constraints mentioned above or any other site constraints, lack of public transport, inadequate availability of skilled, semi-skilled or unskilled workers in the near vicinity, non-availability of construction machinery spare parts and any other constraints not specifically stated here, shall be entertained from the Contractor. Therefore, the Tenderers are advised to visit site and get first-hand information of site constraints. Accordingly, they should quote their tenders. Nothing extra shall be payable on this account.
- 1.1.3. The site is available for work. The Contractor shall carry out survey of the work area, at his own cost, setting out the layout and fixing of alignment of the building as per architectural and Structural drawings in consultation with the Engineer-in-Charge and proceed further ensuring full structural continuity and integrated and monolithic construction. Any discrepancy between the architectural drawings and actual layout at site shall be brought to the notice of the Engineer-in-charge. It shall be responsibility of the Contractor to ensure correct setting out of alignment. Nothing extra shall be payable on this account. No claims, whatsoever, shall be entertained at a later date for any errors found, on plea that the information supplied by the INST MOHALI in the tender is insufficient or is at variance with the actual site conditions.
- 1.1.4. The contractor shall be deemed to have obtained all necessary information as to risks, contingencies and other circumstances which may influence or affect the tender or works to the extent, the contractor shall be satisfied before submitting the tender as to all relevant matters, including (without limitation):
 - (a) The form and nature of the site, including sub-surface conditions,
 - (b) The hydrological and climatic conditions,
 - (c) The extent and nature of the work and goods necessary for the execution and completion of the works and the remedying of any defects,
 - (d) The laws, procedures and labour practices of the country, and
 - (e) The contractor's requirements for access, accommodation, facilities, personnel, power, transport, water and other services etc.
- 1.1.5. The Contractor shall, if required by him, before submission of the tender, inspect the drawings in the Office of the Institute of Nano Science and Technology, Habitat Centre, Sector-64, Phase-X, Mohali- 160062. The INST MOHALI shall not bear any responsibility for the lack of knowledge and also the consequences, thereof to the Contractor. The information and data shown in the drawings and mentioned in the tender documents have been furnished for general information and guidance only. The Engineer- in-Charge, in no case, shall be held responsible for the accuracy thereof and/or interpretations or conclusions drawn there from by the Contractor and all consequences shall be borne by the Contractor. No claim, whatsoever, shall be entertained from the Contractor, if the data or information furnished in tender document is different or incorrect otherwise or actual working drawings are at variance with the drawings available for inspection or attached to the tender documents. It is presumed that the Contractor shall satisfy himself for all possible contingencies, incidental charges, wastages, bottlenecks etc. likely during execution of work and acts of

coordination, which may be required between different agencies. Nothing extra shall be payable on this account.

- 1.1.6. The nomenclature of the item given in the schedule of quantities gives in general the work content but is not exhaustive i.e. does not mention all the incidental works required to be carried out for complete execution of the item of work. The work shall be carried out, all in accordance with true intent and meaning of the specifications and the drawings taken together, regardless of whether the same may or may not be particularly shown on the drawings and/or described in the specifications, provided that the same can be reasonably inferred there from may be several incidental works, which are not mentioned in the nomenclature of each item but will be necessary to complete the item in all respect. All these incidental works / costs which are not mentioned in item nomenclature but are necessary to complete the item shall be deemed to have been included in the rates quoted by the contractor for various items in the schedule of quantities. No adjustment of rates shall be made for any variation in quantum of incidental works due to variation / change in actual working drawings. Also, no adjustment of rates shall be made due to any change in incidental works or any other deviation in such element of work (which is incidental to the items of work and are necessary to complete such items in all respects) on account of the directions of Engineer-in-Charge. Nothing extra shall be payable on this account.
- 1.1.7. The contractor(s) shall give to the local body, police and other authorities all necessary notices etc. that may be required by law and obtain all requisite licenses for temporary obstructions, enclosures etc. and pay all fee, taxes and charges which may be leviable on account of these operations in executing the contract. He shall make good any damage to the adjoining property whether public or private and shall supply and maintain lights either for illumination or for cautioning the public at night.

Proper temporary barricading by fencing with G.I. sheets, shall be carried out by the Contractor at the start of work to physically define the boundaries of the plot for restricted entry to only those involved in the work and also to prevent any accidents, at the same time without causing any inconvenience to the traffic and the users of the buildings in the adjacent plots. It shall be done by providing, erecting, maintaining temporary protective barricading of minimum 3.0 metres in height, made in panels, with each panel having MS frames / MS scaffolding pipes of suitable size and stiffness, with 24 gauge thick GI corrugated sheet or suitably stiffened plain GI sheet fixed on frames. Such panels shall be suitably connected to each other for stability with nuts and bolts, hooks, clamps etc. and fixed firmly to the ground at about 2 metres spacing, for the entire duration till completion of the work.

The contractor shall also provide and erect temporary protective barricades within the plot, if required, to prevent any accident. Temporary protective roofing near the Entrance to the building, under construction, shall be made to protect the visiting officials from getting hurt by falling debris etc. Also, one or more coat of enamel paint of shade as approved and directed by the Engineer-in-Charge shall be applied on the panels and "INST MOHALI" shall be painted over that in suitable sizes, shapes and numbers as directed by the Engineer-in-Charge. It shall be dismantled and taken away by the Contractor after the completion of work at his own cost with the approval of the Engineer-in-Charge. Nothing extra shall be payable on this account.

The contractor shall maintain it during the complete period of execution and realign it if required, for execution of works.

- 1.1.8. The Contractor(s) shall take all precautions to avoid accidents by exhibiting necessary caution boards day and night. In case of any accident of labours/ contractual staffs the entire responsibility will rest on the part of the contractor and any compensation under such circumstances, if becomes payable, shall be entirely borne by the contractor.
- 1.1.9. The work shall generally be carried out in accordance with the "CPWD Specifications 2009 Vol. I & II" with up to date correction slips, additional/Particular Specifications, architectural/Structural drawings and as per

instructions of Engineer-in-Charge. Any additional item of the work, if taken up subsequently, shall also confirm to the relevant CPWD specifications as mentioned above.

- 1.1.10. The several documents forming the tender are to be taken as mutually complementary to one another. Detailed drawings shall be followed in preference to small scale drawings and figured dimensions in preference to scale dimensions.
- 1.1.11. There be any difference or discrepancy between the description of items as given in the schedule of quantities, particular specifications for individual items of work (including special conditions) and I.S. Codes etc., the following order of preference shall be observed.
- i. Description of items as given in Schedule of quantities
 - ii. Particular specifications
 - iii. Special conditions
 - iv. Additional Condition
 - v. Tender drawings attached
 - vi. CPWD Specifications including correction slips issued up to the last date of uploading/submission of tender.
 - vii. General Conditions of Contract for CPWD works including correction slips issued up to the last date of uploading/submission of tender.
 - viii. Indian Standards Specifications of B.I.S.
 - ix. Manufacturer's specifications and as decided by the Engineer-in-Charge.
 - x. Sound Engineering practices or well established local construction practices.
- 1.1.12. The works to be governed by this contract shall cover delivery and transportation up to destination, safe custody at site, insurance, erection, testing and commissioning of the entire works including Defect Liability Period as mentioned in the NIT.

The works to be undertaken by the contractor shall inter-alia include the following:

- I. Preparation of detailed SHOP drawings and AS BUILT drawings wherever applicable.
 - II. Obtaining of Statutory permissions where-ever applicable and required.
 - III. Pre-commissioning tests as per relevant standard specifications, code of practice, Acts and Rules wherever required.
 - IV. Warranty obligation for the equipments and / or fittings/fixtures supplied by the contractor.
 - V. Contractor shall provide all the shop drawings or layout drawings for all the coordinated services before starting any work or placing any order of any of the services etc. These shop drawings/layout drawings shall be got approved from Engineer-in-charge before implementation and this shall be binding on the contractor.
 - VI. The contractor shall submit material submittals along with material sample for approval of Engineer-in-Charge prior to delivery of material at site.
- 1.1.13. The work shall be carried out in accordance with the approved architectural drawings, structural drawings, services drawings to be issued from time to time, by the Engineer-in-Charge. Before commencement of any item of work the contractor shall correlate all the relevant architectural and structural drawings, nomenclature of items and specifications etc. issued for the work and satisfy himself that the information available from there is complete and unambiguous. The figure and written dimension of the drawings shall

be superseding the measurement by scale. The discrepancy, if any, shall be brought to the notice of the Engineer-in-charge before execution of the work. The contractor alone shall be responsible for any loss or damage occurring by the commencement of work on the basis of any erroneous and or incomplete information and no claim whatsoever shall be entertained by the INST MOHALI on this account.

- a. The delay caused on account of non-timely action by the contractor in resolution of the differences whatsoever shall not be considered as valid ground for extension of time unless otherwise accepted by EIC.
- 1.1.14. Unless otherwise provided in the Schedule of quantities vide Part-C, the rates tendered by the contractor shall be all inclusive and shall apply to all heights, lifts, leads and depths of the building and nothing extra shall be payable to him on this account.
- 1.1.15. The Contractor(s) shall take instructions from the Engineer-in-Charge regarding collection and stacking of materials at any place. No excavated earth or building rubbish shall be stacked on areas where other buildings, roads, services and compound walls are to be constructed. The stacking shall take place as per stacking plan however, if any change is required, the same shall be done with the approval of Engineer-in-Charge.
- 1.1.16. The contractor shall engage specialized agency for carrying out specialized items mentioned in this document. Before engaging such agency, the contractor shall submit the details for the approval of Engineer-in-charge, the name of the agency along with their working experience, presentation on method statement and materials being used for execution of such items etc.
- 1.1.17. The Contractor shall bear all incidental charges for cartage, storage and safe custody of Materials, if any, issued by INST MOHALI as well as to those materials also arranged by the contractor.
- 1.1.18. Any cement slurry added over base surface (or) for continuation of concreting for better bond is deemed to have been built in the items and nothing extra shall be payable or extra cement considered in consumption on this account.
- 1.1.19. The contractor shall give performance test of the entire installation(s) as per the specifications in the presence of the Engineer-in-charge or his authorized representative before the work is finally accepted and nothing extra what-so-ever shall be payable to the contractor for such test.
- 1.1.20. Water tanks, taps, sanitary, water supply & drainage pipes, fittings & accessories should conform to by-laws of local body/corporation, where CPWD specifications are not available. The Contractor should engage approved, licensed plumbers for the work and get the materials (fixtures/fittings) tested, by the municipal Body/ Corporation authorities wherever required at his own cost. The Contractor shall submit for the approval of the Engineer-in-Charge, the name of the plumbing agency (along with their working experience in recent past) proposed to be engaged by him.

The contractor shall make his own arrangements for water and for obtaining electric connections if required and make necessary payments directly to the State Govt. departments concerned. Contractor shall get the water tested from laboratory approved by the Engineer-in-charge at regular interval as per the CPWD Specifications. All expenses towards collection of samples, packing, transportation etc. shall be

borne by the contractor. Contractor shall neither be allowed to use existing borewell, if any, nor shall be allowed to dig any borewell in the site premises unless he gets permission from the concerned authority. If required, the contractor shall install water treatment plant at site and treat the water to obtain the desired parameter of water quality required for construction as per relevant IS codes.

1.1.21. Site test register & MAS Registers to be maintained by contractor:

All test registers and MAS registers issued by the engineer-in-charge shall be maintained by the contractor which will be reviewed by the officers of PMC (project management consultant) or the person authorized by INST MOHALI at regular intervals. These may also be reviewed by Engineer in charge as and when required. Frequency of tests will be governed by the CPWD specifications with up to date correction slips.

1.1.22. SECURITY AND TRAFFIC ARRANGEMENTS

In the event of any restrictions being imposed by the Security agency, INST MOHALI, Traffic or any other authority having jurisdiction in the area on the working or movement of labour/material, the contractor shall strictly follow such restrictions and nothing extra shall be payable to the contractor on such accounts. The loss of time on these accounts, if any, shall have to be made up by augmenting additional resources whatever required.

1.1.23. The contractor is required to make his own arrangements to provide huts for laborer's as is acceptable to local bodies and nothing extra shall be paid on this account. He shall make his own arrangements for stores, field office etc. Before tendering, he shall visit the site and assess the manner in which he is able to arrange the above facilities. The Engineer-in- Charge shall in no way be responsible for any delay on this account and no claim, whatsoever, on this account shall be entertained.

1.1.24. No payment shall be made for any damage caused by rain, snowfall, flood or any other natural calamity, whatsoever during the execution of the work. The contractor shall be fully responsible for any damage to the govt. property and the work for which payment has been advanced to him under the contract and he shall make good the same at his risk and cost. The contractor shall be fully responsible for safety and security of his material, T&P/Machinery brought to the site byhim.

1.1.25. The contractor shall construct suitable godowns, yard at the site of work for storing all materials so as to be safe against damage by sun, rain, damages, fire, theft etc. at his own cost and also employ necessary watch and ward establishment for the purpose at his cost. The contractor shall also establish the batching plant and office of the contractor at site free of cost. Before starting such office/ yard the contractor will submit a layout plan to INST MOHALI for approval. This shall be maintained as per the prevailing norms of statutory bodies failing which a suitable penalty shall be imposed on the contractor. The contractor will barricade this area at his own cost and nothing shall be paid on this account.

1.1.26. TIME CONTROL

- (a) After issue of Letter of Acceptance, the Contractor shall submit to the Engineer-In-Charge for approval, the Construction schedule duly signed including Environmental Management Plan showing the general methods, arrangements, order, and timing for all the Micro-activities in the Works along with monthly cash flow forecasts. The same shall be form part of the contract.
- (b) An update of the Program shall be a program showing the actual progress achieved on each activity and the effect of the progress achieved on the timing of the remaining work, including any changes to the sequence of the activities.

- (c) The Contractor shall submit to the Engineer-In-Charge for approval an updated Program at intervals no longer than 30 days. If the Contractor does not submit an updated Program within this period, the Engineer-In-Charge may withhold the amount Rs. 10,000/- from the next Running Bill and continue to withhold this amount until the next payment after the date on which the overdue Program has been submitted.
- (d) Engineer-In-Charge's approval of the Program shall not alter the Contractor's obligations. The Contractor may revise the Program and submit it to the Engineer-In-Charge again at any time. A revised Program shall show the effect of Variations and Compensation Events.

1.1.27. SPECIFICATIONS

The work shall be executed in accordance with the specifications enclosed, the working drawings, the Bill of Quantities and instructions issued from time to time. Wherever these specifications are found wanting in any way, the C.P.W.D. specifications shall apply.

1.1.28. VERIFICATION AT SITE

The Contractor shall verify at the site information regarding existing services, levels, dimensions, etc. as indicated in the drawings and shall remain responsible for the accuracy and maintenance of all dimensions and levels. On verification if any discrepancy is found between what is shown in the drawings and what is actually existing the Contractor before proceeding with further works shall immediately bring the same to the notice of the Engineer-In-Charge.

1.1.29. PROGRAMME OF WORKS AND METHOD OF CONSTRUCTION

The Contractor shall submit to the Engineer-In-Charge prior to the commencement of work, for his approval, a detailed programme in the format as approved by the Engineer-In-Charge. The detailed programme shall necessarily contain but not limited to all the activities in different phases and in different locations, separately specifying there in the start and end of such activity. However, this submission and subsequent approval shall not relieve the contractor of any of his duties or responsibilities under this contract.

1.1.30. NOTICE OF OPERATION

In spite of submission and approval of the work programme the contractor shall not carry out any major operation without the consent of the Engineer-In-Charge.

1.1.31. ORDERING MATERIALS

The Contractor is entirely responsible for assessing the quantities of material to be ordered for using these in permanent works.

1.1.32. WORK DIARY

The Contractor shall maintain site order book on the site in which all remarks, instructions, decisions and the essential details, of the work shall be recorded by the Engineer-in-Charge. The Contractor shall assist in keeping the Site order Book by supplying daily information on the works as required by the Engineer-In-Charge.

1.1.33. CONSTRUCTION RECORDS

The Contractor shall keep and supply to the Engineer-In-Charge full and accurate records of the dimensions and positions of all new work and any other information necessary for the Engineer-In-Charge.

1.1.34. SAFETY OF ADJACENT STRUCTURES OF WORKS

The Contractor shall provide and erect to the approval of the Engineer-In-Charge such supports as may be required to protect efficiently all structures or works which may be endangered by the execution of the works or otherwise take such permanent measures as may be required by the Engineer-In-Charge to protect the structures or works.

1.1.35. KEEPING SITE CLEAN

During the progress of the works and when directed by the Engineer-In-Charge the Contractor shall keep the site clear of all rubbish and debris including that which may be deposited on the site by any sub-contractors until the date of issue of certificate of completion. The cost of keeping the site clean shall be deemed to have been included for in the rates. On completion of the works, the Contractor shall at his own expense clear away and remove from the site not later than 30 days from the date of completion of works all constructional plant, surplus material, rubbish and temporary works of every kind and leave the entire site and works clean and in a workmanlike condition to the satisfaction of the Engineer-In-Charge

1.1.36. LIGHTING FOR WORK

The Contractor shall at all times provide approved lighting as required for the proper execution and supervision of these works.

1.1.37. PROGRESS REPORT

The Contractor shall submit regular fortnight progress reports to the Engineer-In-Charge in a form as required by him.

1.1.38. CONTRACT RATES

- (i) The Contract rates and prices shall be deemed to; include all labour, materials, use of plant tools, temporary works and buildings, etc. insurance, GST, local taxes and duties establishment charges, profit, supervision, transport, testing and other charges and fees and every expense incurred in the proper and due execution, completion and maintenance of the works, and shall be accepted by the Contractor in full satisfaction and discharge of every obligation imposed upon him by these specifications, schedules of items and drawings. GST TDS, Labour cess, Security and other statutory deductions, if any, shall be deducted from each running bill as applicable.
- (ii) The rates quoted by the Contractor are deemed to be inclusive of site clearance, setting out work, profile, setting lay out on ground, establishment of reference bench mark(s), installing various signage, taking spot levels as directed by Engineer-in-charge, survey with total station, construction of all safety and protection devices, compulsory use of helmet and safety shoes, and other appropriate safety gadgets by workers, imparting continuous training for all the workers, barriers, preparatory works, construction of clean, hygienic and well ventilated workers housings in sufficient numbers as per drawing supplied by Engineer in charge, working during monsoon or odd season, working beyond normal hours, working at all depths, height, lead, lift, levels and location, implementation of green building norms to achieve desired GRIHA Rating compliances etc. and any other unforeseen but essential incidental works required to complete this work. Nothing extra shall be payable on this account and no extension of time for completion of work shall be granted on these accounts.
- (iii) The rates quoted by the tenderer, shall be firm and inclusive of all taxes and levies.
- (iv) No foreign exchange shall be made available by the Department for importing (purchase) of equipment, plants, machinery, materials of any kind or any other items required to be carried out during execution of the work. No delay and no claim of any kind shall be entertained from the Contractor, on account of variation in the foreign exchange rate.
- (v) Ancillary and incidental facilities required for execution of work like labour camp, stores, fabrication yard, offices for Contractor, watch and ward, temporary ramp required to be made for working at the basement level, temporary structure for plants and machineries, water storage tanks, installation and consumption charges of temporary electricity, telephone, water etc. required for execution of the work, liaison and pursuing for obtaining various No Objection Certificates, completion certificates from local bodies etc.,

protection works, testing facilities / laboratory at site of work, facilities for all field tests and for taking samples etc. during execution or any other activity which is necessary (for execution of work and as directed by Engineer-in- Charge), shall be deemed to be included in rates quoted by the Contractor, for various items in the schedule of quantities. Nothing extra shall be payable on these accounts. Before start of the work, the Contractor shall submit to the Engineer-in-Charge, a site / construction yard layout, specifying areas for construction, site office, positioning of machinery, material yard, cement and other storage, steel fabrication yard, site laboratory, water tank, etc.

