REQUEST FOR PROPOSAL

FOR

DEVELOPMENT OF THREE PONDS ON THE WAY TO MBB COLLEGE NEAR TARUN SANGHA AT SHIV NAGAR AND POST COMPLETION OPERATION & MAINTENANCE FOR 05 (FIVE) YEARS INCLUDING DEFECTS LIABILITY PERIOD OF 01 (ONE) YEAR

LIST OF IMPORTANT DATES

LIST OF IMPORTANT DATES IN CONNECTION WITH THE

TENDER FOR THE WORK

Name of Work: **Development of Three Ponds on the Way to MBB College Near Tarun Sangha at Shiv Nagar and Post Completion Operation & Maintenance for 05 (five) years including Defects Liability Period of 01 (one) year.**

1.	Completion period for the work	:	**12 (Twelve) Months**
2.	Date of Publishing of Bid	:	**Date 29th December 2018**
3.	Period of downloading of biding documents at	:	**From Date 29th December 2018 https://tripuratenders.gov.in To Date 25th January 2019**
4.	Period of seeking clarifications	:	**From Date 29th December 2018 To Date 7th January 2019**
5.	Time and date of Pre-bid Conference	:	**Date 10th January 2019 Time 11.00 Hours**
6.	Place of Pre-bid Conference	:	**Office of the Chief Executive Officer, Agartala Smart City Limited, Agartala, West Tripura**
7.	Queries Response Date	:	**Date 14th January 2019**
8.	Deadline for online Bidding	:	**Date 25th January 2019 Time 15.00 Hours**
9.	Date & Time of opening Bid/Bids	:	**Date 30th January 2019 Time 11.30 Hours**
10.	Place of opening of Bid(s)	:	**Office of the Chief Executive Officer, Agartala Smart City Limited, Agartala, West Tripura**
11.	Last date of Bid Validity	:	**Date 24th July 2019**
12.	Officer inviting Bid	:	**The Chief Executive Officer, Agartala Smart City Limited, Agartala, West Tripura**

Note : ***All the above mentioned time are as per clock time of e-procurement website https://tripuratenders.gov.in***

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VOLUME - I

SECTION - I

NOTICE INVITING TENDER

AGARTALA SMART CITY LIMITED

AGARTALA

NOTICE INVITING e-TENDER

The **Chief Executive Officer**, on behalf of **Agartala Smart City Limited, Agartala, West Tripura** invites **single bid percentage rate e-tender** from the approved and eligible Contractors / Firms / Agencies of appropriate class registered with Tripura PWD / TTAADC of Tripura / MES /CPWD/ Railway /P&T/Other State PWD/Union Territory (UT)/Central & State Sector undertaking experienced in Civil Engineering / Park Development works for the work detailed as below:

Sl. No.	Name of Work	Estimated Cost	Earnest Money	Time for Completion	Deadline for online bidding	Place, Time and date of opening of online bid	Website for online bidding	Class of Bidder
1.	Development of Three Ponds on the Way to MBB College Near Tarun Sangha at Shiv Nagar and Post Completion Operation & Maintenance for 05 (five) years including Defects Liability Period of 01 (one) year. **NIe-T No. ASCL/RFP/12/17**	**Rs. 3,48,72,797.50**	**Rs. 3,48,727.00**	**12 (Twelve) Months**	**Up to 15.00 Hrs on *25-01-2019***	**O/o the Chief Executive Officer, Agartala Smart City Limited, 5th Floor, Paradise Chowmuhani, Agartala – 799 001 at 11.30 Hrs on *30-01-2019***	**https://tripuratenders.gov.in**	**Appropriate Class / category as per NIe-T**

2. Bid documents consisting of qualification information and eligibility criteria of bidders, plans, specifications, drawings, the schedule of quantities of the various classes of work to be done and the set of terms and conditions of the contract to be complied with by the bidder, can be seen in the website **https://tripuratenders.gov.in** at free of cost between ***29-12-2018*** to ***25-01-2019.***

CHIEF EXECUTIVE OFFICER

3. Eligible bidders shall participate in bidding only in online through website **https://tripuratenders.gov.in .** Bidders are allowed to bid 24x7 until the time of Bid closing, with option for Re-Submission, wherein only their latest submitted Bid would be considered for evaluation. The e-Procurement website will not allow any Bidder to attempt bidding, after the scheduled date and time. **Submission of bids physically is not permitted.**

4. **Earnest Money and Bid Fee** are to be drawn separately on State Bank of India or any other scheduled Bank guaranteed by the RBI, in the shape of **"Deposit at call"/ "Demand Draft"** in favour of the ***Agartala Smart City Limited, Agartala, West Tripura***.

5. Demand drafts furnished as above shall be valid for a minimum period of **03 (three) months** from the last date of publishing of bid. Bid Fee of **Rs. 2500.00 (Rupees two thousand five hundred)** only shall be accepted as "Deposit at call"/ "Demand Draft" and is Non-Refundable.

6. The bidders exempted from depositing earnest money & bid fee in individual case by any order of State / Central Government, PSU etc. shall also have to deposit the stipulated amount of earnest money & bid fee along with the bid in the form as specified in the bid document. No claim/ plea of the bidders in this respect will be entertained.

7. Downloaded tender document is to be uploaded back and digitally signed as part of bid and as proof of acceptance of all terms, conditions etc. in the tender document.

8. A prospective bidder requiring any clarification on bid document may contact the Bid Inviting Officer or send the queries by post at the address indicated in the NIT or write an e-mail at id: **ceoasclagartala@gmail.com** seeking clarifications between ***29-12-2018*** to ***07-01-2019***.

Authority shall not be responsible for ensuring that the bidder's queries have been received by them. Any requests for clarifications post the indicated date and time shall not be entertained by Authority.

Authority will organise a pre-bid conference and will respond to any request for clarification or modification of the bidding documents. Authority shall formally respond to the pre-bid queries after the pre-bid conference. No further clarifications shall be entertained after the date and time of submission of queries.

A Pre Bid Conference shall be held by the Chief Executive Officer, ***Agartala Smart City Limited, Agartala, 5th Floor, Paradise Chowmuhani, Agartala – 799 001, West Tripura*** on ***10-01-2019*** at 11.00 Hrs for clarification of any doubts of the prospective Bidders on any condition of the contract, specification etc.

The Authority shall respond to the queries, by ***14-01-2019***.

The Authority does not undertake to answer all the queries that have been posted by the bidders. The Authority makes no representation or warranty as to the completeness or accuracy of any response made in good faith.

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Any modifications of the RFP documents, which may become necessary as a result of the pre-bid conference, shall be made by Authority exclusively through a corrigendum. Any such corrigendum shall be deemed to be incorporated into this RFP.

9. Bid shall be uploaded in single-bid system with all Pre-Qualification and other details. Bidder shall participate in bid online through website **https://tripuratenders.gov.in**, for which they shall register/enrol themselves in the same website. **Submission of bids physically is not permitted.**

10. To participate in bid, the bidder shall have a valid **Class 2 / Class 3 Digital Signature Certificate (DSC)**, obtained from the certifying authorities enlisted by Controller of Certifying Authorities (CCA) at **http://cca.gov.in**

11. Bids will be opened online through website **https://tripuratenders.gov.in** at **11.30** Hrs on ***30-01-2019.*** If the office happen to be closed on the date of opening of the bids as specified, the bids will be opened on the next working day at the same time and venue.

12. The Bidders shall have to include the scan copy of "Demand Draft"/ "Deposit at call" (as a single PDF file in 100 dpi resolution), against the related Bid Fee & Earnest money, along with Prequalification Details. The Bidder shall also have to deposit both the original "Demand Draft"/ "Deposit at call", only in a sealed envelope depicting DNIT No., Name of the Work and the Bidders Name & Address at the office of the ***Agartala Smart City Limited, Agartala, 5th Floor, Paradise Chowmuhani, Agartala – 799 001, West Tripura*** up to 15.00 Hrs on ***28-01-2019.*** If the office happen to be closed on the last date of receipt of the sealed covers as specified above, the same will be received on the next working day up to same time at same venue.

13. If a bidder is enlisted in the Tripura PWD as well as in MES, P&T, Railways or State PWDs he shall be eligible to bid for works up to the amount permitted by virtue of his enlistment in the Tripura PWD even if he may be authorized to bid for bigger works in the CPWD/ MES/P&T and/or Railways.

14. Bids of intending bidders who are near relatives of Divisional Accountant or Chief Executive Officer or Superintending Engineer or Executive Engineer or Assistant Engineer or Junior Engineer of the Circle in which the work is to be executed, will be rejected.
Note: A near relative includes wife, husband, parents, in-laws, children, brothers, sisters, uncles, aunts and cousins.

15. No Engineer of Gazetted rank or other official employed in the Engineering or Administrative duties in an Engineering Department of the State Government is allowed to work as a bidder for a period of two years after his retirement from government services, without Government permission. This contract is liable to be cancelled if either the bidder or any of his employees is found any time to be such a person who has not obtained the permission of the Government as stated above before submission of the bid or engagement in the bidder's service.

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16. If the percentage quoted in the pre-defined BOQ by a bidder is found to be either abnormally high or due to unethical practices adopted at the time of bidding process, such bids shall be rejected.

17. Each Bidder shall submit only one bid for the work. A bidder who submits more than one bid will cause disqualification of all the bids submitted by the bidder.

18. The bidder, at the bidders own responsibility and risk, is advised to visit and examine the Site of Work and its surroundings and obtain all information that may be necessary for preparing the bid for entering into a contract, for construction of the work. The costs of visiting the site shall be at the Bidder's own expense.

19. The bid for the work shall remain valid for acceptance for a period **180 (one hundred eighty) days** from the last date of submission of the bid.

20. If the bidder withdraws his bid within the validity period then the Government shall, without prejudice to any other right or remedy be at liberty to forfeit the earnest money @50%.