- (vi) For completing the work in time, the Contractor might be required to work in two or more shifts (including night shifts). No claim whatsoever shall be entertained on this account, notwithstanding the fact that the Contractor may have to pay extra amounts for any reason, to the labourers and other staff engaged directly or indirectly on the work according to the provisions of the labour and other statutory bodies regulations and the agreement entered upon by the Contractor with them.
- (vii) All material shall only be brought at site as per program finalized with the Engineer-in-Charge. Any pre-delivery of the material not required for immediate consumption shall not be accepted and thus not paid for.
- (viii) The rate for all items, in which the use of cement is involved, is inclusive of charges for curing.
- (ix) Payment for items of "RCC work", brick work and concrete work above different floor shall be made at the rates provided for these items. For operation of these rates, the floor level shall be considered as top of the main structural slab in that floor viz Top of RCC slab in main room and not top of any sunk or depressed floor for toilet slabs.
- (x) Contractor has to make his own labour hutment arrangements outside the campus, for that he has to identify the areas close to site & take necessary permissions & develop the area with proper facilities like water, sanitation, drains etc. Nothing extra shall be payable on this account to contractor.

1.1.39. SHOP DRAWINGS

- (a) The Contractor shall prepare and submit to the Engineer-In-Charge for approval shop/structural drawings etc. for all Civil & MEP items, before the work is commenced, indicating all details of installation/ fabrication. These drawings in triplicate must be submitted by the Contractor as soon as possible after the order is placed to give ample time for all parties concerned to study and make comment thereon.
- (b) PROGRAMME OF SHOP DRAWING
The Contractor shall provide a detailed programme incorporating production of afore said shop/structural drawings which can be read in conjunction with the building construction programme.
- (c) SHOP/Structural DRAWINGS IN COORDINATION OF ALL TRADES
The work described on any shop/structural drawings submitted shall be carefully checked by the contractor for all clearance, field conditions, maintenance of architecture features in proper coordination will all trades on the job. To this end, the Contractor, during the production drawing stage, shall ensure that he coordinates with all other relevant trades that might interfere with the proper installation of his work. No payment shall be made for any variation or alteration on site due to lack of knowledge of other trades. Any unresolved conflict between grades shall be referred to the Engineer-In-Charge and the decision of the Engineer-In-Charge shall be final and binding on the contractor.
Equipment layouts shall be detailed on the drawings, showing the exact method of installing and clearly illustrating components to be used in making all connections.

(d) APPROVAL OF SHOP/Structural DRAWINGS

The Contractor shall submit all drawings as prescribed hereunder. All drawings shall be supplied in 3 copies and signed by a principal of the Contractor.

1.1.40. AS BUILT DRAWINGS

On completion of work, the Contractor shall submit to the Engineer-In-Charge one original and 2 copies of as built drawings indicating as built civil structures, installed equipments, piping & valves.

1.1.41. SAMPLES AND PROTOTYPES

The contractor shall submit to the Engineer-In-Charge samples of all materials required for prior approval in writing before placing the order. The Contractor shall also construct prototypes or samples of work as laid down in the contract or as instructed by the Engineer-In-Charge.

Such samples and prototypes after approval shall be retained by the Engineer-In-Charge and shall serve as the standards to be achieved in final construction.

1.1.42. MATERIAL INSPECTION, EXAMINATION & TESTING

All materials and equipment shall be brand new. On arrival of the materials at site they shall be inspected and tested by the Engineer-In-Charge to ensure that the materials conform to the specifications and standards. The Engineer-In-Charge and his representatives shall at all reasonable time have free access to the contractor's/manufacturers works. They shall have full powers to examine the materials and workmanship of the equipment at the contractor works or at any other place from where the material or equipment is obtained. The contractor shall give every facility to the Engineer-In-Charge and his representatives and necessary help for inspection, examination & testing of the materials. Original test certificates of the manufacturer's shall be submitted by the Contractor for all major equipment before they are accepted by the Engineer-In-Charge. Acceptance of any material or equipment shall in no way relieve the Contractor of his responsibility for meeting the requirements of the contract.

1.1.43. PERMITS & LICENSES

The Contractor shall obtain all permits and/or licenses if required for any part of the work from the local Authorities and pay for any and all fees required for the same.

1.1.44. GUARANTEE AND DEFECTS LIABILITY

All MEP Works covered by this contract shall be guaranteed by the Contractor against faulty material and workmanship for a period of 12 months (365 days) from the date of virtual completion and taking over by the user. Any part found defective shall be replaced free of all costs by the contractor. The contractor shall guarantee that all MEP & Sanitary System work satisfactorily. If performance of equipment during guarantee period is not satisfactory the guarantee period will be extended till satisfactory performance is established for further period of 12 months (365 days) and consequently, operation & maintenance contract of STP for a period of 12 months shall reckon after satisfactory completion of extended defect liability period.

The services of the contractors personnel if requisitioned during the defects liability period shall be made available free of any cost to the user. If the defects noticed during the guarantee period are not remedied within a reasonable time and/or some or system as a whole remain out of order for a total period of one month (4weeks), (unless or otherwise extended) the user shall have the right to remedy the defects at the contractor's risk and cost without prejudice to any other rights.

1.1.45. MAINTENANCE

During the guarantee and defects liability the contractor shall provide at no extra cost, necessary material and personnel to carry out repairs, routine maintenance as required. The contractor shall attend to all problems experienced in the operation of the systems under this contract within a reasonable time but not more than 48 hours of receiving the complaints and take corrective action immediately.

1.1.46. TRAINING OF PERSONNEL AT SITE

In order to enable the owner's staff to get acquainted with the operation and maintenance of the system, the contractor at no extra cost to the user shall train the user's personnel during the period of installation, testing, commissioning and prior to virtual completion and taking over by user.

1.1.47. POWER & WATER

Power & Water for erection, testing and commissioning shall be provided at one point in the building. The contractor shall provide his own submeters and will pay for all electricity and water consumed by him.

1.1.48. STORAGE OF MATERIALS AND SAFE CUSTODY

Lockable storage space, on site shall be made available by the contractor himself and the contractor shall be responsible for watch and ward and safe custody of his equipment and installations till they are formally taken over by the user.

1.1.49. INSURANCE

All equipment, materials, machinery and installations as a whole shall be insured by the contractor until virtual completion and take over by the user. Insurance policy should cover for all kinds of erection risks, fire, theft, or loss in transit. All workers and third party shall be insured in accordance with the Workmen Compensation Act in the event of an accident.

1.1.50. MEASUREMENT

All works shall be measured in accordance with relevant IS Standards notwithstanding general or local practices unless where specifically described otherwise in the specific sections of the specifications. All measurements shall be taken by the Engineer-In-Charge representative in the presence of the contractor's authorised representative and shall be jointly signed by both parties. Payments in accordance with the measurements recorded shall be released as per the terms and mode of payment agreed in the contract.

1.1.51. APPROVAL OF WORK & OBTAINING NOC CAPITAL FROM PUNJAB STATE POLLUTION CONTROL BOARD

It shall be the responsibility of the contractor to obtain the approval of drawings and to get the installation inspected and passed by any concerned authorities, as may be necessary as per local by laws, any fee payable to the local bodies for such activities shall be reimburse by the client on production of receipt. The contractor shall ensure that final output of treated effluent shall conform to the standards laid down by the Punjab State Pollution Control Board. Accordingly the contractor shall obtain clearance certificate consent to operate the STP from the Punjab State Pollution Control Board.

1.1.52. TIME OF COMPLETION

The entire works are required to be completed within 5 Months (150 days) from the 15th day after the date on which the owner issue written orders to commence the work.

1.1.53. LIQUIDATED DAMAGES/COMENSATION FOR DELAY

In case the contractor is not able to complete the entire work, in accordance with the contract, within the stipulated completion period or within the period of time extended by the consultant / engineer in charge in writing, then the contractor shall be liable to pay to the owner liquidated damages a sum as stipulated in clause 2 of contract agreement.

1.1.54. TERMINATION OF CONTRACT BY THE OWNER

If the contractor commits any “Act or Insolvency” or shall be adjudged as insolvent or shall have an order for compulsory winding up made against him or pass effective resolution for winding up voluntarily or if the contractor shall suffer execution to be issued, or shall suffer any payment under this contract to be attached by / on behalf of any of the creditors of the contractors, or shall assign the contract without prior written consent of the engineer-in-charge shall charge or encumber this contract thereunder, or is the Engineer-in-charge shall certify in writing that the contractor.

- (a) Has abandoned the contract.
- (b) Has failed to commence works, or has without any lawful excuse under these conditions suspended the progress of the works for seven days after receiving from the Engineer-in-charge written notice to proceed.
- (c) Has failed to proceed with the work with such due diligence and failed to make such due progress as would enable the works to be completed in accordance with the approved programme of work.
- (d) Has failed to remove materials from the site or to pull down and replace work for seven days after receiving from the Engineer-in-charge written notice that the said materials or work were condemned and rejected by the Engineer-in-charge under these conditions.
- (e) Has neglected or failed persistently to observe and perform all or any of the acts, matters or things by this contract to observed and performed by the contractor for seven days after written notice shall have been given to the contractor requiring the contractor to observe or perform the same.
- (f) Has to the detriment of good workmanship or defiance of the Engineer-in-charge instructions to the contrary of the said clauses, the owner with the written consent of the consultant may not withstanding any previous waiver, after given seven days notice in writing under the provision of this clause to the contractor, determine the contract without prejudice to the powers of the consultant or the obligations and liabilities of the contract, the whole of which shall continue to be in force as if the contract has not been so determined and as if the work subsequently executed has been executed by / or on behalf of the contractor.

After issue of such notice, the contractor shall not be at liberty to remove from site any plant, tools and materials belonging to which shall have been placed there on for the purposed of the works and the owner shall have lien upon such plant, tools or materials to subsist from the date of such notice and until the notice shall have been complied with.

If the contractor shall fail to comply with the requirements of said notice for 7 days after such notice has been given, the owner shall have powers to enter upon and take possession of the works and site and all plants, tools and materials thereon, and to engage any other person, firm or agency to complete the works, utilizing plant, tools and materials to the extent possible. The owner shall not in any way be responsible for damage or loss of the tools, equipment and materials and the contractor shall not have any compensation on there of.

Upon completion of the works, Engineer-in-charge shall certify the amount of expenditure properly incurred consequent on and incidental to the defaults of the contractor as aforesaid and such amount shall be deducted from the payments due to the contractor. If the said amount exceed the payments

due to the contractor the owner shall be at liberty to dispose off any of the contractor's tools, materials or plant and apply the proceeds for the payments due from contractor and recover the balance by process of law.

After the work have been completed and after amounts due has been fully recovered from the contractor, Engineer-in-charge shall give written notice to the contractor to remove the surplus plant and materials from site. If such items are not removed within a period of 14 days of such notice, the owner shall have the power to remove and sell the same holding the proceeds less cost of removal and sale to the credit of the contractor. The owner shall not be responsible for any loss sustained by the contractor from such sales.

1.1.55. LABOUR

1.1.55.1 LABOUR RULES

In respect of all labour directly or indirectly employed on the works by the contractor, the contractor, shall comply with the provisions of the contract labour (Regulation and Abolition) Act 1970, minimum Wages Act 1948, payment of wages act 1936 and any amendments thereof and all legislations and rules of the state and / or central government or other local authority, framed from time to time, governing the protection of health, sanitary arrangements, wages, welfare and safety for labour employed on building and construction works and for bonus, retirement benefits, retrenchment / lay off compensation, and all other matters involving liabilities of Employers to Employees. The rules and other statutory obligations with regard to fair wages, welfare and safety measures, maintenance of register etc. will be deemed to be part of the contractors obligation under the contract. The contractor shall indemnify the owner against any payments to be made under the observance of the above regulations without prejudice to his right to claim indemnify from his sub-contractors.

1.1.55.2 ACCIDENT REPORTING

The contractor shall be responsible for the safety of all employees and / or workers employed or engaged by him on and in connection with the works and shall forthwith report all cases of accidents to any of them, whoever caused and whenever occurring to the authorities concerned as required by law and to the Engineer-in-charge and shall make every arrangement to render all possible assistance and aid to the victim of the accident.

1.1.55.3 PROVISION OF WORKMEN'S COMPENSATION ACT

The contractor shall at all times indemnify and keep indemnified the owner against all claims for compensation under the provisions of the workmen's compensation act 1923 or any other law for the time being in force by or in respect of any workmen employed by the contractor in carrying out the contract and against all costs and expenses or penalties incurred by the owner in connection there with. In every case in which, by virtue of the provisions of the said act, the owner is obliged to pay compensation to a workman employed by the contractor in executing the works, the owner shall recover from the contractor the amount of the compensation so paid, and without prejudice to the rights of the owner under the said act. The owner shall be at liberty to recover such amount or any part thereof by deducting it from the Retention money or from any moneys due by the owner to the contractor. Whether under this contract or otherwise without prejudice to any other remedy that may be available to the owner in law. The owner shall not be bound to contest any claim made against it under the said act, except on the written request of the contractor and upon his giving to the owner full security for all costs for which the owner might become liable in consequence of contesting such claim.

1.1.55.4. ACCIDENT OR INJURY TO WORKMEN

The owner shall not be liable for or in respect of any damages or compensation payable by law in respect of, or in consequence of any accident or injury to any workmen or other person in the employment of the contractor or his subcontractor, and the contractor shall indemnify and keep indemnified the owner against all such damages and compensation, and against all claims, damages, proceeding costs, charges and expenses whatsoever in respect thereof or in relation thereto.

1.1.55.5. PROVISION OF MINES ACT

The contractor shall observe and perform all the provisions of the mines act 1952 where applicable or any statutory modifications thereof and shall indemnify and keep indemnified the owner from and against any and all claims under the said act.

1.1.55.6. PRESERVATION OF PEACE

The contractor shall make requisite precautions to prevent any riotous or unlawful behaviour by or amongst his workmen and/or others employed on the works by him, for the preservation of peace and protection of the inhabitants and security or property in the neighbourhood or the works.

1.1.55.7. AGE LIMITS OR LABOUR

The age limit of employment of labour shall be strict accordance with the existing labour regulations.

1.1.55.8. REPORT OF LABOUR EMPLOYED

The contractor, shall submit the Daily Labour Report to the project Manager.

1.1.55.9. OBSERVANCE BY SUB-CONTRACTORS

The contractor shall be responsible for the observance of the provisions of aforesaid clauses by the subcontractors employed by him in the execution of the contract.

1.1.56. ESCALATION

No Escalation of any kind is admissible during the period of the project and Contractor shall keep his prices firm during this period. In case of any additional work (the quantity of which is stated elsewhere) in the total scope of work, these quoted rates for the items shall remain valid for the total pendency of the contract from the notice of award.

(a) Any extra item / items which might be executed as per approval of Project Manager at site during execution but is not covered in the scope of work. The contractor has to submit the rate analysis based on lowest market rates for labour and material. On these rates 15 % shall be paid as overheads and contractors profit. If it is an item rate executed through sub contract, the contractor shall be paid 15 % overheads and contractors profit on the sub contract rate.

1.1.57. Any reference made to any Indian Standard Specifications, shall imply to the latest version of that standard, including such revisions/ amendments as issued by the Bureau of Indian Standards upto last date of receipt of tender The Contractor shall keep at his own cost all such publications including relevant Indian Standard Codes applicable to the work at site.

1.1.58. All the hidden items such as water supply lines, drainage pipes, conduits, sewers etc. are to be properly tested before covering.

- 1.1.59. Samples including brand/ quality of materials and fittings to be used in the work shall be got approved from the Engineer-in-Charge, well in advance of actual execution and shall be preserved till the completion of the work.
- 1.1.60. Equipments like batching plant, concrete pumps excavators/ Transit mixers etc. shall be allowed to be moved away from the site when, in written opinion of Engineer-in-Charge, the same are no longer required at site of work.
- 1.1.61. The contractor, his authorized representative, workmen etc. shall strictly observe orders pertaining to fire precautions prevailing in the area.
- 1.1.62. Contractor(s) shall study the soil investigation report for the site, available in the office of the Engineer-in-Charge and satisfy himself about complete characteristics of soil and other parameters at site. However, no claim on the alleged inadequacy or incorrectness of the soil data supplied by the department shall be entertained.
- 1.1.63. The tenderer shall see the approaches to the site. In case any approach from main road is required at site or existing approach is to be improved and maintained for cartage of materials by the contractor, the same shall be provided, improved and maintained by the contractor at his own cost.
- 1.1.64. Contractor shall take all precautionary measures to avoid any damage to adjoining property. All necessary arrangement shall be made at his own cost.
- 1.1.65. The contractor shall take all precautions to avoid accidents by exhibiting necessary caution boards day and night, speed limit boards, red flags, red lights and providing barrier. He shall be responsible for all damages and accidents caused to work due to negligence on his part. No hindrances shall be caused to traffic, during the execution of the work.
- 1.1.66. The contractor shall take instructions from the Engineer-in-Charge regarding collection and stacking of materials at any place. No excavated earth or building rubbish shall be stacked on areas where other buildings, roads, compound wall, services etc are to be constructed.
- 1.1.67. The contractor shall provide at his own cost suitable weighing, surveying and levelling and measuring arrangements as may be necessary at site for checking. All such equipments shall be got calibrated in advance from laboratory, approved by the Engineer-in-Charge. Nothing extra shall be payable on this account.
- 1.1.68. Contractor shall provide permanent bench marks, flag tops and other reference points for the proper execution of work and these shall be preserved till the end of work. All such reference points shall be in relation to the levels and locations, given in the Architectural and plumbing drawings.
- 1.1.69. Water tanks, taps, sanitary, water supply and drainage pipes, fittings and accessories should conform to approved manufacturers specifications where CPWD Specifications are not applicable. The contractor should get the materials (fixtures/fittings) tested from approved labs wherever required at his own cost.
- 1.1.70. The work shall be carried out in accordance with the Architectural drawings and Structural drawings, to be issued from time to time, by the Engineer-in-Charge. Before commencement of any item of work, the contractor shall correlate all the relevant architectural and structural drawings issued for the work, nomenclature of items, specifications etc. and satisfy himself that the information available there from is complete and unambiguous. The figures & the written dimensions of the drawing shall supersede the measurement by scale. The discrepancy, if any, shall be brought to the notice of the Engineer-in-Charge for immediate decision before execution of the work. The contractor alone shall be responsible for any loss or damage occurring by the commencement of work on the basis of any erroneous and/ or incomplete information and no claim, whatsoever shall be entertained on this account.

- 1.1.71. The contractor should submit the shop drawing of staging and shuttering for approval of Engineer-in-Charge before actually commencing the execution of work under the item. Nothing extra shall be payable on this account.
- 1.1.72. Other agencies may also simultaneously execute and install the works and the contractor shall afford necessary facilities for the same. The contractor shall leave such recesses, holes, openings, trenches etc. as may be required for such related works (for which inserts, sleeves, brackets, conduits, base plates, clamps etc. shall be available as specified elsewhere in the contract) and the contractor shall fix the same at the time of casting of concrete, stone work and brick work, if required, and nothing extra shall be payable on this account.
- 1.1.73. All material shall only be brought at site as per program finalized with the Engineer-in-Charge. Any pre-delivery of the material not required for immediate consumption shall not be accepted and thus not paid for.
- 1.1.74. The contractor shall procure the required materials in advance so that there is sufficient time for testing of the materials and approval of the same before use in the work.
- 1.1.75. Existing drains, pipes, cables, over-head wires, sewer lines, water lines and similar services encountered in the course of the execution of work shall be protected against the damage by the contractor at his own expense. The contractor shall not store materials or otherwise occupy any part of the site in a manner likely to hinder the operation of such services. In case temporary supporting of such services is required to facilitate the work, the same shall be done by the contractor at no extra cost. In case the existing services are to be shifted permanently, then before dismantling the existing services, alternate/diversion of service lines has to be laid by the contractor so that there is no interruption in use of existing services. The contractor has to plan the alternate suitable route for diversion/shifting of service lines and get the same approved from the Engineer-in-Charge before starting shifting of services. Nothing extra shall be paid except the payment of dismantling and laying of new service lines as per conditions of contract.
- 1.1.76. The contractor shall be responsible for the watch and ward/ guard of the buildings, safety of all fittings and fixtures including sanitary and water supply fittings and fixtures provided by him against pilferage and breakage during the period of installations and thereafter till the building is physically handed over to the client department. No extra payment shall be made on this account.
- 1.1.77. The contractor shall be fully responsible for the safe custody of materials brought by him/ issued to him even though the materials may be under double lock key system.
- 1.1.78. For construction works which are likely to generate malba/ rubbish, contractor shall dispose of malba, rubbish & other unserviceable materials and wastes at his own cost to the notified specified dumping ground and under no circumstances these shall be stacked/ dumped even temporarily, outside the construction premises.
- 1.1.79. The rates quoted by the Contractor are deemed to be inclusive of site clearance, setting out work, profile, establishment of reference bench mark(s), taking spot levels, construction of all safety and protection devices, barriers, preparatory works, working during monsoon, working at all depths, height, lead, lift and location etc until/ unless specified otherwise and any other incidental works required to complete this work. Nothing extra shall be payable on this account.
- 1.1.80. For works below ground level the contractor shall keep that area free from water. If dewatering or bailing out of water is required the contractor shall do it and nothing extra shall be paid except otherwise provided in the items of schedule of quantities.
- 1.1.81. Results of sub-surface investigations conducted at site are indicated in extracts of the report attached. This information about the soil and sub-soil water conditions is being made available to the Contractor, in good faith, for guidance only and the Contractor is advised to obtain details directly as may be considered necessary by him before quoting rates in the tender. No claim whatsoever on account of any discrepancy

between the sub-surface strata conditions that may be actually encountered at the time of execution of the work and those given in these tender documents, in-accuracy or interpretation thereof shall be entertained from the Contractor under any circumstances. The ground water table is a variable condition and the information given in the report is only indicative and it may vary from time to time.