21. In case the bidder fails to commence the work specified in the biding documents on 15th day or such time period as mentioned in letter of award after the date on which the Engineer-In-Charge issues written orders to commence the work, or from the date of handing over of the site, whichever is later, the Government shall, without prejudice to any other right or remedy, be at liberty to forfeit whole of the earnest money absolutely.

22. Rate Quotation

a. Bidder shall **quote rate in percentage below / above / at par in figures only** in the Bill of Quantity (BOQ) which is in **MS-Excel (macro enabled)** and should be downloaded from the e-procurement application https://tripuratenders.gov.in and the same BOQ should be filled up properly and uploaded as a part of bid with digital signing.

b. Name of bidder must be written in the appropriate field of Bill of Quantity (BOQ) by bidder.

23. **Earnest money given by all bidders except the 1st and 2nd lowest bidder shall be refunded preferably within a week from the date of receipt of bids**. Earnest money of the 2nd lowest bidder will be refunded on finalization of the bid or expiry of the validity period whichever is earlier.

24. The security deposit will be collected by deductions from the running bills of the Bidders at the rate mentioned below and the earnest money will be treated as part of security deposit. Performance security only for bids with quoted rate less than the 15% of the estimated cost of work put to bid) may be accepted as Bank Guarantee of Scheduled Banks.

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A sum @ 10% of the gross amount of the bill shall be deducted from each running bill of the Bidder till the sum along with the earnest money equal to amount of 10% of the bided value of the work subject to following limit.

a. Bided value up to Rs.100.00 lakh Security Deposit @ 10% subject to maximum of Rs. 5.00 lakh.

b. Bided value above Rs. 100.00 lakh up to Rs.200.00 lakh Security Deposit @10% subject to maximum of Rs. 15.00 lakh.

c. Bided value above Rs. 200.00 lakh Security Deposit @10% subject to maximum of Rs. 25.00 lakh.

In addition, the Bidder shall be required to deposit an amount equal to maximum 5% of the bided value of the contract as Performance Security (only for bids with quoted rate less than the (-) 15% of the estimated cost of work put to bid) within the period prescribed for commencement of work in the letter of award issued to him as per condition given in the NIT for single bid system.

For Bids up to 15% less than the estimated contract value of work, no additional security deposit is required. But for bid less than 15% of the Estimated Contract Value of work, the difference between the bided amount and 85% of the estimated contract value, shall be paid by the successful bidder at the time of concluding agreement as an additional security to fulfil the contract through a Bank Guarantee or Demand Draft on a Nationalized Bank / Scheduled bank in the prescribed format valid till completion of the work in all respects.

25. The bidders exempted from depositing security deposit & additional security deposit in individual case by any order of State / Central Government, PSU etc. shall have to deposit the stipulated amount of security deposit & additional security deposit in the manner as specified in the bid document. No claim/ plea of the bidders in this respect will be entertained.

26. The percentage rate quoted by the Bidder shall be deemed to be inclusive of the sales and other levies, duties, royalties, cess, toll taxes of Central and State Governments, local bodies and authorities that the Bidder will have to pay for the performance of this contract. The employer will perform such duties about the deduction of such taxes at source as per applicable law.

27. Other details can be seen in the bid document.

Chief Executive Officer
Agartala Smart City Limited
Agartala, West Tripura

SECTION - II

INSTRUCTIONS TO TENDERERS

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A. GENERAL

1. Name of Work:

Development of Three Ponds on the Way to MBB College Near Tarun Sangha at Shiv Nagar and Post Completion Operation & Maintenance for 05 (five) years including Defects Liability Period of 01 (one) year.

i) The **Chief Executive Officer**, **Agartala Smart City Limited, Agartala, West Tripura** invites bid(s) for the above work during the period, for which dates and time specified in the NIe-T and will be opened by the **Chief Executive Officer**, on behalf of **Agartala Smart City Limited, Agartala, West Tripura** or his nominee at his office on the date and time mentioned in the NIT.

ii) The bid document shall be available in the prescribed form through e-procurement application https://tripuratenders.gov.in.

iii) To participate in the bid, the bidder shall have a valid **Class 2/ Class 3 Digital Signature certificate (DSC)**, obtained from either of the certifying authorities, enlisted by Controller of Certifying Authorities (CCA) at http://cca.gov.in

iv) The Bidder shall enrol himself/herself in the e-procurement website https://tripuratenders.gov.in and obtain User ID and Password for bidding.

v) On publication of the bid, bidder shall download the DNIe-T and all the work items from website as mentioned in the DNIe-T and minutely go through the instructions / terms conditions / critical dates/eligibility criteria of the DNIe-T.

vi) Downloaded DNIe-T document is to be uploaded back and digitally signed as a part of bid, and as a proof of acceptance of all terms conditions in the DNIe-T.

vii) The Bidders shall have to include the scan copy of "Demand Draft"/ "Deposit at call" (as a single PDF file), against related Bid Fee & Earnest money, along with Pre-Qualification Details. The Bidder shall also have to deposit both the **original** "Demand Draft"/ "Deposit at call", only in a sealed envelope to the **"Chief Executive Officer**, **Agartala Smart City Limited, Agartala, West Tripura''** (sealed envelope should be depicted with the DNIe-T No. and Bidders Name & Address) at the office of the ***Agartala Smart City Limited, Agartala, 5th Floor, Paradise Chowmuhani, Agartala – 799 001, West Tripura*** within 15.00 Hrs on ***28-01-2019*****.**

viii) The Bidders shall have to scan all the required documents mentioned in this DNIe-T except 'DNIe-T' & 'BOQ', into PDF format of **100 dpi resolution**, for uploading as part of Bid.

ix) Bill of Quantity (BOQ), which is the percentage Rate quoting sheet in MS-Excel shall be downloaded, filled up properly and uploaded with the bid after digital signing. The Bidder shall always open the BOQ sheet with Macro Enabled.

x) The dates stipulated in the bid notice are firm and under any circumstances, they will not be relaxed unless officially extended.

xi) Bidders are allowed to bid 24x7 until the time of Bid closing, with option for Re-Submission, wherein only their latest submitted Bid would be considered for evaluation. The e-Procurement website will not allow any Bidder to attempt bidding, after the scheduled date and time.

xii) Bidders shall furnish a declaration (Annexure - D of pre-qualification information) as a part of bid that they are not been blacklisted by any department in Tripura. Any wrong declaration in this regard which comes to notice at a later date will disqualify them and the bids so received will be rejected.

xiii) The successful bidder is expected to complete the work within the time-period specified in the NIe-T.

2. Firms Eligible to Tender

2.1 The Firms who

i) possess the valid registration in the class and category mentioned in the NIT and satisfy all the conditions therein.

ii) are not blacklisted or debarred or suspended by any order of any department / PSU in Tripura or in any State in India due to any reason, which is in force as on the date of submission of tender prohibiting them not to continue in the contracting business.

iii) have complied with the eligibility criteria specified in the NIT are the eligible tenderers.

2.2 Firms Ineligible to Tender

i) A retired officer of the Govt. of Tripura or Govt. of India executing works is disqualified from tendering for a period of two years from the date of retirement without the prior permission of the Government.

ii) The tenderer who has employed any retired officer as mentioned above shall be considered as an ineligible tenderer.

iii) The contractor himself or any of his employees is found to be Gazetted Officer who retired from Government Service and had not obtained permission from the Government for accepting the contractor's employment within a period of 2 years from the date of his retirement.

iv) The contractor or any of his employees is found at any time after award of contract, to be such a person who had not obtained the permission of the Government as aforesaid before submission of the tender or engagement in the contractor's service.

v) Contractor shall not be eligible to tender for works in the Division / Circle where any of his near relatives are employed in the rank of Assistant Engineer and above on the Engineering side and Divisional Accounts Officer and above on the administrative side. The contractor shall intimate the names of persons who are working with him in any capacity or are subsequently employed. He shall also furnish a list of Gazetted /Non-Gazetted, State Government Employees related to him. Failure to furnish such information tenderer is liable to be removed from the list of approved contractors and his contract is liable for cancellation.

Note: Near relatives include

1. Sons, step sons, daughters, and step daughters
2. Son-in-law, and daughter-in-law
3. Brother-in-law, and sister-in-law
4. Brothers and Sisters
5. Father and Mother
6. Wife / Husband
7. Father-in-law and Mother-in-law
8. Nephews, nieces, uncle and aunties
9. Cousins and
10. Any person residing with or dependent on the tenderer.

3. Qualification data of the Tenderers

3.1 **The bidder should satisfy the pre-qualification criteria as fixed here under and in case any bidder is not found satisfying any of such criteria as fixed, his/her bid will be summarily rejected.**

The bidder shall furnish the following particulars in the PDF of 100 dpi resolution.

i) Documents in support of registration as approved Contractor / Firms / Agencies in appropriate class under Tripura PWD / TTAADC of Tripura / MES /CPWD/ Railway /P&T/Other State PWD/Union Territory (UT)/Central & State Sector undertaking.

ii) Details of experiences of the tenderer as prime contractor in Civil Engineering / Park Development works. This shall be furnished in the shape of satisfactory completion certificate duly issued by the concerned consignee(s).

iii) The bidder shall furnish along with the bid:

The list of technical staff & key personnel for executing i) Civil Works and ii) Electrical works as depicted in the Technical Specification and Bill of Quantities for execution of the work as per format prescribed in the tender document.