- 1.1.82. Any legal or financial implications resulting out of disposal of earth shall be sole responsibility of the contractor. Nothing extra over the schedule shall be paid on this account.
- 1.1.83. The Contractor shall keep himself fully informed of all acts and laws of the Central & State Governments, all orders, decrees of statutory bodies, tribunals having any jurisdiction or authority, which in any manner may affect those engaged or employed and anything related to carrying out the work. All the rules & regulations and bye-laws laid down by Collector / MC etc. and any other statutory bodies shall be adhered to, by the contractor, during the execution of work. The Contractor shall also adhere to all traffic restrictions notified by the local authorities. It is clarified that the extra sewage charges (one time charges for commencement of work) required to be paid to the Municipal Corporation/ other statutory bodies shall be paid by the department and need not be considered by the contractor. The water charges (for municipal water connection as well as tanker water) shall be borne by the contractor. Also, if the contractor obtains water connection for the drinking purposes from the municipal authorities or any other statutory body, the consequent sewage charges shall be borne by the contractor. All statutory taxes, levies, charges (including water and sewage charges, charges for temporary service connections and/ or any other charges) payable to such authorities for carrying out the work, shall be borne by the Contractor. The Contractor shall arrange to give all notices as required by any statutory/ regulatory authority and shall pay to such authority all the fees that is required to be paid for the execution of work. He shall protect and indemnify the Department and its officials & employees against any claim and /or liability arising out of violations of any such laws, ordinances, orders, decrees, by himself or by his employees or his authorized representatives. Nothing extra shall be payable on these accounts. The fee payable to statutory authorities for obtaining the various permanent service connections and Occupancy Certificate for the building shall be borne by the Department.
- 1.1.84. Royalty at the prevalent rates shall be paid by the Contractor as per the terms of supply between them on all materials such as boulders, metals, sand and bajri etc. collected by him for the execution of the work, directly to the revenue authority of the state government concerned. Nothing extra shall be payable on this account.
- 1.1.85. No foreign exchange shall be made available by the Department for importing (purchase) of equipment, plants, machinery, materials of any kind or any other items required to be carried out during execution of the work. No delay and no claim of any kind shall be entertained from the Contractor, on account of variation in the foreign exchange rate.
- 1.1.86. The Contractor shall conduct his work so as not to interfere with or hinder the progress of the work being performed by other Contractors or by the Engineer-in-Charge. As far as possible, he shall arrange his work and place, so as not to interfere with the operations of other Contractors or shall arrange his work with that of the others, in an acceptable and coordinated manner and shall perform it in proper sequence.
- 1.1.87. The Contractor shall assume all liability, financial or otherwise in connection with this contract and shall protect and indemnify the Department from any and all damages and claims that may arise on any account. The Contractor shall indemnify the Department against all claims in respect of patent rights, royalties, design, trademarks of name or other protected rights, damages to adjacent buildings, roads or members of public, in course of execution of work or any other reasons whatsoever, and shall himself defend all actions arising from such claims and shall indemnify the Department in all respect from such actions, costs and expenses. Nothing extra shall be payable on this account.
- 1.1.88. The Contractor shall make all necessary arrangements for protecting from rains, the work already executed and for carrying out the further work, during monsoon including providing and fixing temporary shelters, protections etc. Nothing extra shall be payable on this account. Also, no claims for hindrance shall be entertained on this account.

- 1.1.89. In case of flooding of site on account of rain or any other cause and any consequent damage, whatsoever, no claim financially or otherwise shall be entertained notwithstanding any other provisions elsewhere in the contract agreement. Also, the Contractor shall make good, at his own cost, the damages caused, if any.
- 1.1.90. The Contractor shall take all necessary precautions to prevent any nuisance or inconvenience to the owners, tenants or occupants of the adjacent properties and to the public in general. The Contractor shall take all care, as not to damage any other adjacent property or other services running adjacent to the plot. If any damage is done, the same shall be made good by the Contractor at his own cost and to the entire satisfaction of the Engineer-in-Charge. The Contractor shall use such methodology and equipments for execution of the work, so as to cause minimum environmental pollution of any kind during construction, to have minimum construction time and minimum inconvenience to road users and to the occupants of the buildings on the adjacent plot and public in general, etc. He shall make good at his own cost and to the entire satisfaction of the Engineer in Charge any damage to roads, paths, cross drainage works or public or private property whatsoever caused, due to the execution of the work or by traffic brought thereon, by the Contractor. Further, the Contractor shall take all precautions to prevent any pollution of streams and waterways. All waste or superfluous materials shall be carted away by the Contractor, entirely to the satisfaction of the Engineer-in-Charge. Utmost care shall be taken to keep the noise level to the barest minimum so that no disturbance as far as possible is caused to the occupants/ users of adjoining buildings. No claim what so ever on account of site constraints mentioned above or any other site constraints not specifically stated here, shall be entertained from the Contractor. Therefore, the Contractors are advised to visit site and get first hand information of site constraints. Accordingly, they should quote their tender. Nothing extra shall be payable on this account.
- 1.1.91. All ancillary and incidental facilities required for execution of work like labour camp, stores, fabrication yard, offices for Contractor, watch and ward, temporary ramp required to be made for working at the basement level, temporary structure for plants and machineries, water storage tanks, installation and consumption charges of temporary electricity, telephone, water etc. required for execution of the work, liaison and pursuing for obtaining various No Objection Certificates, completion certificates from local bodies etc., protection works, barricading, testing facilities/ laboratory at site of work, facilities for all field tests and for taking samples etc. during execution or any other activity which is necessary (for execution of work and as directed by Engineer-in-Charge), shall be deemed to be included in rates quoted by the Contractor, for various items in the schedule of quantities. Nothing extra shall be payable on these accounts. Before start of the work, the Contractor shall submit to the Engineer-in-Charge, a site/ construction yard layout, specifying areas for construction, site office, positioning of machinery, material yard, cement and other storage, steel fabrication yard, site laboratory, water tank, etc.
- 1.1.92. The Contractor shall display all permissions, licenses, registration certificates, bar charts, other statements etc under various labour laws and other regulations applicable to the works, at his site office.
- 1.1.93. No tools and plants including any special T&P etc. shall be supplied by the Department and the Contractor shall have to make his own arrangements at his own cost. No claim of hindrance (or any other claim) shall be entertained on this account. The Contractor shall cooperate with and provide the facilities to the associate-Contractors and other agencies working at site for smooth execution of the work. The Contractor shall :
- i. Allow use of scaffolding already erected, toilets, sheds etc.
 - ii. Properly co-ordinate their work with the work of other Contractor
 - iii. Provide control lines and benchmarks to his associate-Contractors and the other Contractor
 - iv. Provide electricity and water at mutually agreed rates.
 - v. Provide hoist and crane facilities for lifting material at mutually agreed rates.
 - vi. Co-ordinate with other Contractors for leaving inserts, making chases, alignment of services etc. at site.
 - vii. Adjust work schedule and site activities in consultation with the Engineer-in-Charge and other Contractors to suit the overall schedule completion.
 - viii. Resolve the disputes with other Contractor amicably and the Engineer-in-Charge shall not be made intermediary or arbitrator. The contractor shall indemnify the Department against any claim(s) arising out of such disputes.

1.1.94. The contractor shall submit completion plan for water, sewage and drainage line plan within thirty days of the completion of the work at his own cost four prints of "as built" drawings to the Engineer-in-Charge. These drawings shall have the following information.

- (a) Run off of all piping and their diameters including soil, waste pipes and vertical stacks.
- (b) Ground and invert level of all drainage pipes together with locations of all manholes and connections, upto out fall.
- (c) Run off of all water supply lines with diameters, location of control valves, access panels etc.

In case, the contractor fails to submit the completion plan as aforesaid, the department will get it done through other agency at his cost and actual expenses incurred plus Rs 15,000/- for the same shall be recovered from the contractor.

1.1.95. Unless otherwise specified in the Agreement, the rates for respective items shall be all inclusive and apply to the following:

- i. All lifts & all heights, floors including terrace, leads and depths.
- ii. All labour, material, tools and plants and other inputs involved in the execution of the item.
- iii. Any of the conditions and specifications mentioned in the tender documents.
- iv. Providing sunk flooring in bath-rooms, kitchen, etc.
- v. Any legal or financial implications resulting out of disposal of earth, if any.
- vi. Payment of Royalty at the prevailing rates, if any, on the boulders, metal, shingle, sand and bajri etc. or any other material collected by him for the work direct to revenue authorities.
- vii. Performance test of the entire installation(s) before the work is finally accepted.
- viii. Any cement slurry added over base surface (or) for continuation of concreting for better bond is deemed to have been built in the items.
- ix. All incidental charges for cartage, storage and safe custody of materials brought to site.

1.1.96. **SECRECY**

- a) The contractor shall take all steps necessary that all persons employed on any work in connection with the contract have notice that the Indian Official Secrets Act 1923 applies to them & will continue so to apply even after the execution of such works under the contract.
- b) The contract is confidential and must be strictly confined to the contractor's own use (except so far as confidential disclosure to sub-contractors or suppliers as necessary) and to the purpose of the contract.
- c) All documents, copies thereof & extracts there from furnished to the contractor shall be returned to the Engineer-in-Charge on the completion of the work/ works or the earlier determination of the contract.

1.1.97. **DOCUMENTATION**

The Contractor shall render all help and assistance in documenting the total sequences of this project by way of photography, slides, audio/ video recording & other records etc. Nothing extra shall be payable to Contractor on this account. However, cost of photographs, slides, audio/ video graph etc. shall be borne by the Department. The original films shall be the property of the Department. No copy shall be prepared without the prior approval of the Engineer- in – Charge.

1.1.98. **PROGRAMME CHART**

- a) The Contractor shall prepare an integrated programme chart in MS Project/ Primavera software for the execution of work, showing clearly all activities from the start of work to completion, with details of manpower, equipment and machinery required for the fulfilment of the program.
- b) The work has to be completed in stages as indicated in the Milestones under Schedule 'F' and the programme should be prepared in such a manner to achieve these Milestones as indicated therein or earlier.
- c) The programme chart should include the following: -
 - Descriptive note explaining sequence of the various activities.
 - Network (PERT/ CPM / BAR CHART)
 - Programme for procurement of materials by the contractor.

- Programme of procurement of machinery/ equipments having adequate capacity, commensurate with the quantum of work to be done within the stipulated period, by the contractor. In addition to above to achieve the progress of work as per programme, the contractor must bring at site adequate shuttering material required for cement concrete and R.C.C. works etc. for three floors within one month from the date of start of work till the completion of RCC work as per requirement of work. The contractor shall submit shuttering schedule adequate to complete structure work within laid down physical milestone.
- d) If at any time, it appears to the Engineer-in-Charge that the actual progress of work does not conform to the approved program referred above or after rescheduling of milestone, the contractor shall produce a revised programme within 7 (seven) days, showing the modifications to the approved programme to ensure timely completion of the work. The modified schedule of programme shall be approved by the Engineer-in-Charge.
- e) The submission for approval by the Engineer-in-Charge of such programme of such particulars shall not relieve the contractor of any of his duties or responsibilities under the contract. This is without prejudice to the right of Engineer-in-Charge to take action against the contractor as per terms and conditions of the agreement.
- f) The Contractor shall submit the progress report using MS Project/ Primavera software with base line programme referred above for the work done during previous month to the Engineer-in-charge on or before fifth day of each month failing which a recovery of ₹ 500/- shall be made on per day basis in case of delay in submission of the monthly progress report.

1.1.99. PROGRESS AND MONITORING OF WORK:

- (a) Apart from the above integrated program chart, the contractor shall be required to submit monthly progress report of the work in a computerized form. The progress report shall contain the following, apart from whatever else may be required as specified:
- Construction schedule of the various components of the work through a bar chart for the next three quarters (or as may be specified), showing the milestones, targeted tasks and up to date progress.
- Progress chart of the various components of the work that are planned and achieved, for the month as well as cumulative up to the month, with reason for deviations, if any in a tabular format.
- Plant and machinery statement, indicating those deployed in the work.
- Man-power statement, indicating individually the names of all the staff deployed on the work, along with their designations.
- Financial statement, indicating the broad details of all the running account payment received up to date, such as gross value of work done, advances taken, recoveries effected, amount withheld, net payments details of cheque payment received etc.
- (b) For completing the work in time, the Contractor might be required to work in two or more shifts (including night shifts). No claim whatsoever shall be entertained on this account, not with-standing the fact that the Contractor may have to pay extra amounts for any reason, to the labourers and other staff engaged directly or indirectly on the work according to the provisions of the labour and other statutory bodies regulations and the agreement entered upon by the Contractor with them.
- (c) The work should be planned in a systematic manner so that chase cuttings in the walls, ceilings and floors is minimized. Wherever absolutely essential, the chase shall be cut using chase cutting machines. Chases will not be allowed to be cut using hammer/ chisel. The electrical boxes should be fixed in walls simultaneously while raising the brick work. The contractor shall ensure proper co-ordination of various disciplines viz. building works, sanitary & water supply & electrical installations etc.
- (d) The contractor shall conduct his work, so as not to interfere with or hinder the progress or completion of the work being performed by other contractor(s) or by the Engineer-in-Charge and shall as far as possible arrange his work and shall place and dispose off the materials being used or removed so as not to interfere with the operations of other contractor or he shall arrange his work with that of the others in an acceptable and coordinated manner and shall perform it in proper sequence to the complete satisfaction of Engineer-in-charge.
- (e) The Contractor shall do proper sequencing of the various activities by suitably staggering the activities within various pockets in the plot so as to achieve early completion. The agency may deploy adequate equipment, machinery and labour as required for the completion of the entire work within the stipulated period specified. Also ancillary facilities shall be provided commensurate with requirement to complete the

entire work within the stipulated period. Nothing extra shall be payable on this account. Adequate number/ sets of equipment in working condition, along with adequate stand-by arrangements, shall be deployed during entire construction period. It shall be ensured by the Contractor that all the equipment, Tools & Plants, machineries etc. provided by him are maintained in proper working conditions at all times during the progress of the work and till the completion of the work. Further, all the constructional tools, plants, equipment and machineries provided by the Contractor, on site of work or his work shop for this work, shall be exclusively intended for use in the construction of this work and they shall not be shifted/ removed from site without the permission of the Engineer-in-Charge.

- (f) All material shall only be brought at site as per program finalized with the Engineer-in-Charge. Any pre-delivery of the material not required for immediate consumption shall not be accepted and thus not paid for.

1.1.100. DEFECT LIABILITY:

1.1.100.1. The contractor's liability during the defect liability period from the final date of completion as per clause 17 shall be limited to rectification of defects including replacement as follows which in the opinion of Engineer-in-Charge are not manmade.

S.No.	Description	Defect Liability
(i)	Concrete	Rectification of structural/ superficial/ non-structural cracks. Rectification of dampness/ seepage in roof slab/ junctions & sunken portion. Rectification of cracks in beam, shade, column.
(ii)	Brick work/ Concrete Block Masonry	Rectification of cracks in panel wall/ portion. Cracks/ settlement of dwarf walls. Rectification of efflorescence/ leaching.
(iii)	Joinery	Replacement of warped joinery. Cracks in panels, rails/ styles etc.
(iv)	Builders Hardware	Repairs/ Replacement of loosened/ pre-mature failure of fittings. Tightening/ Replacement of sag in mosquito proofing.
(v)	Steel & Iron work	Rectification/ Replacement of defective part of rolling shutter. Redoing of defective portion in fabrication/ welding including painting. Steel windows, grills, gates etc.– defects to be rectified.
(vi)	Roof treatment	Rectification of leakage/ seepage of roof slab including covering at junction till guarantee period.
(vii)	Plastering	Rectification of structural/ superficial cracks if any. Rectification of protruding/ peeling off plaster if any. Rectification of efflorescence
(viii)	Flooring	Rectification of sinking portion of plinth protection including saucer drain. Settlement of foundation & floors, hollow sounding, cracks in tiles/stones.
(ix)	Plumbing/ Sanitary fittings	Making good of leakage through soil/ waste pipe joints. Replacement of looking mirror if found wavy.

S.No.	Description	Defect Liability
		Rectification of leakage of over head tanks. Leakage/ seepage of sunken floor, blockage of taps/ pipes, non-functioning of cistern.
(x)	Finishes	Making good of defective/ dissimilar patches of painting to match with remaining surfaces, peeling of paint.
(xi)	Internal Water Supply	Repairs/ Replacement of defective taps/ fittings. Repair to leakage of GI water pipe lines including joints. Removal of blockage of GI pipe lines.
(xii)	Roads	Repair of sinked portion of road & potholes, if any
(xiii)	Sewage	Rectification of slope/ system if found defective during use. Rectification of major blockage in Sewer lines. Cracks & settlement of sewage lines.
(xiv)	Drains	Repair to Drains. Settlement of Drains
(xv)	External Water Supply	Repairs to installations & fittings.
(xvi)	General	All manufacturing defects of structures/ fixtures/ fittings/ equipments other than listed above including any defects of shrinkage or other faults that appear in the work within twelve months after a certificate of its completion is given by the Engineer-in-Charge shall be rectified by the contractor.

1.1.101. SAFETY MEASURES

1.1.101.1 Contractor shall take all precautionary measures to avoid any damage to adjoining property. All necessary arrangement shall be made at his own cost.

1.1.101.2. Warning/ Caution Boards

All temporary warning/ caution boards/ glow signage display such as "Construction Work in Progress", "Keep Away", "No Parking", Diversions & protective Barricades etc. shall be provided and displayed during day time by the Contractor, wherever required and as directed by the Engineer-in-Charge. These glow signage and red lights shall be suitably illuminated during night also. The Contractor shall be solely responsible for damage and accident caused, if any, due to negligence on his part. Also he shall ensure that no hindrance, as far as possible, is caused to general traffic during execution of the work. This signage shall be dismantled & taken away by the Contractor after the completion of work, only after approval of the Engineer-in-Charge. Nothing extra shall be payable on this account.

1.1.101.3 Sign Boards

The Contractor shall provide and erect a display board of size and shape as required and paint over it, in a legible and workman like manner, the details about the salient features of the project, as required by the Engineer-in-Charge. The Contractor shall fabricate and put up a sign board in an approved location and to an approved design indicating name of the project, client/ owner, architects, structural consultants, Department etc. besides providing space for names of other Contractors, Associate contractors and specialized agencies. Nothing extra shall be payable on this account.

1.1.101.4 Necessary protective and safety equipments shall be provided to the Site Engineer, Supervisory staff, labour and technical staff of the contractor by the Contractor at his own cost and used at site.

1.1.101.5. No inflammable materials including P.O.L shall be allowed to be stored in huge quantity at site. Only limited quantity of P.O.L may be allowed to be stored at site subject to the compliance of all rules/ instructions issued by the relevant authorities and as per the direction of Engineer-in- Charge in this regard. Also all precautions and safety measures shall be taken by the Contractor for safe handling of the P.O.L products stored at site. All consequences on account of unsafe handling of P.O.L shall be borne by the Contractor.

1.2 SCOPE OF WORK

The scope of work comprises installation, commissioning and testing of sewage treatment plant of capacity 100m³/day based on FAB technology. The effluent as per parameters given in Para 3.1.2.1 shall be treated to produce effluent of quality to reach at least a standard mentioned in Para 3.1.2.2. of this specification or as per local regulations. The Tenderer shall handover the plant in full operational condition to the satisfaction of the Engineer.

The sewage treatment plant shall essentially include but not limited to the all items of work indicated in specifications Para 3.1.2.3.

2.0 CIVIL WORKS

2.1. QUALITY ASSURANCE/TESTING OF MATERIALS:

2.1.1. Batch Mix Concrete / Ready Mix Concrete

2.1.1.1. The contractor shall establish a laboratory at site to test the coarse aggregate, fine aggregate, water, sand, cement etc to be used in Batch Mix Plant/ Ready Mix Plant. Contractor is also required to depute technical personnel specifically for supervising the manufacturing of design Mix Concrete in Batch Mix Plant/ Ready Mix Plant and for quality control of mix produced.

2.1.1.2. All incidental expenditure on security, construction of cement godown, access roads, arrangement of water, electricity etc. to be incurred by the agency for arranging, installing and operation of Batch Mix Plant shall be deemed to have been included in his quoted rates and no claim whatsoever will be tenable on this account.

Samples of materials required for testing shall be provided free of charge by the contractor. The cost of tests shall be borne by the contractor.

All the test in field lab setup at construction site shall be carried out by the Engineering Staff deployed by the contractor which shall be 100% witnessed by JE & 50% of tests shall be witnessed by AE –in-charge. At least 10% of the tests are to be witnessed by the EE.

All the entries in the registers will be made by the designated Engineering staff of the contractor and same should be regularly reviewed by JE/AE/EE/SE division office.

Contractor shall be responsible for safe custody of all the test register

Submission of copy of all test registers, materials at site Register and hindrance register along with each alternate Running Account Bill and Final Bill shall be mandatory. These registers should be duly checked by AE (P) in Division Office & receipts of registers should also be acknowledged by Accounts Officer by signing the copies and register to confirm receipt in division office.

All other expenditure required to be incurred for taking samples; conveyance, packing etc. shall be borne by the contractor himself.

2.1.1.3 However, if any ultrasonic pulse velocity/ load testing or special testing is to be done for concrete whose strength is doubtful, the cost of the same shall be borne by the contractor.

2.1.1.4. In case there is any discrepancy in frequency of testing as given in list of mandatory tests and that in individual sub-heads of work as per CPWD Specifications higher of the two frequencies of testing shall be adopted.

2.1.2. Field Laboratory

The contractor has to establish field laboratory at site including all necessary equipments and skilled manpower for the Field Tests as at Page No. 27-29 of Part-A at his own cost to have proper quality control.

For performing the above tests, the Field Testing Equipments and Instruments as at Page No 27-29 of Part-A are to be arranged and maintained by the contractor.

2.1.2.1. The contractor shall ensure quality construction in a planned and time bound manner. Any sub-standard material/ work beyond set-out tolerance limit shall be summarily rejected by the Engineer-in-Charge & contractor shall be bound to replace/ remove such sub-standard/ defective work immediately.

2.1.2.2. The list of Laboratory/ Field equipment referred above are to be arranged and maintained by the contractor at the site of work. In case the equipment required for any test is not available at site, the department shall get the test conducted from the third party. However in that event, besides providing free materials of sample, the cost of taking of sample, packing, transportation, testing charges etc. shall be borne by the contractor irrespective of the results.

2.1.3. Sample of Materials:

2.1.3.1. All materials and fittings brought by the contractor to the site for use shall conform to the samples approved by the Engineer-in-Charge which shall be preserved till the completion of the work. If a particular brand of material

is specified in the item of work in Schedule of Quantity, the same shall be used after getting the same approved from Engineer-in-Charge. Wherever brand/ quality of material is not specified in the item of work, the contractor shall submit the samples as per List of Approved Makes for approval of Engineer-in-Charge. For all other items, ISI Marked materials and fittings shall be used with the approval of Engineer-in-Charge. Wherever ISI Marked material/ fittings are not available, the contractor shall submit samples of materials/ fittings manufactured by firms of repute conforming to relevant Specifications or IS codes for the approval of Engineer-in-Charge.

2.1.3.2. To avoid delay, contractor should submit samples as stated above well in advance so as to give timely orders for procurement. If any material, even though approved by Engineer-in-Charge is found defective or not conforming to specifications shall be replaced/ removed by the contractor at his own risk & cost.

2.1.3.3. BIS marked materials except otherwise specified shall also be subjected to quality test besides testing of other materials as per the specifications described for the item/ material. Wherever BIS marked materials are brought to the site of work, the contractor shall, furnish manufacturer's test certificate or test certificate from approved testing laboratory to establish that the material procured by the contractor for incorporation in the work satisfies the provisions of specifications relevant to the material and/ or the work done.

BIS marked items (except cement & steel for which separate provisions have been made in (para 4.0) required on the work shall be got tested, for only important tests, which govern the quality of the product, as decided by the Engineer-in-Charge. The frequency of such tests (except the mandatory test) shall be 5% of the frequency as specified in BIS. For mandatory test, frequency shall be as specified in the CPWD Specifications.

2.1.3.4. For certain items, if frequency of tests is neither mentioned in the CPWD Specifications & BIS, then tests shall be carried out as per decision of Engineer-in-Charge.

2.1.4. CEMENT & STEEL REINFORCEMENT (IF NOT STIPULATED TO BE SUPPLIED BY THE DEPARTMENT).

2.1.4.1 Contractor has to produce manufacturers test certificate and challan for each lot of Cement & Steel Reinforcement procured at site.

a) CEMENT:

- (i) The contractor shall procure 43 grade Portland Cement conforming to IS: 8112/ Portland Pozzolana Cement conforming to IS: 1489 (Part-1) as required in the work from reputed manufacturers of cement such as ACC, Ultratech, Lafarge, Ambuja, Jaypee Cement, and J.K. Cement. The cement of approved make as aforesaid in 50 kg. Bags bearing manufacturer's name and ISI marking, along with manufacturers test certificate for each lot shall be procured by the contractor. Portland Pozzolana Cement is to be used for RCC works only subject to fulfilment of conditions of circular No. CDO/ SE(RR)/ Fly ash (MAN) 02 dated 09.04.09. However, if the contractor uses higher grade of cement or uses OPC only nothing extra shall be paid.

Samples of cement arranged by the contractor shall be taken by the Engineer-in-Charge and got tested in accordance with provisions of relevant BIS Codes. The cement for such testing purpose shall be supplied by the contractor free of charge. In case test results indicate that the cement arranged by the contractor does 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 cost of tests shall be borne by the contractor.

- (ii) Cement shall be brought at site in bulk supply of approximately 40 tones or as decided by the Engineer-in-Charge.
- (iii) OPC & PPC bags shall be stored in separate godown. Separate godown for tested cement and fresh cement (under testing) to be constructed by the contractor at his own cost as per sketches given in C.P.W.D Specifications having weather-proof roofs and walls. The size of the cement godown is indicated in the sketches for guidance. The actual size of godown shall be as per site requirements and nothing extra shall be paid for the same. Each godown shall be provided with a single door with two locks. The keys of one lock shall remain with Engineer-in-Charge or his authorized representative of the work and that of other lock with the authorized agent of the contractor at the

site of work so that the cement is issued from godown according to the daily requirement with the knowledge of both parties. The account of daily receipt and issue of cement shall be maintained in a register in the prescribed proforma and signed daily by the contractor or his authorized agent and Engineer-in-Charge or his authorized representative in token of its correctness. The day to day receipt and issue accounts of different grade/brand of cement shall be maintained separately in the standard proforma by the contractor or his authorized representative which shall be duly signed by the authorized representative of the Engineer-in-Charge before issue to the work on day to day basis.

One separate cement godown having capacity of 150 MT or more as decided by the Engineer-in-Charge shall be constructed by the contractor at site of work for which no extra payment shall be made. The contractor shall be responsible for the watch and ward and safety of the cement godowns. The contractor shall facilitate the inspection of the cement godowns by the Engineer-in-Charge at any time.

- (iv) The actual issue and consumption of cement on work shall be regulated and proper accounts maintained as provided in the contract. The theoretical consumption of cement shall be worked out as per procedure prescribed in Clause-42 of the contract and shall be governed by the conditions laid therein.
- (v) If the quantity of cement actually used in the work is found to be more than the theoretical quantity of cement including authorized variation, nothing extra shall be payable to the contractor on this account. In the event of it being discovered that after the completion of the work, the quantity of cement used is less than the quantity ascertained as herein before provided (allowing variation on the minus side as stipulated in Clause - 42), the cost of quantity of cement not so used shall be recovered from the contractor as specified in schedule. Decision of the Engineer-in-Charge in regard to theoretical quantity of cement which should have been actually used as per the schedule and recovered at the rate specified, shall be final and binding on the contractor.

For non-scheduled items, the decision of the Engineer-in-charge regarding theoretical quantity of the cement, which should have been actually used, shall be final and binding on the contractor.

- (vi) Cement brought to site and cement remaining unused after completion of work shall not be removed from site without written permission of the Engineer-in-Charge.
- (vii) In case the contractor brings surplus quantity of cement the same shall be removed from the site after completion of work by the contractor at his own cost after approval of the Engineer-in-Charge.
- (viii) Cement, which is not used within 90 days from its date of manufacture, shall be retested at approved laboratory. Until the results of such tests are found satisfactory, it shall not be used on the work.

b) Steel Reinforcement:

- (i) The contractor shall procure TMT bars of Fe500D grade from primary steel producers such as SAIL, Tata Steel Ltd., Rashtriya Ispat Nigam Ltd., Jindal Steel and Power Ltd. and JSW Steel Ltd. or any other producer as approved by CPWD who are using iron ore as the basic raw material/ input and having crude steel capacity of 2.0 Million tonnes per annum and above.
The grade of the steel Fe 500 D to be procured is to be specified as per BIS 1786-2008.
The TMT bars procured from primary producers shall conform to manufacturer's specifications.
TMT bars procured from primary producers, the specifications shall meet the provisions of IS 1786: 2008 pertaining to Fe 500 D grade of steel:

Mechanical Properties

Property	Fe 500 D
0.2 percent proof stress/ Yield stress, Min. , N/mm ²	500.0
Tensile Strength, Min	10 percent more than the actual 0.2 percent proof stress/ yield stress but not less than 565.0 N/ mm ² .
Elongation Percentage, Min. on gauge length $5.65\sqrt{A}$, where A is the cross-sectional area of the test piece	16.00

Chemical Properties

Constituent	Fe 500 D Max. Percent
Carbon	0.25
Sulphur	0.040
Phosphorus	0.040
Sulphur + Phosphorus	0.075

- (ii) The contractor shall have to obtain and furnish test certificates & challan to Engineer –in- Charge in respect of all the supplies brought by him to the site of work.
- (iii) Samples shall also be taken and got tested by the Engineer-in-Charge as per the provisions in this regard in relevant BIS codes. In case the test results indicate that the steel arranged by the contractor does not conform to the specifications, as defined under para 4.3.1 (a) above, the same shall stand rejected, and it shall be removed from the site of work by the contractor at his cost within a week time of written orders from the Engineer-in Charge to do so.
- (iv) The steel reinforcement bars shall be brought in bulk supply of 25 tones or more or as decided by the Engineer-in-Charge along with manufacturer test certificate for each lot.
- (v) The steel reinforcement bars shall be stored by the contractor at site of work in such a way as to prevent their distortion and corrosion and nothing extra shall be paid on these accounts. Bars of different sizes and lengths shall be stored separately to facilitate easy counting and checking.
- (vi) Unless OTHERWISE specified elsewhere in the contract document, the testing (nominal mass, tensile strength, bend test, rebend test etc.) shall be done as per frequency of samples not less than as given below:

SIZE OF BAR	FOR CONSIGNMENT BELOW 100 TONNES	FOR CONSIGNMENT OVER 100 TONNES

Under 10 mm dia	One sample for each 25 tonnes or part thereof.	One sample for each 40 tonnes or part thereof
10 mm to 16 mm dia	One sample for each 35 tonnes or part thereof.	One sample for each 45 tonnes or part thereof
Over 16 mm dia	One sample for each 45 tonnes or part thereof	One sample for each 50 tonnes or part thereof

- (vii) The contractor shall supply free of charge the steel required for testing including transportation to testing laboratories. The cost of tests shall be borne by the contractor.
- (viii) The Actual issue and consumption of steel on work shall be regulated and proper account maintained as provided in clause 10 of the contract. The theoretical consumption of steel shall be worked out as per procedure prescribed in Clause 42 of the contract and shall be governed by conditions laid therein. In case the consumption is less than theoretical consumption including permissible variation, recovery at the rate so prescribed shall be made. In case of excess consumption no adjustment need to be made.
- (ix) Steel brought to site and steel remaining unused shall not be removed from site without the written permission of the Engineer-in-Charge
- (x) The contractor shall submit original vouchers from the manufacturer for the total quantity of steel supplied under each consignment to be incorporated in the work. All consignment received at the work site shall be inspected by the Site staff along with the relevant documents before acceptance. The contractor shall obtain Original Vouchers and Test Certificates and furnish the same to the Engineer-in-Charge in respect of all the lots of steel brought by him from approved supplier to the site of work. The original vouchers and test certificates shall be defaced by the Site staff and kept on record in the site office.
- (xi) Reinforcement including authorized spacer bars and laps shall be measured in length of different diameters as actually (not more than as specified in the drawings) used in the work nearest to a centimetre. Wastage and unauthorized overlaps shall not be measured.
- (xii) The standard sectional weights referred to as in Table 5.4 in para 5.3.4 in CPWD Specifications will be considered for conversion of length of various sizes of M.S. Bars, Steel Bars and T.M.T. bars into Standard Weight.
Records of actual Sectional weights shall also be kept dia-wise and lot-wise. The average sectional weight for each diameter shall be arrived at from samples from each lot of steel received at site. The decision of the Engineer-in-Charge shall be final for the procedure to be followed for determining the average sectional weight of each lot. Quantity of each diameter of steel received at site of work each day will constitute one single lot for the purpose. The weight of steel by conversion of length of various sizes of bars based on the actual weighted average sectional weight shall be termed as Derived Actual Weight. However for the stipulated issue of steel reinforcement up to and including 10mm diameter bars, the actual weight of steel issued shall be modified to take into account the variation between the actual and the standard coefficients and the contractors' accounts will be debited by the cost of modified quantity.

If the Derived Weight as in above is less than the Standard Weight as in Sub-para (xii) above then the Derived Actual Weight shall be taken for payment provided, it is within the following tolerances specified in IS1786-2008, otherwise whole lot will be rejected.

Nominal size in mm	Tolerance on nominal mass		
	Batch	Individual Sample*	Individual sample for coil**
Up to and Including 10	+7	-8	+8
Over 10 and including 16	+5	-6	+6
Over 16	+3	-4	+4

Tolerances on Nominal Mass

* For individual sample plus tolerance is not specified.

**For coils batch tolerance is not specified.

b) If the Derived Actual Weight is found more than the Standard Weight, the Standard Weight shall be taken for payment. In such case nothing extra shall be paid for the difference between the Derived Actual Weight and the Standard Weight.

2.2 PARTICULAR SPECIFICATIONS FOR CIVIL WORKS

2.2.1 EARTH WORK:

- a) The Earth is to be excavated mechanically/ manually and refilled in trenches as per requirement of work and as per direction of Engineer- in Charge. Surplus earth received from excavation is to be filled within the campus and surplus earth after the approval of Engineer-in-Charge shall be carried mechanically out of the campus. All the work shall be done in accordance with CPWD Specifications

2.2.2 R.C.C. WORK:

a) Design Mix Concrete

- i. The RCC work shall be done with Design Mix Concrete. Wherever letter M has been indicated, the same shall imply for the Design Mix Concrete. The Design Mix Concrete will be designated based on the principles given in IS: 456, 10262 & SP 23. The Conditions & Specifications stated herein shall have precedence over all conditions & specifications stated in relevant I.S. Codes / C.P.W.D. Specifications. The concrete mix shall be designed for the specified target mean compressive strength in order to ensure that work test result do not fall below the acceptance criteria specified for the concrete mix. The Contractor shall design mixes for each class of concrete indicating that the concrete ingredients and proportions will result in concrete mix meeting the requirements specified.

The contractor has to submit design mix without use of admixtures.

Admixture may be added in case of specific technical requirement so as to meet the workability / slump requirement or for any other reason but nothing extra is to be paid to contractor on account of adding admixtures.

- ii. The sources of coarse aggregate, fine aggregate, water, admixture & cement to be used in concrete work shall be identified by the contractor & he will satisfy himself regarding their conforming to the relevant specifications & their availability before getting the same approved from the Engineer-In-Charge.

Coarse Aggregate: As per CPWD Specifications

Fine Aggregate: As per CPWD Specifications

Water: It shall conform to requirements laid down in IS:456-2000/ Para 5.4 or CPWD Specifications.

Cement: OPC of grade 43 shall conform to IS: 8112 or IS: 12330 and/or Portland Pozzolana Cement (Fly Ash based), required in the work from reputed manufacturers of cement as per the approved make in 50 kg. bags bearing manufacturer's name and ISI marking, along with manufacturers test certificate for each lot. Portland Pozzolana Cement is to be used for RCC works only subject to fulfilment of conditions of circular number CDO/ SE (RR)/ fly ash (MAN) 02 dated 09.04.09 shall be used for design mix concrete and shall conform to IS-1489 (Part I). However, if the contractor uses higher grade of cement nothing extra shall be paid.

Admixture/ Plasticizer: The admixture shall conform to IS: 9103. Whenever required, the admixture of approved quality & approved make only shall be used to attain the required workability. Nothing extra on account of use of Admixture/ Plasticizer shall be payable.

- iii. Grade of Concrete: The compressive strength of various grades of concrete with various parameters shall be as per CPWD Specifications.

NOTE:

In the designation of a Concrete mix letter M refers to the mix and the number of the specified characteristic compressive strength of 15 cm - Cube at 28 days expressed in N/mm².

It is specifically highlighted that in addition to the above requirements, the maximum cement content for any grade shall be limited to 530 kg. / Cubic meter.

The minimum/ maximum cement content for design mix concrete shall be maintained as per the quantity mentioned above. In cases where the quantity of cement required is higher than the minimum specified above to achieve desired strength based on an approved mix design, nothing extra shall become payable to the contractor.

- iv. The Contractor shall engage one of the following approved laboratories / test house for designing the concrete mix in accordance with relevant IS Code and to conduct laboratory tests to ensure the target strength & workability criteria for a given grade of concrete:

Punjab Engineering College, Chandigarh.

IIT, New Delhi.

Chandigarh Engineering College, Sector 26, Chandigarh.

Technical Teacher Training Institute, Sector 26, Chandigarh.

The various ingredients for mix design / laboratory tests shall be sent to the lab/ test houses through the Engineer-in-charge and the samples of such aggregates sent shall be preserved at site by the department.

In the event if all the above laboratories are unable to carry out the requisite design/ testing, the contractor may have it done from any other laboratory with prior approval of the Director, INST, Mohali through PMC.

- v. The contractor shall submit the report on design mix from any of above approved laboratories for approval of Engineer in Charge within 30 days from the date of issue of letter of acceptance of the tender. No concreting shall be done until the design mix is approved. In case of White Portland Cement and the likely use of admixtures in concrete with ordinary Portland/White Portland Cement, the contractor shall design and test the concrete mix by using trial mixes with white cement and / or admixtures also, for which nothing extra shall be payable.
- vi. In case of change of source or characteristic properties of the ingredients used in the concrete mix during the work, the contractor as per the directions of the Engineer-in-charge shall submit a revised laboratory mix design report conducted at laboratory established at site.
- vii. All cost of mix designing and testing, connected therewith, including charges payable to the laboratory shall be borne by the Contractor including redesigning of the concrete mix whenever required & as directed by Engineer-In-Charge.
- viii. The mix design for a specified grade of concrete shall be done for a target mean compressive strength T_{ck}
 $= F_{ck} + 1.65s$

Where F_{ck} = Characteristic compressive strength at 28 days.

s = Standard deviation which depends on degree of quality control.