The bidders shall also submit the following documentary evidences for the technical persons who will be deployed for the electrical works of the work:

a) valid electrical supervisory license in appropriate class as per government rules for deployed supervisor &

b) permit for the electricians who shall be working for the electrical part of the project

iv) Bidders to submit availability of key & critical construction equipment - Possess Portable Concrete Mixture Machine, Welding Set, Grinding Machine, Portable Diesel Generator and Portable dewatering pump.

v) Availability of working capital for the work (Liquid assets, credit facility and availability of other financial resources such as solvency etc.) to undertake works costing Rs. 87.20 lakh or above *(certificate issued by the competent authority of any Scheduled Bank / Nationalized Bank in India guaranteed by RBI in favour of the tenderer shall not be more than one year old*).

vi) Valid PAN Card of the tenderer.

vii) Valid Sale Tax clearance certificate / valid VAT clearance certificate / valid VAT registration certificate / valid GST (as applicable) issued by the competent authority in the name of the tenderer.

Note:

1. *Registration and other relevant documents of the contractor should be valid on the last date of submission of tender as specified in the NIe-T. In case the last date of submission tender is extended, the registration and other relevant documents of the contractors should be valid on the original date of submission of tender.*

2. *Successful tenderer must have to submit valid license regarding engagement of workers in the contract works, issued from Labour Department, Government of Tripura in the name of the tenderer, to the tender inviting authority (Chief Executive Officer, Agartala Smart City Limited, Agartala, West Tripura) within 15 (fifteen) days from the date of issue of letter of acceptance of tender. Failing which the Government shall without prejudice to any other right or remedy is at liberty to cancel the acceptance of tender and also to forfeit whole of the earnest money absolutely.*

3.2 Tenders from Joint Ventures are not acceptable.

3.3 **Qualification Criteria**

i) Each tenderer should further demonstrate,

a) Availability of the Key personnel

i. Graduate Engineer (for work costing above Rs. 3.00 crore)**:** 1(one) No.

ii. Diploma holder Engineer (for work costing Rs. 1.00 crore to Rs. 3.00 crore)**:** 01 (one) No.

3.4. Even though the tenderers meet the above qualifying criteria, they are liable to be disqualified / debarred / suspended / blacklisted if they have

- ✓ Furnished false / fabricated particulars in the forms, statements, document and annexure submitted in proof of the qualification requirements and/or
- ✓ Not turned up for entering into agreement, when called upon and/or
- ✓ Record of poor progress such as abandoning the work, not properly completing the contract, inordinate delays in completion, financial failures etc. and/or
- ✓ Participated in the previous bidding for the same work and quoted unreasonably high tender percentage and
- ✓ Even while execution of the work, if found that the work was awarded to the tenderer based on false / fake certificates of experience, the contractor will be blacklisted and necessary action will be taken as per rules.

3.5 For tenders up to 15% less than the estimated contract value (ECV) of work, no additional security is required. But for tenders less than 15% of the estimated contract value (ECV) of work, the difference between the tendered amount and 85% of the estimated contract value, shall be paid by the successful tenderer at the time of concluding agreement as an additional security to fulfil the contract through a Bank Guarantee or Demand Draft on a Nationalized Bank / Scheduled Bank in the prescribed format valid till completion of the work in all respect.

3.6 **a)** If the percentage quoted by a tenderer is found to be under collusion or due to unethical practices adopted at the time of tendering process, such tender shall be rejected.

b) A tenderer submitting a tender which the tender accepting authority considers excessive and/or indicative of insufficient knowledge of current prices or definite attempt of profiteering will render himself liable to be debarred permanently from tendering or for such period as the tender accepting authority may decide. The tenderer's overall percentage should be based on the controlled prices for the materials, if any, fixed by the Government or the reasonable prices permissible for the tenderer to charge a private purchaser under the provisions of clause-6 of the hoarding and profiteering prevention ordinance of 1943 as amended from time to time and on similar principle in regard to labour supervision on the construction.

4. One Tender per Tenderer

4.1 Each tenderer shall submit only one tender for the work. A tenderer who submits more than one tender will cause disqualification of all the tenders submitted by the tenderer.

5. Cost of Tendering

5.1 The tenderer shall bear all costs associated with the preparation and submission of his tender and the tender inviting authority will in no case be responsible and liable for those costs.

6. Site Visit

6.1 The tenderer, at the tenderer's own responsibility and risk is advised to visit and examine the jurisdictions of work and its surroundings and obtain all information that may be necessary for preparing the tender for entering into a contract for successful completion of the work in all respects as per specifications & conditions of the contract. The costs of said visit shall be at the tenderer's own expense.

B. TENDER DOCUMENT

7. Contents of Tender Document

7.1 One set of Tender document comprises of the following:

1) Notice Inviting Bids (NIe-T)
2) Instruction to Bidders
3) Forms of Bid & Qualification data of the bidders
4) Conditions of Contract
5) Specifications
6) Forms of Securities i.e. EMD, Additional security etc
7) Drawings
8) Bill of Quantities

8. Clarification on Tender Document

8.1 A prospective tenderer requiring any clarification on tender document may contact the Tender Inviting Officer or send the queries by post at the address indicated in the NIT or send an e-mail at e-mail id: **ceoasclagartala@gmail.com** . The tender Inviting Officer will also respond to any request for clarification, received through post or by e-mail.

8.2 Authority will organise a pre-bid conference and will respond to any request for clarification or modification of the bidding documents. Authority shall formally respond to the pre-bid

queries after the pre-bid conference. No further clarifications shall be entertained after the date and time of submission of queries.

8.3 The Authority does not undertake to answer all the queries that have been posted by the bidders. The Authority makes no representation or warranty as to the completeness or accuracy of any response made in good faith.

9. Amendment to Tender Document

9.1 Before the last date for submission of tender, the Tender Inviting Officer may modify any of the Contents of the Tender Notice, Tender Document by issuing Amendment / Addendum.

9.2 Any addendum/amendments issued by the Tender Inviting Officer shall be part of the Tender Document and it shall either be communicated in writing to all the purchasers of the Tender document or notified in the News Papers & website in which NIT was published.

9.3 Any modifications of the RFP documents, which may become necessary as a result of the pre-bid conference, shall be made by Authority exclusively through a corrigendum. Any such corrigendum shall be deemed to be incorporated into this RFP.

9.4 To give prospective tenderers reasonable time to take an addendum into account in preparing their bids, the Tender Inviting Officer may extend if necessary, the last date for submission of tenders.

C. PREPARATION OF TENDER

10. Language of the Tenders

10.1 All documents relating to the tender shall be in the English Language only.

11. Documents comprising of the Tender

11.1 The Bid comprise the following.

a) Bid document and drawings
b) Qualification information and supporting documents.
c) Bid offer & Bill of Quantities (BOQ)

12. Tender Offer

12.1 Tender offer & Schedule of Works (Bill of Quantities) called Schedule ‘A’ accompanies the tender document as Volume-II. The Schedule-A shall contain the item of works. The Schedule ‘A’ is liable to alterations by omissions, deduction or addition at the discretion of

the Chief Executive Officer or as set forth in the conditions of the contract. The Schedule 'A' shall contain the items of work indicated as Part-I. The tenderer will have to state their willingness to execute the work at certain specific percentage of excess or less or at par of the ECV indicated in Part-I at the spaces provided therein in Schedule 'A'. The tenderer shall quote his offer as an overall tender percentage. The overall tender percentage should be written both words & figures. The tender offer i.e. percentage shall be written both in figures & words legibly and free from errors.

12.2 The Schedule-A contains not only the quantities but also the rates worked out by the department and the amount for each item and total value of the estimated contract. The tenderer should work out his own rates keeping in view the work, site conditions, specifications & conditions of contract etc. and quote his overall tender percentage with which he intends to execute the work.

12.3 The percentage quoted by the tenderer shall be deemed to be inclusive of all kinds of applicable taxes, duties, royalties, Cess of both Central & State Government, local body etc. on all materials that the contractor will have to purchase for performance of the contact, all kinds of transportation charges of stipulated departmental materials as well as other materials to be arranged by the contractor at his own from respective places of delivery to the site of work & also from one work site to another, erection of temporary staging for sinking the tube well & it's subsequent dismantling and removal, making the ground condition good as before after completion of work, proper filling up of abandoned pilot hole, development & protection of worksite etc. whatsoever required to complete the work in all respects as per conditions of the contract. All plumbing & temporary incidental works which are not specifically mentioned in the schedule of works but required for successful completion of the work in all respects shall also be taken in to consideration while quoting the tender percentage. The tenderers shall be careful to avoid any ambiguity in respect of quoted tender rate & corresponding tender amount.

12.4 Prior to quoting the rate & amount, the tenderer(s) should get themselves appraised with the interference of all kinds of applicable taxes, duties, royalties, Cess etc. whatsoever of Central & State Government, local bodies etc. and also the applicable Rules & Regulations of Government of Tripura being followed in respect of tenders for similar kind of works to avoid any ambiguity. No plea / claim of the tenderers will be entertained in this regard afterwards.

12.5 The tendered contract amount is subject to variation during the performance of the Contract in accordance with variation in scopes of works etc.

13. Validity of Tender

13.1 Tender shall remain valid for a period of not less than **180 (One Hundred Eighty) days** from the last date for receipt of tender as specified in NIe-T.

13.2 During the above-mentioned period, no plea by the tenderer for any sort of modification of the tender based upon or arising out of any alleged misunderstanding or misconceptions or mistake or for any reason will be entertained.

13.3 In exceptional circumstances, prior to expiry of the original time limit, the Tender Inviting Officer may request the tenderers to extend the period of validity for a specified additional period. Such request to the tenderers shall be made in writing. A tenderer may refuse the request without forfeiting his earnest money deposit (EMD). A tenderer agreeing to the request will not be permitted to modify his tender, but will be required to extend the validity of his E.M.D. for a period of the extension.

14. Earnest Money Deposit

14.1 The tenderer shall furnish, Earnest Money Deposit equivalent to 1.00% of ECV along with the tender (as specified in NIe-T)**.** The EMD shall be furnished in favour of **Agartala Smart City Limited, Agartala, West Tripura,** and can be furnished in the form of Demand Draft or 'Deposit-at-Call' on any Scheduled Bank / Nationalized Bank, guaranteed by Reserve Bank of India.