The standard deviation for different grades of concrete shall be as follows: -

GRADE OF CONCRETE	STANDARD DEVIATION
M-20	4.0
M-25	4.0
M-30	5.0
M-35	5.0

ix. TRIAL BATCHES

The designed mix proportions shall be checked for target mean compressive strength by means of trial batches.

Minimum three sets of separate preliminary tests shall be carried out for each trial batch of concrete mix. Each test shall comprise of six specimens and only one test-set of six specimens shall be made on any particular day.

The quantities of materials for each trial mix shall be sufficient for at least six specimens (cubes) and the concrete required for carrying out workability tests.

The workability of trial mix No.1 shall be measured and mix shall be carefully observed for freedom from segregation, bleeding and its finishing characteristics. The water content, if required, shall be adjusted corresponding to the required changes in the workability.

With the modified Water Content, the mix proportions shall be recalculated by keeping with water cement ratio unchanged. The mix proportion, as modified, shall form the Trial Mix No.2 and tested for the specified strength and workability.

In addition, trial mix No.3 and 4 shall be designed by keeping water contents same as that determined for trial mix 2 but varying the water cement ratio by + 10 percent of the specified value and tested for their design characteristics.

Out of the six specimen of each set, three shall be tested at seven days and remaining three at 28 days. The preliminary tests at seven days are intended only to indicate the strength to be attained at 28 days, while the design mix shall be approved only on the basis of test strength at 28 days.

x. APPROVAL OF DESIGN MIX

The design mix shall be considered satisfactory and approved if at least three preliminary test-sets individually satisfy the following strength and workability criteria:

The average strength of each test-set is not less than the specified target mean compressive strength (T_{ck}).

The strength of any specimen cube is not less than $0.85 T_{ck}$.

The concrete mix is of required degree of workability and acceptable concrete finish.

b) BATCHING & MIXING:

All design mix concrete shall be done using fully automatic batching plant/ Ready Mix Plant conforming to IS: 4925 of minimum 10 cum per hour capacity. The automatic batching plant shall be charged by devices when actuated by a single starter switch, will automatically start the weighing operation of each material (i.e. stone aggregate, sand, cement, water, admixture etc.) and stop automatically when designated weight of each material has been reached and also it should have rated capacity (in terms of concrete in a single batch). It shall have control panel for operation of the batching plant complete with printing facility.

The contractor shall be free to use Ready Mix Concrete (RMC) in place of Batch mix concrete at his own cost. The contractor shall ensure that transit mixtures shall transport the concrete to site. All the precautions shall be taken during the transportation and handling of concrete to achieve the desired strength, durability, etc. as

envisaged in the Mix Design. Contractor has to get the approval from Engineer-In-Charge regarding source of RMC by giving the details of such plants indicating name of owner / company, its location, technical establishment, past experience and text of Memorandum of Understanding (proposed to be entered between purchaser and supplier). The Engineer-in-Charge, after satisfying himself about quality / capability of the company shall give approval in writing (subject to drawing of MOU). The MOU shall be drawn with RMC plant owner / company and submitted to Engineer-in-Charge within a week of such approval. The contractor will not be allowed to purchase RMC without completion of above formalities for use in the project. Notwithstanding the approval granted by Engineer-in-Charge in aforesaid manner, the contractor shall be fully responsible for quality of concrete including input control, production, transportation and placement etc. The Engineer-in-Charge will reserve the right to deploy his supervisor at plant site to inspect at any such stage and reject the material/ concrete etc if he is not satisfied about quality of material/ product.

All measuring equipment shall be maintained in a clean and serviceable condition and their accuracy shall be checked at least once a month.

Only single sized good quality stone aggregate shall be brought to site of work from the approved source. The grading of the stone aggregate shall be controlled by blending the aggregate of different sizes in the required proportions at site of work

The aggregate of different sizes shall be stock-piled separately, preferably a day before use.

The grading of coarse and fine aggregates shall be checked as frequently as possible and as directed by the Engineer-In-Charge to ensure that the specified grading and quality of aggregate is maintained.

It is important to maintain the Water Cement Ratio constant at its specified or approved value by making adjustment for the moisture contents of both fine and coarse aggregates.

The moisture contents in the aggregate shall be determined as frequently as possible in keeping with the weather conditions and as per the provisions of IS: 2386 (Part-III).

c) OTHER OPERATIONS:

All other operations in concreting work like mixing, slump, laying, placing of concrete, compaction, curing etc. not mentioned in this particular specifications for Design Mix of Concrete shall be as per CPWD Specifications.

d) SAMPLING:

Samples from fresh concrete shall be taken as per IS 1199-1959 and the test cubes shall be made, cured and tested in accordance with IS: 516-1959.

Each test sample shall comprise of six test cubes (specimen), three of which shall be tested at 7 days and remaining for tests at 28 days.

FREQUENCY OF SAMPLING:

A random sampling procedure shall be adopted to ensure that the sampling is spread over the entire period of concreting and cover all mixing units. The concrete work shall be notionally divided into lots as under for the purpose of sampling conditions.

- Footings, rafts etc.
- Columns and walls at all levels.
- Beams at all levels.
- Slabs at all levels.

At least one test sample shall be taken for each lot of concrete work.

Each grade of concrete shall form different lot for testing.

The minimum frequency of sampling of concrete of each grade shall be in accordance with CPWD specification 2009, Vol I with upto date correction slips:-

The concrete work shall be assessed on day to day basis & samples shall be taken as specified.

Work strength test shall be conducted in accordance with IS: 516 on random sampling.

i. TEST RESULTS OF SAMPLES:

The test results of the sample shall be the average of the strength of three specimens. The individual variation shall not be more than + 15% percent of the average. If variation is more, the test results shall be treated as invalid. 90% of the total tests shall be done at the laboratory established at site by the contractor and remaining 10% in any other laboratory as directed by the Engineer-in-Charge.

ii. STANDARD OF ACCEPTANCE:

In case the test results of all the samples are above the characteristic compressive strength, the concrete shall be accepted.

In case the test result of one or more samples fails to meet the requirement (i) above, it shall be accepted if it meets the requirement as laid down in CPWD Specification.

Concrete of each grade shall be assessed separately.

Concrete is liable to be rejected, if it is porous or honeycombed or its placing has been interrupted without providing a proper construction joint or the reinforcement has been displaced beyond the tolerances specified, or construction tolerances have not been met.

e) MEASUREMENT:

As per CPWD Specifications.

In respect of all projected slabs at all levels including cantilever, canopy, the payment for the RCC work shall be made under the item RCC slabs. The payment for shuttering at the edges shall be made under item of centering and shuttering for RCC slabs. Nothing extra shall be paid for the side shuttering at the edge of these projected balconies / projected verandah slabs.

f) TOLERANCES - As per CPWD Specifications.

g) RATES:

The rate includes the cost of materials, labour and T&P, including mixing, placing, transportation involved in all the operations described above except for the cost of centring, shuttering & reinforcement which will be paid for separately.

In case of rejection of concrete on account of unacceptable compressive strength, governed by para "Standard of Acceptance" as above, the work for which samples have failed shall be redone at the cost of contractor. However, the Engineer-in-charge may order for additional tests (like cutting cores, ultrasonic pulse velocity test, load test on structure or part of structure, etc) to be carried out at the cost of contractor to ascertain if the portion of structure wherein concrete represented by the sample has been used, can be retained on the basis of results of individual or combination of these tests. The Contractor shall take remedial measures necessary to retain the structure as approved by the Engineer-in-charge without any extra cost. However, for payment, the basis of rate payable to contractor shall be governed by the 28 days cube test results and reduced rates shall be regulated in accordance with CPWD Specifications.

2.2.3. RCC Work (ORDINARY)

- a) The work shall be done in accordance with CPWD Specifications.
- b) RCC work shall comprise of the following which shall be paid for separately as per description of item:
 - i) Form work (centering and shuttering).
 - ii) Reinforcement
 - iii) Cement concrete i.e. Cast-in-situ/ Precast.
- c) Water Cement ratio for Ordinary RCC work shall not be more than 0.5. This may be kept as specified in CPWD specifications depending upon the mix. Contractor shall use concrete mixture of proper design having arrangement for measuring water for mixing of concrete.

- d) The materials i.e. Cement, water, coarse aggregates, fine aggregate, structural steel (T.M.T. bars) and water proofing materials etc. being used in cement concrete for RCC work / Precast RCC work, should confirm to the CPWD specifications.
- e) The consistency, placing, compaction, curing, sampling and testing of cement concrete used in RCC/ Precast RCC work should confirm to CPWD specifications. The testing results of cement concrete should confirm to laid down standard of acceptance.
- f) The RCC work executed upto 1.20 meter above ground level shall be paid in foundation. Above this level it shall be paid in respective items of RCC. The columns measurement shall be taken through as laid down in specifications.
- g) The rate shall include the cost of materials and labour required for all the operations described in the CPWD specifications.

2.2.4. FORM WORK

- a) The work shall be done in general as per CPWD Specifications.
- b) Only M.S. centering / shuttering and scaffolding material unless & otherwise specified shall be used for all R.C.C. work to give an even finish of concrete surface. However, marine-ply shuttering in exceptional cases as per site requirement may be used on specific request from contractor to be approved by the Engineer-in-Charge.
- c) Nothing extra shall be paid for the centering and shuttering, circular in shape whenever the formwork is having a mean radius exceeding 6m in plan.
- d) Nothing extra shall be paid for grid beams and the corresponding slabs having clear span more than 1.20 meters.
- e) In order to keep the floor finish as per architectural drawings and to provide required thickness of the flooring as per specifications, the level of top surface of R.C.C. shall be accordingly adjusted at the time of its centering, shuttering and casting for which nothing extra shall be paid to the Contractor.
- f) As per general engineering practice, level of floors in toilet / bath, balconies, shall be kept 12 to 20mm or as required, lower than general floors shuttering should be adjusted accordingly. Nothing extra is payable on this account.
- g) Steel shuttering as approved by the Engineer-in-Charge shall be used by the contractor. Minimum size of shuttering plates shall be 600mm x 900mm except for the case when closing pieces are required to complete the shuttering panels.
Dented, broken, cracked, twisted or rusted shuttering plates shall not be allowed to be used on the work. The shuttering plates shall be cleaned properly with electrically driven sanders to remove any cement slurry or cement mortar or rust. Proper shuttering oil or de-bonding compound shall be applied on the surface of the shuttering plates in the requisite quantity before assembly of steel reinforcement.

2.2.5. REINFORCEMENT:

- a) The reinforcement shall be done as per CPWD Specifications.
- b) The rate of item of reinforcement of RCC work includes all operations including straightening, cutting, bending, welding, binding with annealed steel or welding and placing in position at all the floors with all leads and lift complete as per CPWD Specifications
- c) The contractor shall provide approved type of support for maintaining the bars in position and ensuring required spacing and correct cover of concrete to reinforcement as called for in the drawings, spacer blocks of required shape and size. Chairs and spacer bars shall be used in order to ensure accurate positioning of reinforcement. Cover blocks shall be cast well in advance and rate of RCC items is inclusive of cost of such cover blocks.

2.2.6. PRE-CAST RCC WORK

- a) The work shall be done in accordance with CPWD Specifications.
- b) Pre-cast reinforced concrete units shall be of grade or mix as specified. Provision shall be made in the mould to accommodate fixing devices such as hooks etc. and forming of notches and holes. Each unit shall

be cast in one operation. A sample of the unit shall be got approved from Engineer-in-charge before taking up the work.

- c) Pre-cast units shall be clearly marked to indicate the top of member and its location.
- d) Pre-cast units shall be stored, transported and placed in position in such a manner that these are not damaged.
- e) The compaction of the concrete shall be done by vibrating, table or external vibrator, as approved by Engineer-in-charge. The rate quoted for the item shall include the element for framework and mechanical vibration.
- f) Rate for item includes cost of all materials, labour, and all operations involved. Cost of M.S. frames, lugs including their welding, lifting hooks is also included.

2.2.7. BRICK WORK:

- a) The brickwork shall be carried out with good quality well burnt FPS bricks of class designation 75 as per CPWD Specifications.
- b) The rate shall also include for leaving chases / notches for dowels / cramps for all kinds of cladding to come over brick work.
- c) Brick work provided around shaft or lift walls or around slab cutouts shall be measured in the brick for corresponding floor level. Nothing extra shall be paid on this account.
- d) M.S. Strip provided at every third course of half brick masonry shall be in single piece. If required, welding joint can be used without overlaps. Nothing extra shall be paid for welding and overlaps.

2.2.8. STONE / MARBLE WORK:

- a) General: The execution of stones work shall be in general as per CPWD Specifications.
- b) The Random rubble masonry shall be carried out by using materials i.e. stone, through/bond stones etc strictly as mentioned in specifications. The weep holes with drainage arrangements shall be provided where ever necessary to ensure the subsoil drainage from backfill of the soil.

2.2.9. SAMPLES FOR STONE WORK:-

Samples of each item of stone work either individually or in combination shall be prepared for approval of Engineer-in-charge before commencement of work.

2.2.10. WOOD WORK:-

- a) The wood work in general shall be carried out as per CPWD Specifications.
- b) The sample of timber to be used shall be deposited by the contractor with Engineer-in-charge before commencement of work.
- c) Glazing for toilets shall be of translucent type.
- d) The shape and size of beading shall be as per drawings. The joints of beading shall be mitred.
- e) Timber shall be of specified species, good quality and well seasoned. It shall have uniform colour, reasonably straight grains and shall be free from knots, cracks, shakes and sapwood. It shall be close grained. The contractor shall deposit the samples of species of timber to be used with the Engineer-in-Charge for testing before commencement of the work.
- f) Wood work shall not be painted, oiled or otherwise treated before it has been approved by the Engineer-in-charge. All portion of timber including architrave abutting against masonry, concrete, stone or embedded in ground shall be painted with approved wood preservative or with boiling coaltar.

- g) The contractor(s) shall produce cash voucher and certificates from approved Kiln Seasoning Plants about the timber used on the work having been kiln seasoned and chemically treated by them, falling which it would not be so accepted as kiln seasoned and/or chemically treated.
- h) Transparent sheet glass conforming to IS: 2835 – 1977 shall be used. Thickness being governed as under unless otherwise specified in the item in wood work/steel work:

Area of Glazing	Thickness
(a) For glazing area up to 0.50 sqm	4.0 mm
(b) For glazing area more than 0.50 sqm	5.5 mm

- i) Factory made paneled / wire gauge door shutters
- j) The work shall be executed through specialized agencies to be approved by the Engineer in Charge.
- k) The shutters should be fabricated in factories & fabrication should conform to CPWD Specifications Para 9.6.6 & IS 1003 Part-I.
- l) The contractor shall propose well in advance to Engineer-in-Charge, the names and address of the factory where from the contractor intends to get the shutters manufactured along with the credential of the firm. The contractor shall place the order for manufacturing of shutters only after obtaining approval of the Engineer in Charge whose decision in this case shall be final & binding. In case the firm is not found suitable he shall propose another factory. The factory may also be inspected by a group of officers before granting approval; shutters shall however be accepted only if these meet the specified test.
- m) Contractor will arrange stage wise inspection of the shutters at factory by the Engineer-in-Charge or his authorized representative. The contractor will have no claim if the shutters brought at site in part or full lot are rejected by the Engineer-in-Charge due to bad workmanship / quality. Such defective shutters will not be measured and paid. The contractor shall remove the same from the site of work within 7 days after the written instruction in this regard are issued by the Engineer-in-Charge.
- n) The shutters should be brought at site without primer / painting.
- o) Inspection of shutters shall be carried out for dimensions & tolerances, size & type general construction & workmanship, finish & glazing at the following frequency:

Lot Size	Sample Size	Permissible number of defectiveness
Upto 25	2	0
26 to 50	5	0
51 to 100	8	0
101 to 150	13	1
151 to 300	20	2
301 to 500	32	3
501 to 1000	50	5
1001 & above	80	7

Criteria for conformity

Any sample shutter failing in any one or more of the requirements inspected for as above shall be considered as defective. A lot shall be considered as having satisfied the requirements of the standard if the number of defective shutters in the sample does not exceed the corresponding permissible number of defectiveness given above.

- p) Testing–The shutters shall be tested for species, seasoning & treatment, defects in the timber, panel material, construction & workmanship in the approved Govt. Laboratory at the following frequency: -

Lot Size	Sample Size
Upto 50	1
51 to 100	2
101 to 150	3
301 to 500	4
500 to 1000	6
1001 & above in multiple of 1000	10

If shutters are found defective in any one of the criterion, double the shutter shall be tested & if found permissible, can be accepted. If shutter is found defective in more than one criterion, the whole lot shall be rejected.

2.2.11. STEEL WORK:

- a) The work shall be carried out as per CPWD Specifications.
- b) Pressed Steel Frame/ T Iron Frames: The work shall be done as per CPWD Specifications. The frames shall be fabricated in approved workshops. The angle and flat iron frames for cupboard shall also be fabricated from the above approved workshops.
- c) Steel windows/ ventilators: The work shall be done strictly as per CPWD Specifications. Flash butt-welded steel windows / ventilators only shall be provided and shall be procured from the approved manufacture ₹ The corners should be welded to form a solid fused welded joint conforming to the requirement given below.

Weld shall be made all along the place of meeting the member.

Weld should be properly grounded.

Complete cross section of the corner shall form a solid joint with no cavities, free from cracks, under cutting, overlaps, gross porosity and entrapped slag.

All sub dividing and glazing bars shall be tennoned & riveted into the frames i.e. all centre mullion section F4B and glazing section T2, T6 shall not be directly welded to the frames. For this a slot has to be cut in the frames, the F4B/ T2/ T6 section inserted into it & head be hydraulically tennoned & riveted by Tennon Riveting Machine.

The thickness of projecting type hinges shall not be less than 3.15 mm. For fixing of hinges to outer frame, slot shall be cut, hinges inserted & welded at the back. For non projected type hinges if allowed, the wall thickness shall not be less than 3 mm & total width not less than 40 mm. For fixing, the slot shall be cut in the fixed frames, hinge flap inserted & welded from the back.

The fixing lug shall be as per IS 1038 with adjustable slot & fixed to window frames by screws & nuts. The fixing of unit shall be done as per IS 1081.

- d) M.S. Sheet Door–M.S Sheet shall be in one piece i.e. no joint in M.S. Sheet shall be permitted.
- e) Steel work welded in built up sections/ framed work: The contractor will submit the shop drawing to the Engineer-in-Charge for approval well in advance. The gate shall be provided with wheel like arrangement for its easy operation and cement concrete pavement shall be provided to meet the operational requirements of the gate. After its only the work shall be executed.

- f) Flash butt welded steel work in frames etc. only shall be provided and shall be procured from the approved manufacture. The corners should be welded to form a solid fused welded joint conforming to the requirement given below.

Weld shall be made all along the place of meeting the member.

Weld should be properly grounded.

Complete cross section of the corner shall form a solid joint with no cavities, free from cracks, under cutting, overlaps, gross porosity and entrapped slag.

- g) The work shall be done strictly as per CPWD Specifications.

2.2.12. FLOORING:

- a) All work in general shall be carried out as per CPWD Specifications.
- b) Whenever flooring is to be done in patterns of tiles and stones, the contractor shall get samples of each pattern laid and approved by the Engineer-in-charge before final laying of such flooring. Nothing extra shall be payable on this account.
- c) Different stones / tiles used in pattern flooring shall be measured separately as defined in the nomenclature of the item and nothing extra for laying pattern flooring shall be paid over and above the quoted rate. No additional wastage, if any, shall be accounted for any extra payment.
- d) Samples of flooring stones (Kota/ Marble/ Granite etc.) shall be deposited well in advance with the Engineer-in-Charge for approval. Approved samples should be kept at site with the Engineer-in-Charge and the same shall not be removed except with the written permission of Engineer-in-Charge. No payment whatsoever shall be made for these samples.
- e) The Marble/ Kota/ Granite or any other stone shall be fully supported by the details establishing the quarry and its location.
- f) Full width Marble/ Kota/ Granite stone over kitchen platform shall be provided which shall not be less than 900mm long except to adjust for closing pieces. The marble / stone flooring in treads and risers of staircase shall not be less than 1500mm long except to adjust the closing pieces. Nothing extra shall be paid on these accounts
- g) Precast Terrazzo Tile Flooring
The tiles shall be procured from the approved manufacturer.
The tiles of 250 x 250 x 22 mm size shall be used & sample of tiles shall be got approved from the Engineer-in-Charge.
- h) Ceramic Tiles Flooring
The tiles shall be procured from the approved manufacture of the approved shade & colour.
The tile shall be conforming to IS-13755 & IS-13753 for floor and wall tiles respectively.
Tiles for dado shall be 200mm x 300mm (minimum size) GROUP-III as approved.
Tiles for flooring shall be 300mm x 300mm (minimum size) GROUP-V Tiles as approved.
Test shall be conducted to satisfy the quality of material as per CPWD Specifications
- i) The rate of items of flooring is inclusive of providing sunken flooring in bathrooms, kitchen etc. and nothing extra on this account is admissible. The proper gradient shall be given to flooring for toilets, verandah, kitchen, courtyard, etc. as per the directions of Engineer-in-charge.

2.2.13. WATER PROOFING FOR SUNKEN FLOORS:-

- a) The work shall be got executed from the specialized agency as approved by the Engineer in Charge.
- b) Total quantity of the water proofing compound required shall be arranged only after obtaining the prior approval of the make by Engineer-in-charge in writing. Materials shall be kept under double lock and key and proper account of the water proofing compound used in the work shall be maintained. It shall be ensured that the consumption of the compound is as per specified requirements.
- c) The finished surface after water proofing treatment shall have adequate smooth slope as per the direction of the Engineer-in-charge.
- d) Before commencement of treatment on any surface, it shall be ensured that the outlet drain pipes/ spouts have been fixed and the spout openings have been chased and rounded off properly for easy flow of water.

2.2.14. GUARANTEE BOND:

Ten years Guarantee bond in prescribed proforma at Part-B P-68 shall be submitted by the contractor which shall also be signed by both the specialized agency and the contractor to meet their liability / liabilities under the guarantee bond. However, the sole responsibility about efficiency of water proofing treatment shall rest with the building contractor. (Ten per cent) of the cost of water-proofing work shall be retained as Security Deposit and the amount so deducted would be released after ten years from the date of completion of the entire work under the agreement, if the performance of the treatment is found satisfactory. If any defect is noticed during the guarantee period, the contractor shall rectify it within 15 days of receipt of intimation of defects in the work. If the defects pointed out are not attended to within the specified period, the same will be got done from another agency at the risk and cost of contractor.

2.2.15. FINISHING:

- a) The work shall be done in accordance with CPWD Specifications.
- b) The contractor shall submit the internal and external finish proposal along with the shade /colour scheme well in advance from the Engineer-in-Charge.
- c) All painting material of approved brand and manufacturer shall be brought to the site of work in the original sealed container. The material brought to the site of work shall be sufficient for at least 30 days of work. The material shall be kept under the joint custody of contractor and representative of the Engineer-in-charge. The empty containers shall not be removed from the site till the completion of the work without written permission of the Engineer-in-charge.

Pin holes: Pores of size less than 1mm appearing on the surface.

Small Pores: Pores of size more than 1mm but less than 2mm appearing on the surface.

Wrinkling: A slight ridge or furrow on surface.

Aggregate Defects: Presence of defects such as pin holes, impurities and traces of mending 5 or more in aggregate for defects at localized place.

2.2.16. SANITARY INSTALLATIONS /WATER SUPPLY / DRAINAGE:

- a) The contractor shall submit schematic drawing of water supply and sanitary installation showing details of layout, including internal water supply and drainage details, showing the detail of water supply lines including fittings diameter wise and fixtures connecting to soil waste through traps and connection of W.C. to main shaft pipe for drainage including its ventilation system for approval of Engineer-in-Charge.
- b) For the work of water supply and sanitary installations, the contractor shall engage the approved licensed plumbers and submit the name of proposed plumbing agencies with their credentials for approval of the Engineer-in-Charge.

- c) The work in general shall be carried out as per CPWD Specifications.
- d) The contractor shall submit the proposal for CP fittings and sanitaures (alongwith their shade /colour scheme) proposal well in advance from the Engineer-in-Charge.
- e) The tendered rates shall include the cost of cutting holes in walls, floors, RCC slabs etc. wherever required and making good the same for which nothing extra shall be paid.
- f) The Centrifugally spun cast iron pipe IS: 3989-1984 wherever necessary shall be fixed to RCC columns, beams etc. with rawl plugs of approved quality and nothing extra shall be paid on this account.
- g) The pig lead to be used in jointing should be as per C.P.W.D. Specifications.
- h) Nothing extra for providing & fixing CP Brass caps /extension pieces wherever required for CP Brass fittings shall be paid beyond the rates payable for corresponding CP Brass fittings
- i) The entire responsibility for the quality of work will however rest with the building contractor only and he shall submit a Guarantee Bond as per Proforma at Part-B P-68. 10% (ten percent) of the cost of these items would be retained as security deposit and the amount so deducted would be released after two years from the date of completion of the entire work under the agreement, if the performance of the items are found satisfactory. If any defect is noticed during the guarantee period, it should be rectified by the contractor within seven days of receipt of intimation of defects in the work and if not attended to the same will be got done from another agency at the risk and cost of contractor. However, this security deposit can be released in full if bank guarantee of equivalent amount is produced and deposited with the department.

2.2.17. Aluminium doors, windows, ventilators etc. glazing specifications

- a) Extent and Intent: The work shall be carried out through an approved Specialized Agency, who shall furnish all material, labour, accessories, equipment, tool and plants and incidentals required for providing and installing anodized aluminium doors, windows, claddings, louvers and other items as called for on the drawings. The drawings and specifications cover the major requirements only. The supplying of additional fastenings, accessories, fixtures and other items not mentioned specifically herein, but which are necessary to make a complete installation shall be a part of this contract.
- b) General: Aluminium doors, windows etc. shall be of sizes, section details as shown on the Architectural drawings. The details shown on the drawings indicate generally the sizes of the component parts and general standards. These may be varied slightly to suit the standard adopted by the manufacture. Before proceeding with any manufacturing, the contractor shall prepare and submit complete manufacturing and installation drawings for approval of the Engineer-in-Charge and no work shall be performed until the approval of these drawings is obtained.
- c) Shop Drawings: The contractor shall submit the shop drawings of doors, windows, louvers, cladding and other aluminium work, based on the architectural drawings to the Engineer-in-Charge for his approval. The shop drawing shall show full size sections of doors, windows etc. thickness of metal (i.e. wall thickness) details of construction, sub frame/rough ground profile, anchoring details hardware as well as connection of windows, doors and other metal work to adjacent work. Samples of all joints and methods of fastening and joining shall be submitted to the Engineer-in-Charge for approval well in advance of commencing the work.
- d) Samples: Samples of doors, windows louvers etc. shall be fabricated, assembled and submitted to Engineer-in-Charge for his approval. They shall be of sizes, types etc. as decided by Engineer-in-Charge. All samples shall be provided at the cost of the contractor.
- e) Sections: Aluminium doors and windows shall be fabricated from extruded sections of profiles as detailed on drawings. The sections shall be extruded by the manufacturers approved by the Engineer-in-Charge. The aluminum extruded sections shall conform to BIS designation IIE/IIV 9 WP alloy, with chemical composition technical properties, as per IS: 733 and IS: 1285. The permissible tolerance of the extruded

sections shall be such as not to impair the proper and smooth function/ operations and appearance of doors and windows.

- f) Fabrication: Doors, windows etc. shall be fabricated to sizes at factory and shall be of section, sizes, combinations and details as shown on the drawings. All doors, windows etc. shall have mechanical joints. The joints shall be designed to withstand a wind load of 150 Kg. Per Sqm. The design shall also incur that the maximum deflection of any member shall not exceed 1/175 of the span of the member. All members shall be accurately machined and fitted to form hairline joints prior to assembly. The joints accessories such as cleats, brackets etc. shall be of such material as not to cause any bimetallic action. The design of the joints and accessories shall be such that the accessories are fully concealed. The fabrication of doors, windows, etc. shall be done in suitable sections to facilitate easy transportation, handling and installation. Adequate provision shall be made in the door and window members for anchoring to support and fixing of hardware and other fixture as approved by the Architect.
- g) Anodizing: All aluminum sections shall be anodized as per IS: 7088 and to required colour as specified in the item as per IS: 1868 grading as specified in item schedule after cutting the member to requisite sizes before the final assembly. Anodizing confirming to specified grade with minimum average thickness of 15 microns when measured as per IS: 612. The anodic coating shall be properly sealed by steams or in boiling water are cold sealing process as per IS: 1868/IS: 6057. Polythene tape protection shall be applied on the anodized section before they are brought to site. All care shall be taken to ensure surface protection during transportation, storage at site and installation. The tape protection shall be removed on installation. The sample will be tested in the approved laboratory and cost of samples; cost of testing etc. shall be borne by the contractor.
- h) Protection of finish: All aluminium members shall be wrapped with approved self-adhesive non-staining PVC tapes.
- i) Handling and Stacking:
- j) Fabricated materials shall be carried in an approved manner to protect the material against any damage during transportation. The loading and unloading shall be carried out with utmost care. On receipt of material at site, it shall be carefully examined to detect any damaged pieces. Arrangements shall be made for expeditious replacement of damaged pieces/ parts. Materials found to be acceptable on inspections shall be repacked in crates and stored safely.
- k) In the case of composite windows and doors, the different units are to be assembled first. The assembled Composite units should be checked for line, level and plumb before final fixing is done. Units may be serial numbered and identified as out how to be assembled in their final locations if situation so warrants.
- l) The contractor shall be responsible for assembling composite, bedding and filling the grove with polysulphide sealant inside and outside, at transoms and mullions placing the doors, windows etc. in their respective openings. After the doors/ windows have been fixed in their correct assigned position, the open hollow sections abutting masonry concrete shall be fitted with approved polysulphide sealant densely packed and finished neat.
- m) The contractor shall be responsible for doors, windows, etc. being set straight, plumb, level and for their satisfactory operation after fixing is complete.

2.2.18. Installation:

- a) Just prior to installation the doors, windows, etc. shall be uncreated and stacked on edge on level bearers and supported evenly. The frame shall be fixed into position true to line and level using adequate number of expansion machine bolts, anchor fasteners, of approved size and manufacture and in an approved manner. The holes in concrete/ masonry members for housing anchor bolts shall be drilled with an electric drill.
- b) The door/ windows assembled as shown on drawings shall be placed in correct final position on the opening and marks made on concrete members at jambs, sills and heads against the holes provided in frames for

anchoring. The frame shall then be removed from the opening and laid aside. Neat holes with parallel sides of appropriate size shall then be drilled in the concrete members with an electric drill at the marking to house the expansion bolts. The expansion bolts shall then be inserted in the holes, struck with a light hammer till the nut is forced into the anchor shell. The frame shall then be placed in final position in the opening and anchored to the support through cadmium plated machine screws of required size and anchored to the support through cadmium plated machine screws of required size threaded to expansion bolts. The frame shall be set in the opening by using wooden wedges at supports and be plumbed in position. The wedges shall invariably be placed at the meeting at points of glazing bars and frame.

- c) PVC/ Neoprene gaskets: The contractor shall provide and install PVC/ Neoprene gaskets of approved size and profile at all locations as shown and as called for to render the doors, windows etc. absolutely air tight and weather tight. The contractor shall produce samples of the gaskets for approval and shall procure the same after approval only.
- d) Fittings: - Hinges, stays, handles, tower bolts, locks and other fittings shall be of quality and manufacturer as approved by the Engineer-in-Charge.
- e) Manufacturer’s Attendance: The manufacturer immediately prior to the commencement of glazing shall adjust and set all windows and doors and accept responsibility for the satisfactory working of the opening frames.
- f) Poly-sulphide: The gaps between frames and supports and also any gaps in the door and windows sections shall be raked out as directed and filled with poly-sulphide of approved colour and make to ensure complete water tightness. The poly-sulphide shall be of such colour and composition that it would not stain the masonry/concrete work, shall receive paint without bleeding, will not sag or run and shall not set hard or dry out under any conditions of weather. The sample of poly-sulphide to be used for this purpose shall be got approved from the Engineer-in-Charge before its actual use.
- g) Details of Test:
- h) The various tests on aluminium sections shall be conducted in accordance with the relevant IS codes.
- i) The minimum number of tests for anodizing and corrosion resistance shall be as given below:

Sr. No.	Details	No. of Tests
1.	Doors, windows and ventilators	One test for every 1000 kg or part thereof.

- j) The samples of major member of each unit of doors/ windows shall be selected at random by Engineer-in-Charge as such that all the aluminium section shall be got tested.

2.2.19. Acceptance Criteria: The aluminium work shall carry two years guarantee after completion of work against unsound material, workmanship and defective anodizing/ powder coating as per guarantee bond. Two years guarantee in prescribed Performa attached under Part-B P-71 must be given by the specified firm, which shall be counter signed by the contractor, in token of his overall responsibility. 10% (ten percent) of the cost of these items would be retained as security deposit and the amount so deducted would be released after two years from the date of completion of the entire work under the agreement, if the performance of the items is found satisfactory. If any defect is noticed during the guarantee period, the contractor should rectify it within seven days and if not attended to the same will be got done from another agency at the risk and cost of contractor. However, this security deposit can be released in full if bank guarantee of equivalent amount is produced and deposited with the department.

2.2.20. Rates:

- a) The rates of the item shall include the cost of materials, labour required in all the above operations.
- b) The rates include the cost of hinges/ pivots, angle cleats and rest of the fittings shall be paid separately.

2.2.21. SPECIFICATIONS FOR SOLID POLY VINYL CHLORIDE (PVC) DOOR SHUTTERS:

a) SCOPE:

- i. This specification lays down requirement regarding types, sizes, material, construction, workmanship, finish, performance evaluation, sampling and testing of solid Poly Vinyl Chloride (PVC) Panelled door shutters for use in residential buildings, non-residential buildings such as offices, schools, hospitals, etc.
- ii. This specification does not cover large size door shutters for industrial and special buildings such as workshops, garages, godowns etc.
- iii. PVC door shutters shall be used in internal locations only.

b) REFERENCES:

The Indian Standards and other Standards listed in Annexure-I are necessary adjuncts to this standard. The products bearing BIS certification i.e. ISI Mark with code number shall have precedence over those not bearing ISI Mark.

c) TERMINOLOGY:

For the purpose of this specification, the definitions given below in addition to those given in IS 707-1976 shall apply:

- I. Blistering: Air or solvent entrapped during moulding.
- II. Colour blots: Colour blots occurring on account of uneven distribution of pigment.
- III. Crazing: Fine hair cracks on the surface.
- IV. Defective Impregnation: Imperfect impregnation of PVC resin with other additives.
- V. Colour Fading: Fading of colour on exposure to sunlight.
- VI. Impurities: Presence of matter other than those specified.
- VII. Pin holes: Pores of size less than 1mm appearing on the surface.
- VIII. Small Pores: Pores of size more than 1mm but less than 2mm appearing on the surface.
- IX. Wrinkling: A slight ridge or furrow on surface.
- X. Aggregate Defects: Presence of defects such as pin holes, impurities and traces of mending 5 or more in aggregate for defects at localized place.

d) HANDLING:

Handling and direction of closing of shutters shall be designated in accordance with IS: 4043:1969.

e) MATERIAL:

Poly Vinyl Chloride Resin (suspension grade) is the basic raw material of PVC compound. PVC resin in mixed with chemicals like calcium searate, hydrocarbon Wax, Titanium dioxide, calcium carbonate Acrylic base etc. Further additives like UV stabilizers, impact modifiers, pigments, epoxy plasticizer, lubricants, acrylic processing aid etc. are also added. The purpose of adding the chemicals and additives is to impart strength, surface finish, colour and resistance to fading by light rays. These chemicals are mixed in the desired proportion and shall be used in the formulation of PVC material and for free and smooth extrusion of PVC cellular sheets.

f) PROCESS:

- i. MIXING: The PVC material so formulated with the addition of chemicals, fillers & additives shall be mixed dry powder form in a high speed hot mixer at a temperature of 1100 C to 1250 C. The heated dry blend is then to be cooled at room temperature. However, the temperature has to be determined keeping in view the climatic conditions and the process requirements.

- ii. EXTRUSION: The cooled dry blend is off loaded into the hopper of the extruder, and then is fed to the screw & barrel of the extruder, where it is melted and kneaded at varying temperatures upto 2050 C by rotating screws. The thick paste of PVC material is then passed through a hot die to make the sheet of required thickness.
- iii. POLISHING: The basic shape of the sheet so acquired is then polished with the help of a three-roll calendar. At the same time the sheet is cooled by circulating water in the rolls of the calendar and thereafter on a roller table by atmospheric air.
- iv. CUTTING: The final finished product coming out of the haul-off is cut as per the required size.

2.3 SAMPLE POUR CARD FOR RCC WORK

- 1.0 GENERAL
 - 1.1 Name of Agency
 - 1.2 Structural Element
 - 1.3 Location
 - 1.4 Architectural drawing No.
 - 1.5 Structural drawing No.
 - 1.6 Approximate quantity and grade of concrete
 - 1.7 Expected start time
 - 1.8 Expected finish time
 - 1.9 Name of Contractor's Engineer

CENTRING TYPE
 Adequate vertical supports Y/N
 Adequate lateral supports Y/N

SHUTTERING TYPE
 Cleaned Y/N
 Oiled Y/N
 Leveled Y/N
 Holes plugged Y/N

REINFORCEMENT TYPE
 Cover blocks Y/N
 Conforms to Drawings Y/N
 Tied Properly Y/N
 Space Bars / chairs Y/N
 Pre-stressing operations completed Y/N

CONCRETE TYPE

Plant informed about mix and type Y/N
Transit mixer ready Y/N
Tower crane ready Y/N
Concrete pump ready Y/N
Vibrators (Electrical & Diesel Ready) Y/N
Predetermined Holes left wherever required Y/N
Boards for construction joints Y/N
Conduits placed in position Y/N
Fan clamps placed in position Y/N
Steel templates Y/N
Cement slurry Y/N

Dated:

The above information filled by me after proper verification

(SITE ENGINEER OF FIRM)

The above information checked by me Allowed for concreting

(PMC)

2.4 APPROVED MAKES FOR CIVIL WORKS:

S.No.	Material	Approved Make
1	(i) 43 Grade Ordinary Portland Cement / Portland Pozzolona Cement.	ACC, Ultratech, Lafarge, Ambuja, Jaypee Cement, J.K. Cement.
	(ii) White Cement	Birla White, J. K. White, Lafarge
2	Reinforcement Steel (TMT-Fe500 D)	SAIL, Tata Steel, Rashtriyaspat Nigam Ltd (RINL), Jindal Steel & Power Ltd. and JSW Steel Ltd.
3	Admixtures & Plasticizer, Other construction chemicals	BASF, Fosroc , Pidilite, Sika, CICO
4	Floor Hardner	BASF, Fosroc , Pidilite, Sika, STP, Flowcrete
5	Tubular / Structural Steel	SAIL, Tata Steel, Rashtriya Ispat Nigam Ltd (RINL), Jindal Steel & Power Ltd. and JSW Steel Ltd.
6	Stainless Steel Sections (Grade 304)	Tata steel, Jindal Steel & Power Ltd. and JSW Steel Ltd.,
7	Waterproofing Compund	BASF, Kryton,Sika, Flocrete
8.	PVC Water Stops	Sika, Pidilite, STP,Fosroc
9.	APP Waterproofing Membrane	Sika, Pidilite, STP,Suprema
10.	Shuttering Ply	Archidply, Century, Green
11.	Rebaring Chemical	Hilti, 3M, Fischer, Ejot, Wurth
12.	Fire Sealant	Hilti, 3M , Fischer, Wurth
13.	SS Fasteners/Anchors/Cramps	Hilti, Fischer, Ejot, Wurth
14.	Metal Ceiling	Durum, Hunter Douglas, Unmet, Credence, Armstrong.
15.	Pre Coated Galvanised Sheet	Lloyds , Tata , Jindal
16.	Heat Resistant Tile	Thermotek , Dalal Tile
17.	Furniture	Geeken,Indo innovations, Godrej.
18.	Mineral Fibre Ceiling	Decosonic, Armstrong ,Saint Gobain
19.	Geotextile Membrane	Virendra Textile, Ovilite

3.0 STP WORKS

3.1 SPECIFICATIONS FOR FAB BASED SEWAGE TREATMENT PLANT OF CAPACITY 100 KLD

3.1.1. DESCRIPTION OF PROCESS SCHEME

Waste water will flow via gravity through a bar screen chamber & Oil & Grease Trap to an Equalization Tank. A bar screen will be provided at the inlet point in the bar screen chamber and the waste water will flow through this bar screen into the Tank. Bar screen will be so designed that it can be cleaned manually from outside the Tank. The oil & grease from the Oil & Grease Trap would have to be removed manually. Waste water from the equalization tank will be transferred by means of Pumps into the FAB tank where it will be mixed with living organisms also called MLSS (Mixed Liquor Suspended Solids) in presence of air & air will be introduced through submerged air diffusers (MLSS in aeration tank will be maintained 2500-3000 Mg/L). The FAB system will be designed in a way so as to achieve complete mixing of organisms with raw sewage. After achieving a complete mixing of organisms over a retention period of 10-12 hrs, the effluent would flow via gravity into the Tube Settler. In the tube settler, PVC Tube Media would be provided to enhance settling of the sludge with attached settling process. Through the use of baffles the liquid in the Tube Settler is maintained in quiescent condition which allows the solids to settle to the bottom for collection. The accumulating solids known as "Sludge" will be constantly pumped back into the FAB tank by sludge recycle pumps. This return sludge undergoes further digestion in the aeration tank and also provides the active organism needed to digest the incoming raw sewage.