14.2 Earnest money deposit is required to be valid at least for tender validity period as stipulated in the NIe-T. If Demand draft having validity of three months period (as per latest circular of RBI) is furnished towards EMD along with tender and in such case if asked by the concerned Chief Executive Officer prior to expiry of validity of said Demand draft, the tenderer shall furnish another Demand draft towards earnest money having validity for further three months period so that total validity period of earnest money furnished through demand draft shall be ensured at least for the stipulated tender validity period. However, the Demand draft furnished along with the tender shall be returned to the tenderer on receipt of fresh Demand draft with required validity as noted above.

14.3 The EMD of the tenderers will be returned no sooner the tenders are finalized or end date of the tender validity period whichever is earlier.

14.4 The earnest money deposited by the tenderers will not carry any interest. The earnest money deposited by the tenderers will be dealt with as provided in the conditions stipulated in the tender document.

14.5 The tenderers exempted from depositing earnest money in individual case by any order of State / Central Government, PSU etc. shall also have to deposit the stipulated amount of Earnest Money along with the tender in the form as specified in the tender document. No claim/ plea of the tenderers in this respect will be entertained.

14.6 The EMD shall be forfeited

i) if the tenderer withdraws the tender during the validity period of tender.

ii) in case of successful tenderer, if he fails to sign the agreement for whatever the reason.

iii) in case the bidder fails to start the work specified in the bid documents on 15th day or such time period as mentioned in letter of award after the date on which the Engineer-in-Charge issues written orders to commence the work or from the date of handing over of the site, whichever is letter.

15. Alteration

16.1 No alteration which is made by the tenderer in the contract form, the conditions of the contract, the drawings, specifications or statements / formats or quantities accompanying the same will be recognized; and, if any such alterations are made, the tender will be void.

D. SUBMISSION OF BIDS

16. Submission of Bids

16.1 The bidders who are desirous of participating in bid, shall submit their pre-qualifications and other details etc. in the standard formats prescribed in the bid document through the application http://tripuratenders.gov.in

16.2 **List of documents to be scanned and uploaded**

16.2.1 **Documents to be kept in the "Assigned folder" of Bidder:** The following documents, as per standard format detailed in bid document, or as per standard dictated by Regulatory/ Statutory bodies, shall be scanned and uploaded along with the bid document as per requirements.

For ease of biding, the bidders shall scan the following documents at 100 dpi resolution and upload them as per the folder structure provided in the **"Assigned Folder"**, which is provided free of cost to all bidders, post his/her registration in the application https://tripuratenders.gov.in. This operation is expected to be completed before commencement of actual biding by the bidder.

Sl. No.	Folder Name	Documents to be uploaded
1	**Registrations**	**i)** Documents in support of registration as approved Contractor /Firms/Agencies in appropriate class under Tripura PWD / TTAADC of Tripura / MES /CPWD/ Railway /P&T/Other State PWD/Union Territory (UT)/Central & State Sector undertaking.
		ii) Documents of power of attorney in favour of the member who has digitally signed the bid on behalf of a firm, company / evidence of satisfactory authorization in favour of the officer who has digitally signed the tender on behalf of a corporation.
2	**DNIe-T Document**	Downloaded DNIe-T

Sl. No.	Folder Name	Documents to be uploaded
3	**Experiences**	a) Details of experiences of the tenderer as prime contractor in Civil Engineering / Park Development works. This shall be furnished in the shape of satisfactory completion certificate duly issued by the concerned consignee(s). b) The list of technical staff & key personnel for executing i) Civil Works and ii) Electrical works as depicted in the Technical Specification and Bill of Quantities for execution of the work as per format prescribed in the tender document. c) Documentary evidences for the technical persons who will be deployed for the electrical works of the work: i) valid electrical supervisory license in appropriate class for deployed supervisor & ii) permit for the electricians who shall be working for the electrical part of the project
4	**Machineries and equipment details**	Possess Portable Concrete Mixture Machine, Welding Set, Grinding Machine, Portable Diesel Generator and Portable dewatering pump.
5	**Financial Details**	Availability of working capital for the work (Liquid assets, credit facility and availability of other financial resources such as solvency etc.) to undertake works costing Rs.87.20 lakhs or above (certificate issued by the competent authority of any Scheduled Bank /Nationalized Bank in India guaranteed by RBI in favour of the tenderer shall not be more than one year old).
6	**Tax related documents**	**i)** Valid PAN Card of the bidder.
		ii) Valid Sale Tax clearance certificate / valid VAT clearance certificate /valid VAT registration certificate / valid GST (as applicable) issued by the competent authority in the name of the tenderer.
7	**Misc. document**	**i)** The bidders shall submit the following documentary evidences for the technical persons who will be deployed for the electrical works of the work: **a)** valid electrical supervisory license in appropriate class as per government rules for deployed supervisor & **b)** permit for the electricians who shall be working for the electrical part of the project

Sl. No.	Folder Name	Documents to be uploaded
		ii) Any other relevant & applicable documents

During actual bidding, the bidder shall select / check these documents from the **"Assigned Folder"**, which will ensure completion of biding within the same session, even if the bidder is connecting to the application over a slow speed network.

16.2.2 Documents required during actual Bidding: In addition to the documents kept in the **"Assigned Folder"** as mentioned in 16.2.1 above, the following documents are also to be uploaded to the e-Procurement application during actual biding.

i) Scanned copy of "Demand Draft" or "Deposit at Call receipt" of any Scheduled Bank guaranteed by RBI against EMD and scanned copy Demand Draft of any Scheduled Bank guaranteed by RBI towards bid fee, both in a single PDF.

ii) Check list as per **Annexure - A**

iii) Declaration of Bidder as per **Annexure – D**

iv) Undertaking of the Bidder as per **Annexure - E**

v) Schedule – A of BOQ as per **Annexure - F**

Note:
Bidder should take the printout of format of Annexure - A (i.e. Check list**),**

Annexure - B (i.e. Availability of Key & critical construction equipment)**,**

Annexure – C (i.e. Availability of technical staff & key personnel for execution & site management the work),

Annexure – D (i.e**.** Declaration of the Bidder),

Annexure - E (i.e. Undertaking of the Bidder**) &**

Annexure - F (i.e. Schedule-A of BOQ**)**

Annexure - G (i.e. Form of Solvency Certificate From A Scheduled Bank**)**

Annexure - H (i.e. Form of Performance Guarantee**)**

Attached with this bid documents and fill up where necessary, put ink signature with stamp and upload the scanned copy in the 'Assigned Folder' after digital signing at

the time of Bidding. Bidder shall download the BOQ (Rate quoting schedule) and fill up properly and upload after digital signing at the time of bidding.

16.3.2 If any of the certificates/documents furnished by the Bidder, found to be false / fabricated / bogus, the bidder will be liable to blacklisted and their E.M.D. will be forfeited**.**

17. Last date / time for Submission of the bids

17.1 Bids must be submitted not later than the date and time specified in NIe-T.

17.2 The Chief Executive Officer may extend the date for receipt of bids by issuing an amendment in which case all rights and obligations of the Chief Executive Officer and the bidders will remain same as previously.

18. Late Bids

18.1 The e-Procurement application https://tripuratenders.gov.in will not allow any Bidder to attempt bidding, after the scheduled date and time prescribed in NIe-T.

E. TENDER OPENING AND EVALUATION

19. Tender opening

19.1 The bids will be opened online by the Bid openers at the time, date and venue as specified in the bid document. The bids shall be scrutinized in accordance with the conditions stipulated in the bid document. In case of any discrepancy of non-adherence conditions, the bid accepting authority shall communicate the same which will be binding both on the bid opening authority and the bidder In case of any ambiguity, the decision taken by the Bid Accepting Authority on bids shall be final.

20. Evaluation and Comparison of Tender rate

20.1 All the statement, documents, certificates, demand draft/bank guarantee, BOQ (bills of quantity) etc. submitted / uploaded by the bidder will be verified for evaluation of bids. The clarifications, particulars, if any, required from the bidders, will be obtained by addressing the bidders. Bids will be evaluated against the specified parameters / criteria same as in the case of conventional bids and the qualified bidders will be identified. The result of bids evaluation can be seen in the e-procurement application https://tripuratenders.gov.in by all the bidders who participated in the Bid.

20.2 The 'BOQ comparative chart' generated & displayed from the e-procurement application, after the opening of Bid will not be final. Department will prepare comparative Statement as per the decision of the Bid evaluation Committee, which will be appropriately displayed in the e-procurement application.

20.3 In case where it became necessary, negotiation should be restricted only to the lowest bidder prior to finalization of the bid for acceptance if desired by the bid accepting authority.

21. Discrepancy in Tender Percentage quoted

21.1 Tender shall be scrutinized in accordance with the conditions stipulated in the Bid document. Tenderer shall quote rate in percentage in figures only. In case of any ambiguity, the decision taken by the Bid Accepting Authority on Bidders shall be final.

22. Process to be Confidential

22.1 Information relating to the examination, clarification, evaluation and comparison of bids and recommendations for the award of a contract shall not be disclosed to bidders or any other persons not officially concerned with such process until the award to the successful bidder has been announced by the bid accepting authority. Any effort by a bidder to influence the processing of bids or award decisions may result in the rejection of his bid.

22.2 No bidder shall contact the Chief Executive Officer or any authority concerned with finalization of bids on any matter relating to its bid from the time of the bid opening to the time the contract is awarded. If the bidder wishes to bring additional information to the notice of the Chief Executive Officer, it should do so in writing.

22.3 Before recommending / accepting the bid, the bid recommending / accepting authority shall verify the correctness of certificates submitted to meet the eligibility criteria and specifically experience. If required, the authenticated agreements of previous works executed by the lowest bidder may be called for.

F. AWARD OF CONTRACT

23. Award Criteria

23.1 The Chief Executive Officer will award or recommend to the competent bid accepting authority for award of the contract to the bidder who is found qualified as per the bid conditions and whose offer rate is lowest.

23.2 The bid accepting authority reserves the right to accept or reject any bid or all bids and to cancel the biding process, at any time prior to the award of contract, without thereby incurring any liability to the affected bidder or bidders or any obligation to inform the affected bidder or bidders of the reasons for such action.

24. Notification of Award and Signing of Agreement

24.1 The bidder whose bid has been accepted will be notified of the award of the work by the Chief Executive Officer or any authorized official, prior to expiration of the bid validity period by registered letter. This letter (hereinafter and in the Conditions of Contract called "Letter of Acceptance") will indicate the sum that the Government will pay the bidder in consideration of the execution, completion and maintenance of the Works by the bidder as prescribed by the Contract (hereinafter and in the Contract called the "Contract Amount").

24.2 When a bid is to be accepted, the concerned bidder shall attend the office of the Chief Executive Officer concerned on the date fixed in the Letter of acceptance. Upon intimation being given by the Chief Executive Officer, of acceptance of his bid, the bidder shall make payment of the additional security deposit wherever needed by way of Demand Draft or Deposit at Call obtained from a Nationalized / Scheduled Bank with required validity period and sign an agreement in the form prescribed by the department for the due fulfilment of the contract. Failure to attend the Chief Executive Officer's office on the date fixed, in the written intimation, to enter into the required agreement shall entail forfeiture of the Earnest Money deposited. The written agreement to be entered into between the bidder and the Government shall be the foundation of the rights and obligations of both the parties and the contract shall not be deemed to be complete until the agreement has first been signed by the bidder and then by the proper officer authorized to enter into contract on behalf of the Government.

24.3 The successful bidder has to sign an agreement within a period of 15 days from the date of receipt of communication of acceptance of his bid. On failure to do so his bid will be cancelled duly forfeiting the EMD paid by him without issuing any further notice and action will be initiated for black listing the bidder.

25. Corrupt or Fraudulent Practices

25.1 The Government requires that the bidders / suppliers / contractors under Government financed contracts, observe the highest standard of ethics during the procurement and execution of such contracts. In pursuance of this policy, the Government

(a) define for the purposes of the provision, the terms set forth below as follows:

(i) "corrupt practices" means the offering, giving, receiving or soliciting of anything of value to influence the action of a Government official in procurement process or in contract execution; and

(ii) "fraudulent practice" means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the Government and includes collusive practice among bidders (prior to or after Bid submission) designed to establish in bid prices at artificial non-competitive levels and to deprive the Government of the benefits of free and open competition.

(b) Will reject a proposal for award if it determines that the bidder recommended for award has engaged in corrupt or fraudulent practices in competing for the contract in question.

(c) Will blacklist / or debar a firm, either indefinitely or for a stated period of time, if at any time determines that the firm has engaged in corrupt or fraudulent practices in competing for, or in executing a Government Contract.

(d) Furthermore, bidders shall be aware of the provisions stated in the Conditions of Contract.

SECTION - III

FORM OF BID

QUALIFICATION INFORMATION

Annexure- A

CHECK LIST TO ACOMPANY THE BID

Sl. No.	Description	Submitted
1	2	3
1.	Submit the check list (**as per Annexure – A)**	Yes / No
2.	Documents in support of registration as approved Contractor / Firms / Agencies in appropriate class under Tripura PWD / TTAADC of Tripura / MES /CPWD/ Railway /P&T/Other State PWD/Union Territory (UT)/Central & State Sector undertaking.	Yes / No
3.	Documents of power of attorney in favour of the member who has digitally signed the bid on behalf of a firm, company / evidence of satisfactory authorization in favour of the officer who has digitally signed the tender on behalf of a corporation.	Yes / No
4.	Downloaded DNIe-T.	Yes / No
5.	Details of experiences of the tenderer as prime contractor in Civil Engineering / Park Development works. This shall be furnished in the shape of satisfactory completion certificate duly issued by the concerned consignee(s).	Yes / No
6.	Bidders to submit availability of key & critical construction equipment: Possess Portable Concrete Mixture Machine, Welding Set, Grinding Machine, Portable Diesel Generator and Portable dewatering pump (**as per Annexure-B**).	Yes / No
7.	**A)** The list of technical staff & key personnel for executing i) Civil Works and ii) Electrical works as depicted in the Technical Specification and Bill of Quantities for execution of the work as per format prescribed in the tender document (**as per Annexure - C**). **B)** Documentary evidences for the technical persons who will be deployed for the electrical works of the work: a) valid electrical supervisory license in appropriate class for deployed supervisor & b) permit for the electricians who shall be working for the electrical part of the project	Yes / No
8.	Declaration of the Bidder (**as per Annexure - D**)	Yes / No

Sl. No.	Description	Submitted
9.	Undertakings of the Bidder (**as per Annexure - E**)	Yes / No
10.	Schedule – A of BOQ **(as per Annexure - F)**	Yes / No
11.	Availability of working capital for the work (Liquid assets, credit facility and availability of other financial resources such as solvency etc.) to undertake works costing Rs. 87.20 lakhs or above (certificate issued by the competent authority of any Scheduled Bank /Nationalized Bank in India guaranteed by RBI in favour of the tenderer shall not be more than one year old) (**as per Annexure - G**).	Yes / No
12.	Form of Performance Guarantee (**as per Annexure - H**)	Yes / No
13.	Valid PAN Card of the bidder	Yes / No
14.	Valid Sale Tax clearance certificate and /or valid VAT clearance certificate and / or valid Sale Tax registration and /or valid VAT registration certificate/ valid GST (as applicable) issued by the competent authority in the name of the bidder.	Yes / No
15.	Scanned copy of “Demand Draft” or “Deposit at Call receipt” of any Scheduled Bank guaranteed by RBI against EMD and scanned copy “Demand Draft” or “Deposit at Call receipt” on any Scheduled Bank guaranteed by RBI towards Bid Fee	Yes / No
16.	Any other relevant & applicable documents	Yes / No

Signature of the Bidder

Annexure- B

Availability of Key & Critical Construction Equipment

1) I / We do hereby solemnly affirm and declare that I / we own the following equipment for using on the subject work and also declare that I / We will abide by any action such as disqualification or determination of contract or blacklisting or any action deemed fit, if the department detects at any stage that I / we do not possess the equipment listed below.

Sl. No.	Equipment Type and Characteristics	Minimum quantity required
1. 2. 3.		

2) I / We do hereby declare that the said rig machine & other equipments will be deployed only for this work and will be placed to the worksite after issuance of work order.

Signature of the Bidder

Annexure-C

Schedule of Availability of Technical Staff & Key Personal

I / We will employ the following technical staff & key personnel for supervising the work and will see that one of them is always at site during working hours; personally, checking all items of works and pay special attention to such works as required.

Name of members of Technical staff proposed to be employed	Qualification

Name of members of Key Personnel proposed to be employed	Qualification

I / We declare that I / We agree to recover the salaries of the technical staff actually engaged on the work by the department from the work bills, if I / We fail to employ technical staff as per the bid condition.

Signature of the Bidder

Annexure – D

DECLARATION OF THE BIDDER

1) I / we have gone through carefully all the bid conditions and solemnly declare that I / we will abide by any penal action such as disqualification or black listing or determination of contract or any other action deemed fit, taken by the Department against me / us, if it is found that the statements, documents, certificates produced by me / us are false / fabricated.

2) I / We do hereby declare that there is no order of any Government department / PSU of Tripura or any other State in India is in force as on the date of submission of bid regarding blacklisting or debarment or suspension prohibiting me / us from continuing contracting business for any reason.

3) I / We have not been demoted to the next lower category for not filing the bids after buying the bid schedules in a whole year and my/our registration has not been cancelled for a similar default in two consecutive years.

4) I / We agree to disqualify me/us for any wrong declaration in respect of the above and to summarily reject my/our bid.

Address of the Bidder:

Phone No.:

Fax No.:

Email No.:

Note: If the bid is made by an individual, it shall be signed with his full name and his full postal address shall be given. If the bid is made by a firm/company, it shall be signed by a member of the firm/company holding a power of attorney authorizing him to do so and such power of attorney to be produced with the bid and it must disclosed that the firm/company is duly registered under the Indian Partnership Act / Indian Company Act. If the bid is made by a corporation it shall be signed by a duly authorized officer who shall produce with his bid satisfactory evidence of his authorization. Such bidding corporation may be required before the contract is executed, to furnish evidence of its corporate existence.

Signature of the Bidder

Annexure – E

Undertaking of the Bidder

Date:

To,
The Chief Executive Officer,
Agartala Smart City Limited,
Agartala, West Tripura.

Sir,

I / We do hereby bid and if this bid be accepted, undertake to execute the following work viz. **"**Development of Three Ponds on the Way to MBB College Near Tarun Sangha at Shiv Nagar and Post Completion Operation & Maintenance for 05 (five) years including Defects Liability Period of 01 (one) year**"** as described in the specifications deposited in the office of the Chef Executive Officer, Agartala Smart City Limited, Agartala, West Tripura with such variations by way of alterations or additions to, and omissions from the said works and method of payment as provided for in the 'Conditions of the Contract' for the sum of Rs. ……..……Rupees…….. (***To Be Filled In During Signing of Agreement***) or such other sum as may be arrived under the clause of the standard preliminary specifications relating to 'payment on lump sum basis or by final measurement at unit rates'.

I/We have quoted percentage excess or less, at par on ECV, **in Bills of Quantities (BOQ) in figures only** for which I / We agree to execute the work when the lump sum payment under terms of the agreement is varied by payment on measurement quantities.