The provision of anoxic tank with mixer with an arraignment of re-circulation of sludge from aeration tank is also made to reduce Nitrogen level.

The Tube Settler will be provided with adjustable overflow weir to collect the treated effluent and a scum baffle will keep any floating matter from passing out in the final treated water. Treated water from Tube Settler will overflow into a chlorine contact tank where hypochlorite solution will be added to disinfect the treated water.

Excess sludge from the bottom of the Tube Settler will be collected in an adjoining aerobic digester cum thickener tank. In this tank sludge will be aerated. The air will be shut off periodically and supernatant water shall flow into the collection tank. This way the sludge will be thickened and its volume will be reduced. The sludge digester cum thickener tank will be sized to hold excess sludge. The excess sludge will be further passed into a filter press where the sludge will be pressed between plates manually and the liquid concentration in the sludge will be further reduced. The sludge will then form into semi-solid cake which can be removed for disposal.

The treated effluent from clarifier will be further treated for tertiary treatment with the help of filters, activated carbon filter sand UV reactor. Ultra filtration is also proposed to reduce the BOD level to 10 ppm, for use in flushing cisterns, landscape irrigation.

3.1.2 GENERAL SPECIFICATIONS

3.1.2.1 CHARACTERISTICS OF SEWAGE AT INLET

The following characteristics of Sewage Treatment plant shall be considered for design purpose. The tenderer may collect additional data, if so required by him at his own cost.

Estimated sewage = 100 KLD

PH : 6.5 - 8.5

BOD : 350 Mg/L

S. Solids	:	250 - 300 Mg/L
COD	:	500 - 800 Mg/L
Oil & grease	:	< 50 mg/L
Inlet Coliform	:	$10^6 - 10^7$ counts / 100 ml

3.1.2.2 TREATED EFFLUENT CHARACTERISTICS AT OUTLET

PH	:	6.5 – 7.5
BOD5	:	Less than 10 Mg/L
Total suspended Solids	:	Less than 20 Mg/L
COD	:	Less than 50 Mg/L
Oil & Grease	:	Less than 10 Mg/L
NH ₄ -N	:	5 PPM
N- total	:	10 PPM
Outlet Coliform	:	< 100 counts / 100 ml (at CCT outlet)

The treated effluent shall be odourless, free from oil, grease and other obnoxious matters.

3.1.2.3 DOCUMENTS TO BE SUBMITTED WITH TENDER

The tenderer shall submit the following details along with the tender

- (i) Flow scheme with hydraulics
- (ii) Description of process
- (iii) List of mechanical and electrical equipments.
- (iv) Guarantees

3.1.2.4 LIST OF ITEMS FOR SEWAGE TREATMENT PLANT

In general, STP shall comprises erecting, testing and commissioning of the following items of STP suitable for handling 100m³/day based on FAB technology. The sewage treatment plant in general shall comprise following items of work.

- a) 1 No. manual bar screen suitable for 100m³/day flow rate.
- b) 2 Nos. Sewage lifting pumps (one duty + one stand by) capacity 5m³/hr at 12m head.
- c) 2 Nos. Sludge pumps (one duty + one stand by) capacity 5m³/hr at 12m head.
- d) 2 Nos. Sludge recirculation pumps from FAB-2 tank to Anoxic tank (one duty + one stand by) capacity 20.0m³/hr at 10m head.
- e) 2 Nos. Filter press feed screw pumps (one duty + one stand by) capacity 1.0m³/hr at 40m head.
- f) 2 Nos. Filter feed pumps (one working + one standby) each of capacity 12m³/hr at 25m head.

- g) 1 Set Hydro-pneumatic system flushing water supply comprising 3 nos. pumps (two working + one standby) each of capacity 15.0m³/hr at 65m head.
- h) 1 Set Hydro-pneumatic system Irrigation water supply comprising 2 nos. pumps (one working + one standby) each of capacity 27.0m³/hr at 45m head.
- i) 1 No. MSRL pressure Dual Media filter with frontal pipe work capacity. Flow Rate 12m³/hr and 2.5kg/cm² working Pressure.
- j) 1 No. MSRL activated carbon filter with frontal pipe work capacity. Flow Rate 12m³/hr and 2.5kg/cm² working Pressure.
- k) Submersible mixer suitable for 10.0m³ Anoxic tank.
- l) 1 No. UV reactor of capacity 12m³/hr.
- m) 2 Nos. Air blowers with VFD drive (two working and one standby) twin lobe rotary air blower each of capacity 130m³/hr at 6000 mmwg.
- n) All interconnecting piping and valves for above equipment as per BOQ.
- o) 1 Lot Electrical cabling, earthing, MCC and local push buttons station (Electrical Cabling, earthing including the incoming power supply etc shall be provided by the other agency. However, connections/terminations to the equipments, testing and commissioning shall be carried out by the contractor).

Following civil structures as per drawing to be executed in civil works subhead of tender documents:

- a) 1 Nos. RCC Bar Screen Channel.
- b) 1 No. RCC O& G Trap Chamber.
- c) 1 No. RCC Equalisation Tank.
- d) 1 No. RCC Anoxic tank.
- e) 2 Nos. RCC FAB tanks.
- f) 1 No. RCC tube settler tank.
- g) 1 No. RCC Filter feed tank.
- h) 1 No. RCC Chlorine contact tank.
- i) 1 No. RCC Treated water tank.
- j) 1 No. RCC Ultra filtration water tank.
- k) 1 No. RCC sludge holding tank.
- l) Civil Foundations for the STP mechanical equipment.
- m) All manholes, vent pipes as required.
- n) Working/maintenance platform for STP fabrication from MS chequard plate & structure steel works.

- o) Fencing around the treatment plant battery limits, entry gate & arrangement for removal of storm water.
- p) Any other work necessary for satisfactory performances of the system

3.1.2.5 LIST OF INSTRUMENTS

Following instruments shall be provided in STP

SR. NO.	DESCRIPTION	QTY.	LOCATION
1.	Pressure gauges	Lot	Pumps / blowers
2.	Air rota meters	Lot	On FAB air line
3.	Auto de-slugging valve	Lot	Tube settler drain
4.	Digital energy meter	Lot	Electrical panel
5.	Water magnetic flow meter with totalizer & outlet of treated water	Lot	At inlet of sewage
6.	Level switches	Lot	Tanks

3.1.2.6 Electrical Works

- i. **Cables**
 - a) Contractor shall provide all power and control cables from motor control centre to various motors, level controllers and other control devices.
 - b) Cables shall conform to IS:1554 and carry ISI mark.
 - c) Wiring cables shall conform to IS:694.
 - d) All power cables shall be aluminium conductor PVC insulated/PVC sheathed FRLS armoured cables of 1100 volts grade.
 - e) All control and wiring cables shall be copper conductor PVC insulated armoured and PVC sheathed 600 volt grade.
 - f) All cables shall have stranded conductors. The cables shall be in drums as far as possible and bear manufacturer's name.

ii. Motor Control Centres

Cubicles switch board of floor mounted and shall be fabricated from 16 gauge M.S. sheet with dust and vermin proof construction. It shall be painted with stove enamelled paint of approved make and shade. It shall be fitted with suitable etched plastic indentifications plates for each motor. The cubicles shall in general comprise of the following :

- (A) Incoming and outgoing MCCB's of required capacity with rotary handle.
- (B) PVC Colour coated TPN Aluminium busbar having current density 0.8Amp/sq.mm.
- (C) Isolation switch fuse unit one for each motor.
- (D) Fully automatic DOL/Star Delta starters appropriate for motor rating with ON/OFF push buttons and on/off indicating neon lamps for individual motor.
- (E) Single phase preventor of appropriate rating for each motor.
- (F) Selector switch for pump operation.
- (G) Panel type ampere meters of appropriate rating one for each motor.
- (H) Panel type voltmeter on incoming main with rotary selector switch to read voltage between phase to neutral and phase to phase.
- (I) Rotary switch for manual or auto operation for each pump.
- (J) Space for liquid level controllers specified separately in this contract.

The panel shall be prewired with colour coded wiring. All interconnecting wiring from incoming main to switch gear, meters and accessories with in the switch board panel.

3.2 LIST OF APPROVED MAKES FOR SEWAGE TREATMENT PLANT

Engineer-in-Charge reserve the right to select the any of the brand out of the Brands listed in list of approved makes. Contractor to obtain written approval of Brand and model prior to procurement of material.

SL. NO.	MATERIALS	BRAND NAME
1.0	STRUCTURAL STEEL	TATA / SAIL
2.0	G.I. PIPES	JINDAL HISSAR/SURYA PRAKASH/ TATA
3.0	CPVC PIPES	ASTRAL/ ASHIRVAD / AKG
4.0	SS PIPES	JSL/ PRIMEGOLD/ VIEGA
5.0	ENAMEL PAINT/EPOXY PAINT	NEROLAC / BERGER / ASIAN PAINT
6.0	BUTTERFLY VALVES	ZOOTO/ SANT/ LEADER
7.0	NON-RETURN VALVES	ZOOTO/ SANT/ LEADER
8.0	BALL VALVES	ZOOTO/ SANT/ LEADER
9.0	CENTRIFUGAL TYPE, NON CLOG SELF PRIMING PUMPS	KSB /GRUNDFOS / JOHNSON /KIRLOSKAR
10.0	FACTORY ASSEMBLED HYDROPNEUMATIC SYSTEM	EBARA PUMPS/GRUNDFOS
11.0	AIR BLOWERS	EVEREST/BETA/KAY
12.0	PRESSURE GAUGES	H.GURU/FIEBIG
13.0	AIR DIFFUSERS	REHAU/AIRFIN/MM AUQA
14.0	CHEMICAL DOSING PUMPS	ASIA LMI/PROMINENT/ WALKTON
15.0	BASKET CENTRIFUGE	ACE / EQUI/ UNIVERSAL
16.0	FAB MEDIA / TUBE SETTLER MEDIA	COOLDECK / WELCOME/ PP AQUA
17.0	MULTI GRADE FILTER/ACTIVATED CARBON FILTER	FABRICATED
18.0	DOSING TANKS	SINTEX/ SHEETAL

19.0	SLUDGE TRANSFER PUMPS	KIRLOSKAR / JOHNSON
20.0	PLC PANELS	ABB, SIEMENS, L&T, CUTLER-HAMMER/ALEN BRADLY/MITSHUBISHI/VEE4TECH
21.0	VFD	ABB, SIEMENS, L&T, CUTLER-HAMMER/ALEN BRADLY/MITSHUBISHI
22.0	DO METER/EM FLOW METER/INSTRUMENTATION	FORBES MARSHALL/ABB/SIEMENS/RIASA/ HACH
23.0	UV SYSTEM	ALFAA/SUKRUIT/PHILIPS
24.0	ULTRA FILTRATION MEMBRANES	DOW/ GE/ HYDRANAUTICS
25.0	ULTRA FILTRATION INTEGRATOR	RIASA
26.0	WATER METERS	AQUAMET/KAYCEE/CAPSTON
27.0	PH METERS	ION EXCHANGE/FORBS MARSHAL
28.0	ROTA METER FOR AIRS	MICROWFLOW
29.0	FLOW METERS	ASTER / FLOWSTAR/SCIENTIFIC DEVICES
30.0	CABLES	SKYTONE/ POLYCAB/ GRANDLAY
31.0	LIQUID LEVEL CONTROLLERS	ACTIVE CONTROL/MINILEC
32.0	ELECTRICAL CONTROL PANLEL	DIAMOND ELECTRICALS / SPC ELECTROTECH PVT. LTD. / NEPTUNE SYSTEMS PVT. LTD. / SYNERGY
33.0	TESTING METERS	ABB/SIEMENS

3.3 List of Drawings for STP:

S. No.	Drawings Title	Drawing No.
1.	SEWAGE TREATMENT PLANT CAP=100KLD LAYOUT PLAN & SECTIONS	INST/MP/PL-STP-01
2.	STP FOUNDATION PLAN AND ROOF LVL.	INST/LAB/STP/S-352
3.	STP SECTION	INST/LAB/STP/S-353
4.	STP SECTION	INST/LAB/STP/S-354



INSTITUTE OF NANO SCIENCE AND TECHNOLOGY

Habitat Centre, Sector-64, Phase-X, Mohali-160062

PART – C

FINANCIAL BID

C/o Sewage Treatment Plant of 100 KLD for INST Campus at Sector-81, Knowledge City, Mohali.

Schedule of Quantities

CONSTRUCTION OF SEWAGE TREATMENT PLANT for INST at Sector-81, Knowledge City, MOHALI

S.No.	Description	Unit.	Quantity	Rate in Figures (in ₹)	Amount (in ₹)
1	2	3	4	5	6
A	CIVIL				
1.00	SUB-HEAD : I : EARTH WORK :-				
1.1	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including getting out and disposal of excavated earth lead upto 50 m and lift upto 1.5 m, as directed by Engineer-in-charge.				
1.1.1	All kinds of soil	cum	3878.00	125.95	488434.00
1.2	Extra for every additional lift of 1.5 m or part thereof in excavation / banking excavated or stacked materials.				
1.2.1	All kinds of soil	cum	8763.00	51.75	453485.00
1.3	Filling available excavated earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift upto 1.5 m.	cum	2317.00	125.75	291363.00
1.4	Disposal of excess excavated earth/building rubbish/ malba/ similar unserviceable, dismantled or waste material by mechanical transport including loading, transporting, unloading to approved municipal dumping ground for lead upto 10 km for all lifts, complete as per directions of Engineer-in-Charge.	cum	1561.00	209.90	327654.00
2.00	SUB-HEAD : II : CONCRETE WORK :-				
2.1	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level				
	1:4:8 (1 Cement : 4 coarse sand (zone-III) : 8 graded stone aggregate 40 mm nominal size)	cum	33.00	4478.15	147779.00

3.00	SUB-HEAD : III : REINFORCEMENT CEMENT CONCRETE :-				
3.1	Providing and laying in position machine batched and machine mixed design mix M-30 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer-in-charge. (Note :- Cement content considered in this item is @ 430 kg/cum of PPC)				
3.1.1	All works upto plinth level	cum	540.00	7021.60	3791664.00
3.1.2	All works above plinth level upto floor V level	cum	5.00	7825.10	39126.00
3.2	Centring and shuttering including strutting, propping etc. and removal of form for:				
3.2.1	Foundation ,footing, bases of columns ,etc. for mass concrete	sqm	39.00	193.95	7564.00
3.2.2	Walls (Any thickness) including attached pilasters, butresses, plinth and string courses etc.	sqm	1281.00	378.60	484987.00
3.2.3	Suspended floors, roofs, landings, balconies and access platform	sqm	230.00	422.30	97129.00
3.2.4	Lintels, beams, plinth beams, girders, bressuners and cantilevers	sqm	46.00	342.90	15773.00
3.2.5	Columns, Pillars, Piers, Abutments, Posts and struts	sqm	24.00	467.85	11228.00
3.3.6	Edges of slab and breaks in floors and walls				
3.3.6.1	Under 20cm wide	metre	80.00	122.20	9776.00
3.3.7	Weather shade, chajjas, corbels etc., including edges	sqm	16.80	521.75	8765.00
3.3	Extra for additional height in centring, shuttering where ever required with adequate bracing, propping etc., including cost of de-shuttering and decentring at all levels, over a height of 3.5 m, for every additional height of 1 metre or part thereof (Plan area to be measured).				

3.3.1	Suspended floors, roofs, landing, beams and balconies (Plan area to be measured)	sqm	920.00	171.50	157780.00
3.4	Steel reinforcement for RCC work including straightening, cutting, bending, placing in position and binding all complete for all works i.e below /above plinth level.				
3.4.1	Thermo-Mechanically Treated bars of grade Fe-500D or more	Kg	80945	56.60	4581487.00
4.00	SUB-HEAD : IV : BRICK WORK :-				
4.1	Brick work with common burnt clay F.P.S. (non modular) bricks of class designation 7.5 in superstructure above plinth level up to floor V level in all shapes and sizes in				
	Cement mortar 1:6 (1 cement : 6 coarse sand)	cum	2.00	5582.85	11166.00
5.00	SUB-HEAD : V : FLOORING WORK :-				
5.1	62 mm thick cement concrete flooring with concrete hardener topping, under layer 50 mm thick cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20mm nominal size) and top layer 12mm thick cement hardener consisting of mix 1:2 (1 cement hardener mix : 2 graded stone aggregate, 6mm nominal size) by volume, hardening compound mixed @ 2 litre per 50 kg of cement or as per manufacture's specifications. This includes cost of cement slurry, but excluding the cost of nosing of steps etc. complete.	cum	110.00	609.05	66996.00
5.2	Cement plaster skirting up to 30 cm height, with cement mortar 1:3 (1 cement : 3 coarse sand), finished with a floating coat of neat cement.				
	18 mm thick	sqm	5.00	350.05	1750.00

5.3	Providing and fixing 1st quality ceramic glazed wall tiles conforming to IS: 15622 (thickness to be specified by the manufacturer), of approved make, in all colours, shades except burgundy, bottle green, black of any size as approved by Engineer-in-Charge, in skirting, risers of steps and dados, over 12 mm thick bed of cement mortar 1:3 (1 cement : 3 coarse sand) and jointing with grey cement slurry @ 3.3kg per sqm, including pointing in white cement mixed with pigment of matching shade complete.	sqm	372.00	744.80	277066.00
5.4	Providing and laying Ceramic glazed floor tiles of size 300x300 mm (thickness to be specified by the manufacturer) of 1st quality conforming to IS : 15622 of approved make in colours such as White, Ivory, Grey, Fume Red Brown, laid on 20 mm thick cement mortar 1:4 (1 Cement : 4 Coarse sand), jointing with grey cement slurry @ 3.3kg/sqm including pointing the joints with white cement and matching pigment etc., complete.	sqm	49.00	688.35	33729.00
6.00	SUB-HEAD : VI : STEEL WORKS :-				
6.1	Steel work in built up tubular (round, square or rectangular hollow tubes etc.) trusses etc., including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer, including welding and bolted with special shaped washers etc. complete.				
	Electric resistance or induction butt welded tubes	Kg	80.0	112.20	8976.00
6.2	Steel work welded in built up sections/ framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer using structural steel etc. as required.				
6.2.1	In stringers, treads, landings etc. of stair cases, including use of chequered plate wherever required, all complete	Kg	580.00	65.80	38164.0
6.2.2	In gratings, frames, guard bar, ladder, railings, brackets, gates and similar works	Kg	925.00	85.95	79504.0