I/We have quoted percentage excess or less, at par on ECV, **in Bills of Quantities (BOQ) in figures only**. I/WE have not tampered with the provided Bills of Quantity (BOQ) and I/WE have uploaded the same downloaded BOQ after filling in the necessary fields**.**

I/We agreed to keep the offer in this bid valid a period of **180 (one hundred eighty) days** mentioned in the bid notice and not to modify the whole or any part of it for any reason within above period. If I/WE withdraw the bid for any reasons whatsoever, the earnest money paid by me / us will be forfeited to Government.

I/We hereby distinctly and expressly declare and acknowledge that, before the submission of my / our bid, I/We have carefully followed the instructions in the bid notice and the preliminary specifications and that I/We have made such examination of the contract document and the plans, specifications and quantities and of the location where the said work is to be done, and such investigation of the work required to be done, and in regard to the material required to be furnished as to enable me/us to thoroughly understand the intention of same and the requirements, covenants, agreements, stipulations and restrictions contained in the contract, and in the said plans and specifications and distinctly agree that I/We will not hereafter make any claim or demand upon the Government based upon or arising out of any alleged misunderstanding or misconception or

mistake on my / our part of the said requirement, covenants, agreements, stipulations, restrictions and conditions.

I / We enclosed to my/our application for bid a crossed “Demand Draft”/ “Deposit at Call Receipt” (No……dated:……..) for Rs. ……as earnest money not to bear interest.

I / We shall not assign the contract or sublet any portion of the same.
If My / Our bid is not accepted, the sum shall be returned to me / us on application when intimation is sent to me / us of rejection or at the expiration of 180 (one hundred eighty) days from last date of receipt of this bid, whichever is earlier. If my / our bid is accepted, the earnest money shall be retained by the Government as security for the due fulfilment of this contract. If upon written intimation to me / us by the office of The Chief Executive Officer,

I / We fail to attend the said office on the date herein fixed or if upon intimation being given to me / us by the Chief Executive Officer or acceptance of my/our bid and if I/We fail to make the additional security deposit or to enter into the required agreement as defined in the bid notice, then I / We agree the forfeiture of the earnest money. Any notice required to be served on me/us hereunder shall be sufficiently served on me/us if delivered to me/us personally or forwarded to me/us by post to (registered or ordinary) or left at my/our address given herein. Such notice shall if sent by post be deemed to have been served on me/us at the time wherein due course of post it would be delivered at the address to which it is sent.

I/We fully understand that the written agreement to be entered into between me/us and Government shall be the foundation of the rights of the both the parties and the contract shall not be deemed to be complete until the agreement has first been signed by me/us and then by the proper officer authorized to enter into contract on behalf of Government.

I am / We are professionally qualified and my/our qualifications are given below;

Name	**Qualifications**

I / We will deploy the **technical staff** (as per **Annexure - C** of this Bid document) for supervising the work and will see that one of them is always at site during working hours, personally checking

all items of works and pay extra attention to such works as required special attention (e.g.) Reinforced concrete work etc.

I / We declare that I/We agree to recover the salaries of the technical staff actually engaged on the work by the department from the work bills if I / We fail to employ technical staff as per the bid condition.

TENDERER'S CERTIFICATE

(1) I / We hereby declare that I / We have perused in detail and examined closely the Standard Specifications of Government of Tripura, all clauses of the preliminary specifications with all amendments and have either examined all the standards specifications or will examine all the standard specifications for items for which I / We bid, before I/We submit such bid and agree to be bound and comply with all such specifications for this agreement.

(2) I/We certify that I/We have inspected the site of the work before quoting my Percentage excess or less on ECV, I /We have satisfied about the quality, availability and transport facilities for stones, sand and other materials.

(3) I/We am/are prepared to furnish detailed data in support of my quoted rate, if and when called upon to do so without any reservations.

(4) I/We hereby declare that I/We will pay an additional security deposit in terms of conditions, the difference between 85% of ECV and my/our bid amount, in case if my / our offer is less than (-)15%.

(5) I/We hereby declare that I/We will not claim any price escalation for this work.

(6) a) I/We declare that I/We will procure all the required construction materials (except stipulated departmental materials) including earth and use for the work after approval of the Engineer-in-Charge.

The responsibility for arranging and obtaining the land for borrowing or exploitation in any other way shall rest with me/us for the materials for construction. I/We shall ensure smooth and un-interrupted supply of materials.

b) I/We declare that the responsibility for arranging and obtaining the land for disposal of spoil/soil not useful for construction purposes shall rest with me/us.

c) I/We declare that I/We shall not claim any compensation or any payment for the land so arranged for disposal of soil and the land for borrow area. My/our quoted percentage excess or less ECV or at Par are inclusive of the land so arranged and I/We will hand over the land so arranged for disposal of soil to the department after completion of work.
d) I/WE declare that I/WE will not claim any extra amount towards any material used for the work other than the quoted works for respective schedule 'A' items.

(7) I/We declare that I/We will execute the work as per mile stone programme and if I/We fail to complete the work as per the mile stone programme, I / We abide by the condition to recover liquidated damages as per the bid conditions.

(8) I/We declare that I/We will abide for settlement of disputes as per the bid conditions.

(9) I/We declare that I/We will produce Forest Clearance Certificate from the Divisional Forest Officer having jurisdiction over the area, in respect of extraction of any forest produces for utilization in works under this contract before final payment and/or/refund of security deposit. If I/We fail to do so, a sum of money towards royalty remaining unpaid by the me / us, if any, as may be specified by the concerned Divisional Forest Officer, will be set-off from any sum of money including security deposit due any payable to the me / us under this contract.

(10) I/We declare that if my / our bid is accepted, I/We will submit valid license regarding engagement of workers in the contract works, issued from Labour Department, Government of Tripura in the name of the bidder to the bid inviting authority *(The Chief Executive Officer, Agartala Smart City Limited, Agartala, West Tripura*) within 15 (fifteen) days from the date of issue of letter of acceptance of bid. If I/We fail to submit the license regarding engagement of workers in the contract works as above, then I/We agree with the forfeiture whole of the earnest money deposited by me / us absolutely and cancellation of acceptance of my/our bid. I / we will also abide by any penal action such as black listing or any other action deemed fit, taken by the Department against me/us for such default from my / our part.

Address of the Bidder:

Phone No. **Fax No.** **Email Id.**

Note:
If the bid is made by an individual, it shall be signed with his full name and his full postal address shall be given. If the bid is made by a firm/company, it shall be signed by a member of the firm/company holding a power of attorney authorizing him to do so and such power of attorney to be produced with the bid and it must disclosed that the firm/company is duly registered under the Indian Partnership Act / Indian Company Act. If the bid is made by a corporation it shall be signed by a duly authorized officer who shall produce with his bid satisfactory evidence of his authorization. Such bidding corporation may be required before the contract is executed, to furnish evidence of its corporate existence.

Signature of the Bidder

SECTION - IV

CONDITIONS OF CONTRACT

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CONDITIONS OF CONTRACT

A. GENERAL

1. Interpretation

1.1 In interpreting these Conditions of Contract, singular also means plural, male also means female, and vice-versa. Headings have no significance. Works have their normal meaning under the language of the contract unless specifically defined. The Engineer-in-charge will provide instructions clarifying queries about the Conditions of Contract.

1.2 The documents forming the Contract shall be interpreted in the following order of priority:

1) Agreement
2) Letter of Acceptance, notice to proceed with the works
3) Contractor's Tender
4) Conditions of Contract
5) Specifications and other terms & conditions
6) Bid offer & Schedule of work (Bill of Quantities)
7) Any other document listed as forming part of the Contract

2. Engineer-in-charge's Decisions

2.1 Except where otherwise specifically stated, the Engineer-in-charge will decide the contractual matters between the Department and the Contractor in the role representing the Department.

3. Delegation

3.1 The Engineer-in-charge may delegate any of his duties and responsibilities to other officers and may cancel any delegation by an official order issued.

4. Communications

4.1 Communications between parties, which are referred to in the conditions, are effective only when in writing. A notice shall be effective only when it is delivered (in terms of Indian Contract Act).

5. Other Contractors

5.2 The contractor shall cooperate and share the Site with other contractors, Public authorities, utilities and the Department. The contractor shall also provide facilities and services for them as directed by the Engineer-in-charge.

6. Personnel

6.1 The contractor shall employ the required key personnel named in the schedule of key personnel to carry out the functions stated in the Schedule or other personnel approved by the Engineer-in-charge. The Engineer-in-charge will approve any proposed replacement of key personnel only if their qualifications, abilities, and relevant experience are substantially equal to or better than those of the personnel listed in the Schedule.

6.2 Failure to employ the required technical personnel by the contractor, the amounts as specified in the conditions of the contract herein after will be recovered from the contractor over and above the provisions made in the tender document.

6.3 The technical personnel should be on full time and available at site whenever required by Engineer-in-charge to take instructions.

6.4 The names of the technical personnel to be employed by the contractor should be furnished in the prescribed proforma of this tender document.

6.5 In case the contractor is already having more than one work on hand and has undertaken more than one work at the same time, he should employ separate technical personnel on each work.

6.6 If the Engineer-in-charge asks the contractor to remove a person who is a member of contractor's staff or his work force stating the reasons, the contractor shall ensure that the person leaves the site forthwith and has no further connection with the work in the contract.

7. Contractor's Risks

7.1 All risks of loss of or damage to physical property and of personnel injury and death, which arise during and in consequence of the performance of the Contract, are the responsibility of the contractor.

8. Insurance

8.1 The contractor shall provide, in the joint names of the Department and the contractor, insurance cover from the Start Date to the end of the Defects Liability Period i.e., 1**2 (Twelve) months** after completion for the following events which are due to the contractor's risks.

a) loss of or damage to the Works, Plant and Materials ;
b) loss of or damage to the Machineries & Equipment ;
c) loss of or damage of property in connection with the Contract ; and
d) personal injury or death of persons employed for construction

8.2 Policies and certificates of insurance shall be delivered by the contractor to the Engineer-in-charge at the time of concluding agreement. All such insurance shall provide for compensation to be payable to rectify the loss or damage incurred.

i. The Contractor shall furnish insurance policy in force in accordance with proposal furnished in the tender and approved by the Department for concluding the agreement.

ii. The Contractor shall also pay regularly the subsequent insurance premium and produce necessary receipt to Engineer-in-charge well in advance.
iii. In case of failure to act in the above said manner, the Department will pay the premium and the same will be recovered from the contractor's payments.

8.3 Alterations to the terms of insurance shall not be made without the approval of the Engineer-in-charge.

9. Site Inspections

9.1 The contractor should inspect the site and also proposed quarries of choice for materials source of water and quote his percentage including quarrying, conveyance and all other charges etc.

9.2 The responsibility for arranging the land for borrow area rests with the contractor and no separate payment will be made for procurement or otherwise. The contractor's quoted tender percentage will be inclusive of cost of arrangement of such land.

10. Contractor to Construct the Works

10.1 The contractor shall construct and complete the work in accordance with the stipulated specifications and conditions of contract in all respects.

11. Diversions of Streams and Drains

No separate payment for bailing out sub-soils, water drainage or locked up rain water for diversion, shoring, foundations, bailing of pumping water either from excavation of soils from foundations or such other incidental will be paid. The amount to be quoted by the contractor is for the finished item of work in situ and including all the incidental charges. The borrow pits are also to be de-watered by the contractor himself at his expense, if that should be found necessary. The contractor has to arrange for bailing out water, protection to the work in progress and the portion of works already completed and safety measures for men and materials and all necessary arrangements to complete the work. No separate payment will be entertained for this purpose. All the arrangements so required should be carried out and maintained at the cost of the contractor and no separate or additional payment is admissible.

12. Power Supply

12.1 The contractor shall make his own arrangements for obtaining power from the Tripura State Electricity Corporation Ltd. (TSECL) at his own cost for execution of the work and for his establishments at work site. The contractor will pay the bills of TSECL for the cost of power consumed by him.

12.2 The contractor shall satisfy all the conditions and rules required as per Indian Electricity Act 1910 and under Rule-45(I) of the Indian Electricity Rules, 1956 as amended from time to time and other pertinent rules.

12.3 The power shall be used for bonafide Departmental work only.

13. Works Adjacent To Road

13.1 The contractor shall take all necessary measures for the safety of traffic during construction and provide erect and maintain such barricades, including signs, marking, flags, lights, information, and protection of traffic approaching or passing through the section of the road adjacent to the work site.

13.2 Warring lights shall be mounted on the barricades at night and keep lit throughout from sunset to sun shine.

14. Ramps

Ramps required during execution shall be formed wherever necessary and same are to be removed after completion of the work. No separate payment will be made for this purpose.

15. Monsoon Damages

Damages due to rain or flood either in cutting or in banks shall have to be made good by the contractor till the work is handed over to the Department. The responsibility of de-silting and making good the damages due to rain or flood rests with the contractor. No extra payment is payable for such operations and the contractor shall therefore, have to take all necessary precautions to protect the work done during the construction period.

16. The works to be Completed by the Intended Completion Date

16.1 The contractor may commence execution of the works on the Start Date and shall carry out the works in accordance with the program submitted by the contractor, as updated with the approval of the Engineer-in-charge and complete the work by the Intended Completion Date.

17. Safety

17.1 The contractor shall be responsible for the safety of all activities on the Site.

18. Discoveries

18.1 Anything of historical or other interest or of significant value unexpectedly discovered on the Site is the property of the Government. The contractor is to notify the Engineer-in-charge of such discoveries and carry out the Engineer-in-charge's instructions for dealing with them.

19. Possession of the Site

19.1 The Department shall give possession of the work site to the contractor. If possession of a part work site is given, the Department will ensure that the part site so handed over is amenable to carry out the work at site by the contractor.

20. Access to the Site

20.1 The contractor shall provide the Engineer-in-charge and any person authorized by the Engineer-in-charge, access to the site and to any place where work in connection with the Contract is being carried out or is intended to be carried out.

21. Instructions

21.1 The contractor shall carry out all instructions of the Engineer-in-charge and comply with all the applicable local laws where the work site is located.

22. Settlement of Disputes

22.1 If any dispute or difference of any kind whatsoever arises between the Department and the Contractor in connection with, or arising out of the Contract at stage, whether during the progress of the works or after their completion and whether before or after the termination, abandonment or breach of the Contract, it shall in the first place, be referred to and settled by the Engineer-in-charge who shall, within a period of twenty days after being requested by the Contractor to do so, give written notice of his decision to the Contractor. Upon receipt of the written notice of the decision of the Engineer-in-charge the Contractor shall promptly proceed without delay to comply with such notice of decision.

22.2 If the Engineer-in-charge fails to give notice of his decision in writing within a period of twenty days after being requested or if the Contractor is dissatisfied with the notice of the decision of the Engineer-in-charge, the Contractor may within fifteen days after receiving the notice of decision appeal to the concerned Chief Executive Officer of Department who shall after affording opportunity of being heard shall give notice of his decision within a period of thirty days. After Chief Executive Officer has given written notice of his decision to the Contractor and no claim to arbitration, has been communicated to him by the Contractor within a period of fifteen days from receipt of such notice the said decision shall remain final and binding on both side. If the Chief Executive Officer fails to give notice of his decision, as aforesaid within a period of thirty days after being requested as aforesaid, or if the Contractor be dissatisfied with any such decision, then and in any such case the contractor within thirty days after the expiration of the first named period of thirty days as the case may be, require that the matter or matters in dispute be referred to arbitration as detailed below:

SETTLEMENT OF CLAIMS

All disputes or difference arising of or relating to the Contract shall be referred for the adjudication as follows:

Claims up to a value of Rs. 50,000.00: Executive Engineer of Agartala Municipal Corporation, Government of Tripura.

Claims above Rs. 50,000.00: Chief Engineer of Urban Development (UD) or Arbitrator appointed by the Chief Engineer of UD, Government of Tripura.

22.3 The arbitration shall be conducted in accordance with the provisions of Indian Arbitration and Conciliation Act 1996 or any statutory modification thereof.

22.4 The arbitrator shall state his reasons in passing the award.

22.5 A reference for adjudication under this clause shall be made by the contractor within six months from the date of intimating the contractor of the preparation of final bill or his having accepted payment whichever is earlier. Only contracts executed in Tripura shall have jurisdiction for any suit arising out of this contract. More particularly no suit shall be instituted or entertained in any court outside the State arising out of contract.

B. TIME FOR COMPLETION

23. Program

23.1 The total period of completion shall be the time as mentioned in the Notice Inviting Tender from the date entering with agreement to proceed including rainy season. Keeping in view the schedule of handing over of site the work should be programmed such to achieve the milestones as in 'Rate of progress' statement enclosed.

23.2 The attention of the tenderer is directed to the contract requirement at the time of beginning of the work, the rate of progress and the dates for the whole work and its several parts as per milestones. The following rate of progress and proportionate value of work done from time to time as will be indicated by the Chief Executive Officer's certificate for the value of work done and completion of milestones will be required. Date of commencement of their programme will be the date for concluding agreement.

23.3 After signing the agreement, the contractor shall forthwith begin the work, shall regularly and continuously proceed with them.

23.4 Rate of progress

i) Work programme of achieving the milestones (statement).

ii) Site Schedule of programme of handing over site to the contractor (statement).

23.5 The contractor shall commence the work on site within the period specified under condition after the receipt by him of a written order to this effect from the Chief Executive Officer and shall proceed with the same with due expedition and without delay, except as may be expressly sanctioned or ordered by the Chief Executive Officer or be wholly beyond the contractor's control.

23.6 Same in so far as the contractor may prescribe, the extent of portions of the site of which the contractor is to be given possession from time to time and the order in which such portions shall be made available to him and subject to any requirement in the contract as to the order in which the works shall be executed, the Chief Executive Officer will, with the written order to commence the work, give to the contractor possession of so much of the site as may be required to enable the contractor to commence proceed with the execution of the works in accordance with the program if any, and otherwise in accordance with such reasonable proposals of the contractor as he shall by written notice to the Chief Executive Officer, make

and will from time to time as the works proceed, give to the contractor possession of such further portions of the site as may be required to enable the contractor to proceed with the execution of the works with due dispatch in accordance with the said program or proposals as the case may be; if the contractor suffers delay or incurs cost from failure on the part of the Chief Executive Officer to give possession in accordance with the terms of this clause, the Chief Executive Officer shall grant an extension of time for the completion of works.

23.7 The contractor shall bear all costs and charges for special or temporary way leases required by him in connection with access to the site. The contractor shall also provide at his own cost any additional accommodation outside the site required by him for the purposes of the work.

23.8 Subject to any requirement in the contract as to completion of any section of the works before completion of the whole of the works shall be completed in accordance with provisions of clauses in the schedule within the time stated in the contract calculated from the last day of the period named in the statement to the tender as that within which the works are to be commenced or such extended time as may be allowed.

23.9 Delays and extension of time

No claim for compensation on account of delays or hindrances to the work from any cause whatever shall lie, except as hereafter defined. Reasonable extension of time will be allowed by the Chief Executive Officer or by the office competent to sanction the extension, for unavoidable delays, such as may result from causes, which in the opinion of the Chief Executive Officer, are undoubtedly beyond the control of the contractor. The Executive Engineer shall assess the period of delay or hindrance caused by any written instructions issued by him, at twenty-five per cent in excess or the actual working period so lost.

In the event of the Executive Engineer failing to issue necessary instructions and thereby causing delay and hindrance to the contractor, the latter shall have the right to claim an assessment of such delay by the Chief Executive Officer whose decision will be final and binding. The contractor shall lodge in writing with the Chief Executive Officer a statement of claim for any delay or hindrance referred to above, within fourteen days from its commencement, otherwise no extension of time will be allowed.