6.3	Providing and fixing hand rail of approved size by welding etc. to steel ladder railing, balcony railing, staircase railing and similar works, including applying priming coat of approved steel primer.				
	E.R.W. tubes	Kg	80.00	118.05	9444.0
7.00	SUB-HEAD : VII : FINISHING WORKS :-				
7.1	12mm cement plaster of mix :-				
7.1.1	1:6 (1 cement : 6 fine sand)	sqm	30.00	160.35	4811.00
7.2	15mm cement plaster on the rough side of single or half brick wall of mix				
7.2.1	1:6 (1 cement : 6 fine sand)	sqm	30.00	185.20	5556.00
7.3	12mm Cement Plaster finished with a floating coat of neat cement of Mix:				
7.3.1	1:4 (1 cement: 4 fine sand)	sqm	26.00	214.20	5569.00
7.4	Painting with synthetic enamel paint ,having VOC (Volatile Organic Compound) content less than 150 gms/litre,of approved brand and manufacture,including applying additional coats wherever required to achieve even shade colour.				
7.4.1	Two or more coats	sqm	110.00	75.00	8250.00
7.5	Finishing walls with textured exterior paint of required shade :				
7.5.1	New work (Two or more coats applied @ 3.28 ltr/10 sqm) over and including priming coat of exterior primer applied @ 2.20kg/10 sqm	sqm	60.00	150.65	9039.00
8.00	SUB-HEAD : VII : WATER PROOFING WORKS :-				

8.1	Providing and laying APP (Atactic Polypropylene Polymer) modified prefabricated five layer 3 mm thick water proofing membrane, black finished reinforced with non-woven polyester matt consisting of a coat of bitumen primer for bitumen membrane @ 0.40 litre/sqm by the same membrane manufacture of density at 25°C, 0.87-0.89 kg/ litre and viscosity 70-160 cps. Over the primer coat the layer of membrane shall be laid using Butane Torch and sealing all joints etc, and preparing the surface complete. The vital physical and chemical parameters of the membrane shall be as under : Joint strength in longitudinal and transverse direction at 23°C as 650/450N/5cm. Tear strength in longitudinal and transverse direction as 300/250N. Softening point of membrane not less than 150°C. Cold flexibility shall be upto -2°C when tested in accordance with ASTM, D - 5147. The laying of membrane shall be got done through the authorised applicator of the manufacturer of membrane :				
8.1.1	3 mm Thick	sqm	612.00	417.10	255265.0
8.2	Providing and Placing in position suitable PVC water stops conforming to IS:12200 for construction/ expansion joints between two RCC members and fixed to the reinforcement with binding wire before pouring concrete etc. complete :				
8.2.1	Serrated with central bulb (225 mm wide, 8-11 mm thick)	metre	396.00	254.15	100643.00

8.3	Providing and mixing integral crystalline admixture for waterproofing treatment to RCC structures like basement raft, retaining walls, reservoir, sewage & water treatment plant, tunnels / subway and bridge deck etc. at the time of transporting of concrete into the drum of the ready-mix truck, using integral crystalline admixture @ 0.80% (minimum) to the weight of cement content per cubic meter of concrete) or higher as recommended by the manufacturer's specification in reinforced cement concrete at site of work. The material shall meet the requirements as specified in ACI-212-3R-2010 i.e. by reducing permeability of concrete by more than 90%, compared with control concrete as per DIN 1048 and resistant to 16 bar hydrostatic pressure. The crystalline admixture shall be capable of self-healing of cracks up to a width of 0.50mm. The work shall be carried out all complete as per specification and the direction of the Engineer-in-charge. The product performance shall carry guarantee for 10 years against any leakage	kg	1469.00	376.40	552932.00
B.	SEWAGE TREATMENT PLANT OF CAPACITY 100 KLD				
1.0	SEWAGE TREATMENT PLANT OF CAPACITY 100 KLD				
	Supply, erection, testing and commissioning of underground sewage treatment plant based on attached growth aerobic moving bed bio reactor technology for the following:				
	Daily Avg. Sewage : 100m ³ /day				
	PH : 6.5 - 8.5				
	BOD 5 : 350 mg/l				
	S. Solids : 250 - 300 mg/l				
	COD : 500 - 800 mg/l				
	Oil & grease : < 50 mg/L				
	Coliform : 10 ⁶ - 10 ⁷ counts / 100 ml				
	Effluent discharge standard after treatment:				
	Conforming to requirement approved standards				
	PH : 6.5 - 7.5				
	BOD 5 : Less than 10 mg/l				
	S. solids : Less than 20 mg/l				
	COD : Less than 50 mg/l				
	Oil & grease : < 10 mg/L				
	NH4-N : 5 PPM				

	N- total : 10 PPM				
	Outlet Coliform : < 1000 counts / 100 ml (at CCT outlet)				
	Sewage treatment plant shall include supply erection, testing & commissioning of the following items:				
1.1	Manual Bar screen (SS-304) for 100m ³ /day at the inlet of receiving sump.	Each	1	41300.00	41300.00
1.2	Sewage pumps: Centrifugal type, non clog self priming pumps complete with valves, suction and delivery header of an approved make of suitable capacity capable of handling minimum 7 mm to 10 mm size solids for untreated effluent with fan cooled induction motor with class 'B' insulation, mounted on a common structural base plate, suitable vibration eliminated pads of approved design for pump foundation, motor to be suitable for 400/440 volts, 3 phase, 50 cycles AC supply with rpm, to suit the corresponding pumps.				
a)	Capacity 5.0m ³ /hr at 12m head (For sewage lifting from equalisation sump)	Each	2	29500.00	59000.00
1.3	Submersible drainage pumps: Providing, fixing and commissioning non clog type stainless Steel mono block submersible drainage pumps suitable for handling solids of 12 mm size with totally water and dust proof motor.				
a)	Capacity 18.0m ³ /hr at 15m head (For drainage lifting from drainage sump)	Each	2	82600.00	165200.00
1.4	Sludge pumps: Centrifugal type, non clog self priming pumps complete with valves, suction and delivery header and priming tank of an approved make of suitable capacity capable of handling minimum 7mm to 10mm solids size for untreated effluent with fan cooled induction motor with class 'B' insulation, mounted on a common structural base plate, suitable vibration eliminated pads of approved design for pump foundation, motor to be suitable for 400/440 volts, 3 phase, 50 cycles AC supply with rpm, to suit the corresponding pumps.				
a)	Capacity 5.0m ³ /hr at 12m head (For transfer of sludge)	Each	2	23600.00	47200.00
b)	Capacity 20.0m³/hr at 10m head (For recirculation of sludge from FAB-2 tank to Anoxic Tank)	Each	2	30680.00	61360.00
1.5	Providing, fixing, testing & commissioning of submersible mixer suitable for 10.0m ³ Anoxic Tank)	Each	1	59000.00	59000.00

1.6	Air Blowers: Twin lobe positive displacement type, rotary air blowers of suitable type with V-belt drive, belt guard, base plate, inlet filter-silencer, flexible connectors, check valve, relief valve, pressure gauge and piping.				
a)	Capacity- 130m ³ /hr @ 6000 MMWG, 2 Nos. (1w+1s),	Each	2	129800.00	259600.00
1.7	Non-Clogging, freely moving PP media for MBBR reactors	m ³	8	23600.00	188800.00
1.8	The MBBR tanks equipped with non clog Air Grids for 100m ³ /day sewage flow to supply sufficient air for the treatment process and maintain adequate circulation velocity to prevent solids from settling.				
	No. of Diffusers : (Fine bubel) 30 Nos. to be distribution in aeration tank , equilization tank & sludge holding tank. (Shop drawings will be required indicating no of diffusers & pipe work in each tank)				
	Non submerged air piping : CPVC pipes (SDR 11 grade ASTM D-2846) for pipes upto 50 mm NB & for 65 NB & above (SCH-40 ASTM F-441)				
	Submerged Air Piping : SS-304 Grade	Job	1	88500.00	88500.00
1.9	Media for tube settler as per design requirement	m ³	4	16520.00	66080.00
1.10	Filter Press for compression, management & disposal of 18 Nos plates 18" x 18" (Hydraulic operated).	Each	1	206500.00	206500.00
1.11	Filter press feed screw pumps of an approved makes complete with suction and delivery valves and non return valves,suction pipes and delivery pipes headers capable of handling sludge complete with motor & mounted on structural base plate with pressure guage with isolation cable.				
a)	Capacity 1.0m ³ /hr at 40m head.	Each	2	47200.00	94400.00
1.12	Providing and fixing UV reactor for waste water treatment of capacity 12.0m ³ /hr.	Each	1	129800.00	129800.00
1.13	Chlorinator: Supply, assembly, erection, testing and commissioning of metering pump suitable for operation on 220 ± 5% single phase, 50 Hz AC supply, mounted on 200 litres triple layer HDPE white tank complete in all respects.				
a)	Suitable for flow rate 12000 lph	Each	1	17700.00	17700.00

1.14	Vertical, MSRL, filter: Fabricated from IS:226/2062 plate 5mm thick for shell and 6mm thick M.S. plate for dished ends complete with initial charge of filter media, face piping and valves accessories, painting, testing and commissioning complete.				
a)	Capacity : 12m ³ /hr				
	Flow velocity: 15m ³ /hr/m ²				
	Working pressure : 2.5kg/cm ²				
	Design pressure: 4 kg./cm ²	Set	1	194700.00	194700.00
1.15	Vertical, MSRL, activated carbon filter: Fabricated from IS:226/2062 plate 5mm thick for shell and 8mm thick M.S. plate for dished ends complete with initial charge of filter media, face piping and valves accessories, painting, testing and commissioning complete.				
a)	Capacity : 12m ³ /hr				
	Flow velocity: 15m ³ /hr/m ²				
	Working pressure : 2.5kg/cm ²				
	Design pressure: 4 kg./cm ²	Set	1	231280.00	231280.00
1.16	Filter Feed pumps: Centrifugal type, monoblock, pumps with bronze in impeller of an approved make and complete with valves, suction and delivery headers capable of handling clear water complete with fan cooled induction motor with class B insulation, mounted on a common structural base plate with 100mm dia pressure gauge with gunmetal isolation cock and suitable vibration elimination pads of approved design for pump foundation. Motor to be suitable for 400/440 volts, 3 phase, 50 cycle AC supply with rpm, to suit the corresponding pumps.				
a)	Capacity 12.0m ³ /hr at 25m head.	Each	2	23600.00	47200.00
1.17	Providing, installation, testing, and commissioning of Factory assembled skid mounted Variable Frequency Drive Hydropneumatic system comprising of following items. (Flushing water supply to OHT).				
a)	3 Nos. Vertical in line pumps complete in SS coupled with TEFC motor				
	Pump capacity - 15m ³ /hr.				
	Head - 65 m				
	RPM - 2900				
	Cut out head - 6.5 kg/cm ²				
	Cut in head - 5.5 kg/cm ²				

b)	1 No. 500 litres vessels with inter changeable butyl rubber membrane.				
c)	1 No. Variable speed drive Electric control panel with controller relays, sequence timer for alternate operation of pumps, electrical wiring, cabling from panel to pumps, level controller complete with all accessories as per manufacturer specifications.				
d)	Accessories like butterfly valves, NRV's on suction and discharge, pressure gauge suction, discharge header, diaphragm type PRV and base frame etc., complete as required.				
e)	1 No. 80mm dia Magnetic flow meter with 3 Nos. butterfly valves for bypass connection.				
f)	Hydropneumatic system as described above.	Set	1	1062000.00	1062000.00
1.18	Providing, installation, testing, and commissioning of Factory assembled skid mounted Variable Frequency Drive Hydropneumatic system comprising of following items. (Irrigation water supply).				
a)	2 Nos. Vertical in line pumps complete in SS coupled with TEFC motor				
	Pump capacity - 27m ³ /hr.				
	Head - 45 m				
	RPM - 2900				
	Cut out head - 4.5 kg/cm ²				
	Cut in head - 3.5 kg/cm ²				
b)	1 No. 500 litres vessels with inter changeable butyl rubber membrane.				
c)	1 No. Variable speed drive Electric control panel with controller relays, sequence timer for alternate operation of pumps, electrical wiring, cabling from panel to pumps, level controller complete with all accessories as per manufacturer specifications.				
d)	Accessories like butterfly valves, NRV's on suction and discharge, pressure gauge suction, discharge header, diaphragm type PRV and base frame etc., complete as required.				
e)	1 No. 80mm dia Magnetic flow meter with 3 Nos. butterfly valves for bypass connection.				
f)	Hydropneumatic system as described above.	Set	1	1085600.00	1085600.00

1.19	Pipe lines and valves: CPVC / SS pipes complete with all valves & fittings e.g. tees, crosses, plugs, sockets, elbows, reducers, supports and clamps, etc., cutting chases complete as per				
	Note:				
	All exposed pipes shall be CPVC pipes (SDR 11 grade ASTM D-2846) for pipes upto 50 mm NB & for 65 NB & above (SCH-40 ASTM F-441)				
	All submerged pipes in tanks shall be SS-304 grade.	Lot	1	236000.00	236000.00
1.20	Intrumentation comprising of the following items.				
a)	Digital energy meter in the electrical panel - 1no.				
b)	At Inlet of sewage & Outlet of treated water magnetic flow meter with totalizer - 3 each				
c)	pH meter - 1 no.				
d)	Level switches for auto operation of the system- 1 lot	Lot	1	171100.00	171100.00
1.21	Supply, installation, testing and commissioning of dust, damp and vermin proof, free floor standing factory built sheet steel enclosed nondrawout modular panel for water supply pumps, fabricated out of suitable sized square tubular section and covered with 2.0mm thick CRCA sheet, hinged doors of 2mm thick CRCA sheet, duly painted complete with earth bus, necessary metering protections & indications and mounted with the following including all inter connection etc. (Including earthing).				
a)	One No. 100 amps TP incoming MCCB complete with the following:				
i)	1 No. 0-500 volts 96x96 sq. mm ammeter with selector switch and fuses.				
ii)	1 No. 0-150 amps 96x96sq.mm ammeter with CT's and selector switch.				
iii)	Over voltage and under voltage tripping mechanism for persistent voltage fluctuations of more than $\pm 10\%$ of the rated voltage for more than 5 minutes.				
iv)	Phase indicating lamps with toggle switches.				
v)	Indication lamps for ON/OFF/TRIP status of motors.				
b)	Aluminium bus bar of 150 amps for three phase and neutral.				
c)	Out going feeders/Starters				
i)	2 Nos. 10 amps TP MCB with DOL starter for sewage lifting pumps (1 HP)				
ii)	2 Nos. 10 amps TP MCB with DOL starter for sludge transfer pumps (1 HP)				
iii)	2 Nos. 16 amps TP MCBS with DOL starter for re-circulation pumps for anoxic tank (2 HP)				

iv)	2 Nos. 32 amps TP MCB DOL starter for air blowers (3 HP)				
v)	2 Nos. 16 amps TP MCBS DOL starter for filter feed pumps.(2 HP)				
vi)	2 Nos. 10 amps TP MCB DOL starter starter filter press screw pump.(1 HP)				
vii)	1 No. 6 amps DP MCB with Dol starter each suitable for 0.5 to 1 HP motor for metering pumps.				
viii)	1 Nos. 32 amps TPN MCB with built-in SPP each suitable for 7.5 HP hydropneumatic system for flushing water supply (1 Set).				
ix)	1 Nos. 32 amps TPN MCB with built-in SPP each suitable for 7.5 HP hydropneumatic system for Irrigation water supply (1 Set).				
x)	1 Nos. 32 amps TPN MCB with built-in SPP each suitable for 5 HP Ultra Filtration plant panel (1 Set).				
xi)	1 Nos. 32 amps TPN MCB with built-in SPP each suitable for 3 HP drainage pumps panel (1 Set).				
xii)	Rotary manual/auto/off switch. (4 Nos.)				
xiii)	Polymer tube based fire detection & suppression system within the electrical control panel including provision of cylinder near panel complete with other accessories hooter etc. (1 Set)				
xiv)	Sapre MCBS				
a)	10 Amp (2 Nos.)				
b)	16 Amp (2 Nos.)				
c)	32 Amp (2 Nos.)				
Note :					
a)	All switch gear/panels shall be suitable for 25 KA rating.				
b)	All outgoing will have 96 sq. mm size ammeter and CT.				
c)	All starter units for pumps to be provided with 3 level liquid level contractor.				
d)	All outgoing starter units to have "ON" red lamps.				
e)	All pumps to be provided with duty selector switch.				
f)	All pumps to be provided with sequence timer 220 / 440 V AC / DC and alternate working of pumps between 6 to 8 hours or alternate use of pumps after one service in sequence.				
g)	All pumps to be provided with over load relay.				
h)	Arrangement for phase reversal to be provided in panel.				

i)	Necessary cable alleys for space switches, level controller internal wiring and copper earthing of all equipment shall also be included. All switch gears/control gears shall be motor duty rating.				
j)	Provisions of BMS system for pumps to be included in electrical control panel. The panel manufacturer shall include the following:				
	PF contact at Pumps Starter panels for Pumps Start/Stop Command for all pumps indicated above.				
	PF contact at Pumps Starter panels for Pumps Run Status for all pumps indicated above.				
	PF contact at Pumps Starter panels for AUTO/MANUAL switches for all pumps indicated above.				
	PF contact at Pumps Starter panels for over load relay trip signals for all pumps indicated above.				
	Cabling from BMS system to this panels will be done by BMS contractor.	Set	1	354000.00	354000.00
1.22	Supplying and laying the PVC insulated & sheathed FRLS Armoured cables of 1.1 K.V. Aluminium Conductor including supplying and making and termination with brass compression glands:				
a)	3 Core x 2.5 Sq.mm	Metre	40	118.00	4720.00
b)	3 Core x 4 Sq.mm	Metre	50	142.00	7100.00
c)	3 Core x 6 Sq.mm	Metre	80	171.00	13680.00
1.23	Supplying and installation following size of perforated pre painted M.S. cable trays with perforation not more than 17.5%, in convenient sections, joint with horizontal and vertical bends, reducers, tees, cross members and other accessories as required and duly suspended from the ceiling with M.S. suspenders etc. as required.				
a)	150mm width x 50mm depth x 1.6mm thickness	Metre	50	472.00	23600.00
b)	300mm width x 50mm depth x 1.6mm thickness	Metre	25	708.00	17700.00
1.24	Supply, erection, testing and commissioning UF plant of capacity 8 cum/hr complete with all interconnecting pipes and valves with all the required accessories & chemical cleaning system, complete in all respects & comprising the following:				
a)	UF Module (Hollow Fibre -outside in type porocity 0.1 to 0.01 micron) including micron cartridge filter in PP housing, Pneumatic Valve, PLC Electrical Panel, flow meter, compressor and all other accessories				

	making the system complete				
	Flow rate : 8m ³ /hr Output				
	Inlet TSS :- 10-30 mg/lit				
	Filtration Flux :- 40 lt/m ² /hr				
	Membrane Area - 55-75 M2 as per approved makes				
	Membrane MOC – PVDF				
	Membrane Type :- Pressure Feed Membrane 25 micron cartridge type, Out to in process				
	No. of UF Membrane - 1 Number				
b)	UF Feed Pump 2 Nos. (1W+S) 8.0m ³ /hr each 25-30m head				
c)	UF pre fine filtration				
d)	UF Backwash pumps with Complete SS - 304 with motor, pressure gauge with isolation cock, Isolation valve, NRV on delivery line. Isolation valve, strainer at suction etc. (Cap. 16m ³ /hr head 30-40m (1 W+ 1S) Including HDPE back tank of capacity 500 litres.				
e)	Chlorine dosing system				
f)	CEB / CIP dosing station including dosing tank & pumps etc.				
g)	PLC control panel with all automation required like Pneumatic valves, piping in UPVC PLC and other required accessories.	Set	1	1121000.00	1121000.00
1.25	Approval: Contractor to provide adequacy report consisting of inlet and outlet test reports, report/drawings as per pollution board requirement. Contractor shall include the cost of all chemicals consumed during testing and commissioning and the cost of such items of works, which are not explicitly mentioned above. All required statutory approvals shall be included in the rates.	Job	1	236000.00	236000.00
1.26	Operation & Maintenance contract of STP for a period of one year after completion of one year defect liability period after commissioning. All spares and replacement of any defective part shall be included in the contract.	Job	1	826000.00	826000.00
	Total in figures				19498974.00
	Quoted Rates in Figures (Percentage)	Less(-) / Above(+)			
	Quoted Rates in words (Percentage)				