Whenever authorized alterations or additions made during the progress of the work are of such a nature in the opinion of the Chief Executive Officer as to justify an extension of time in consequence thereof, such extension will be granted in writing by the Chief Executive Officer or other competent authority when ordering such alterations or additions.

24. Construction Program

24.1 The contractor shall furnish within one month of the order of the work a program showing the sequence in which he proposed to carry out the work, monthly progress expected to be achieved, also indicating date of procurement of materials, plant, machineries, equipments etc. The schedule should be such that it is practicable to achieve completion of the whole work within the time limit fixed and in keeping conformity with the Mile Stone programme specified and shall obtain the approval of the Engineer-in-charge.

Further rate of the progress as in the program shall be kept up to date. In case it is subsequently found necessary to alter this program, the contractor shall submit sufficiently in advance the revised program incorporating necessary modifications and get the same approved by the Engineer-in-charge. No revised program shall be operative without approval of Engineer-in-charge.

24.2 The Executive Engineer shall have all times the right, without anyway violating this contract or forming grounds for any claim, to alter the order of progress of the works or any part thereof and the contractor shall after receiving such directions proceed in the order directed. The contractor shall also report the progress to the Chief Executive Officer within 7 days of the Executive Engineer direction to later the order of progress of works.

24.3 The contractor shall give written notice to the Engineer-in-charge whenever planning or progress of the works is likely to be delayed or disrupted unless approval of any further drawings or order including a direction, instruction or approval is issued by the Engineer-in-charge within a reasonable time. The notice shall include details of approval of the drawing or order required and of why and by when it is required and of any delay or disruption likely to be suffered if it is late.

25. Speed of Work

25.1 The contractor shall at all times maintain the progress of work to conform to the latest operative progress schedule approved by the Engineer-in-charge. The contractor should furnish progress report indicating the programme and progress once in a month. The Engineer-in-charge may at any time in writing direct the contractor to slow down any part or whole of the work for any reason (which shall not be questioned) whatsoever, and the contractor shall comply with such orders of the Engineer-in-charge. The compliance of such orders shall not entitle the contractor to any claim of compensation. Such orders of the Engineer-in-charge for slowing down the work will however be duly taken into account while granting extension of time if asked by the contractor for which no extra payment will be entertained.

25.2 Delays in Commencement or progress or neglect of work and forfeiture of earnest money, Security deposit and withheld amounts If, at any time, the Engineer-in-charge shall be of the opinion that the contractor is delaying commencement of the work or violating any of the provisions of the contract and / or neglecting / delaying the progress of the work as defined by the tabular statement, ‘Rate of Progress’ in the ‘Articles of Agreement’, he shall so advise the contractor in writing and at the same time demand compliance in accordance with conditions of Tender notice. If the contractor neglects to comply with such demand within seven days after receipt of such notice, it shall then or at any time thereafter, be lawful for the Engineer-in-charge to take suitable action in accordance with clause of contract.

26. Suspension of Works by the Contractor

26.1 If the contractor shall suspend the works, or sublet the work without sanction of the Engineer-in-charge, or in the opinion of the Engineer-in-charge shall neglect or fail to proceed with due diligence in the performance of his part of the Contract as laid down in the

schedule rate of progress, or if he shall continue to default or repeat such default in the respects mentioned in relevant clause of contract, Engineer-in-charge shall take action in accordance with Clause(s).

26.2 If the contractor stops work for 28 days and the stoppage has not been authorized by the Engineer-in-charge, the Contract will be terminated under relevant Clause.

26.3 If the contractor has delayed the completion of works, the Contract will be terminated as per clause applicable to the contract.

27. Extension of the Intended Completion Date

27.1 The Engineer-in-charge shall extend or recommend for extension, in accordance with the Government orders in force, the Intended Completion Date if a variation is issued which makes it impossible for completion to be achieved by the Intended Completion Date.

27.2 The Engineer-in-charge shall decide whether and by how much to extend the Intended Completion Date within 21 days of the contractor asking the Engineer for a decision upon the effect of a variation and submitting full supporting information. If the contractor has failed to give early warning of a delay or has failed to cooperate in dealing with a delay, the delay by this failure shall not be considered in assessing the new Intended Completion Date.

28. Delays Ordered by the Engineer-in-charge

28.1 The Engineer-in-charge may instruct the contractor to delay the start or progress of any activity within the Work.

29. Early Warning

29.1 The contractor is to warn the Engineer-in-charge at the earliest opportunity of specific likely future events or circumstances that may adversely affect the Execution of Works.

29.2 The contractor shall cooperate with the Engineer-in-charge in making and considering proposals for how the effect of such an event or circumstance can be avoided or reduced by anyone involved in the work and in carrying out any resulting instruction of the Engineer-in-charge.

C. QUALITY CONTROL

30. Identifying Defects

30.1 The Engineer-in-Charge shall check the contractor's work and notify the contractor of any defects that are found. Such checking shall not affect the contractor's responsibilities. The

Engineer-in-charge may instruct the contractor to verify the defect and to uncover and test any work that the Engineer considers may be a defect.

31. Tests

31.1 If the Engineer-in-charge instructs the contractor to carry out a test not specified in the specification to check whether any work has a defect and the contractor shall pay for the test and any samples.

32. Correction of Defects

32.1 The Engineer-in-charge shall give notice to the contractor of any defects before the end of the Defects Liability Period, which begins on completion. The defects liability period shall be extended for as long as defects remain to be corrected by the contractor.

32.2 Every time notice of a defect is given; the contractor shall correct the notified defect within the length of time specified by the Engineer-in-charge's notice.

33. Uncorrected Defects

33.1 If the contractor has not corrected the defect within the time specified in the Engineer-in-charge's notice, the Engineer-in-charge will assess the cost of having the defect corrected and the contractor will pay this amount.

33.2 The Engineer-in-charge may also introduce check lists which shall be kept in Bound registers by the construction supervision staff. The contractor may be required to fill up these lists in the first instance and shall be subsequently checked by the construction / quality control engineers.

34. Quality Control

34.1 In addition to the normal inspection by the regular staff in charge of the construction of work, the work will also be inspected by the Chief Executive Officer / Executive Engineer or any other authority authorized by the Department. If any sub-standard work or excess payments are noticed with reference to measurement books etc. during inspection, action will be taken based on their observations and these will be effected by the Engineer-in-charge of the execution of the work.

34.2 The contractor shall be responsible in all respects to maintain the quality of the works. Necessary tests of samples of materials, work done etc. shall be carried out by the contractor at his own cost as per directions of the Engineer-in-charge. Reports of such tests shall be binding on the contractor. No plea / claim of the contractor shall be entertained in this respect.

D. COST CONTROL

35. Bill of Quantities

35.1 The Bills of Quantities shall contain items for the construction work to be done by the contractor.

35.2 The contractor shall be paid for the quantity of the work done at the estimate rate in the Bill of Quantities for each item plus or minus accepted tender percentage.

36. Changes in the Quantities

36.1 The contractor is bound to execute all supplemental works that are found essential, incidental and inevitable during execution of main work.

36.2 The payment of rates for such supplemental items of work will be regulated as under;

36.2.1 Supplemental items directly deducible from similar items in the original agreement

36.2.1.1 The rates shall be derived by adding to or subtracting from the agreement rate of such similar item the cost of the difference in the quantity of materials, labour between the new items and similar items in the agreement worked out with reference to the Schedule of Rates of PWD, Govt. of Tripura or any other rate(s) adopted in the sanctioned estimate with which the tender is accepted plus / minus overall tender percentage.

36.2.2 (a) Similar items but the rates of which cannot be directly deduced from the original Agreement

(b) Purely new items which do not correspond to any item in the agreement.

36.2.2.1 The rates for all such items shall be estimated rates plus or minus accepted overall tender premium.

37. Extra Items

37.1 Extra items of work shall not vitiate the contract. The contractor shall be bound to execute extra items of work as directed by the Engineer-in-charge. The rates for the extra items shall be worked out by the Chief Executive Officer as per the conditions of the contract and the same are binding on the contractor.

37.2 The contractor shall before the 15th day of each month submit in writing to the Executive Engineer a statement of extra item, if any that he has executed during the preceding month failing which the contractor shall not be entitled to claim any.

37.3 Entrustment of additional items

37.3.1 Wherever additional items not contingent on the main work and outside the scope of original agreement are to be entrusted to the original contractor dispensing with bids and if the value of such items exceeds the limits up to which the officer is empowered to entrust works initially to contractor without calling for tenders, approval of next higher authority shall be obtained. Entrustment of such items on nomination shall be at rates not exceeding the estimated rates.

37.3.2 Entrustment of the additional items contingent on the main work will be authorized by the officers up to the monetary limits up to which they themselves are competent to accept items in the original agreement so long as the total amounts up to which they are competent to accept in an original agreement rates for such items shall be worked out in accordance with the procedure

(I) For all items of work in excess of the quantities shown in the Bill of Quantities of the tender, the rate payable for such items shall be estimate rates for the items plus or minus overall tender percentage accepted by the competent authority.

37.3.3 Entrustment of either additional or supplemental items shall be subject to the provisions of the agreement entered in to by a competent authority after the tender is accepted. The Chief Executive Officer being the authority next higher to the Executive Engineer, who entered in to agreement approves the rate for the items / variations in quantity in the current agreement. The items shall not be ordered by an Officer on his own responsibility if the revised estimate or deviation statement providing for the same requires the sanction of higher authority.

Note:

(i) It may be noted that the term ‘Estimate Rate’ used above means the rate in the sanctioned estimate with which the tender is accepted, or if no such rate is available in the estimate, the rate derived will be with reference to the standard Schedule of Rates adopted in the sanctioned estimate with which the tender is accepted.

(ii) The numbers as stated in the ‘Name of Work’ is tentative and liable for variation depending upon length of tube well assembly due to soil strata conditions of work place of each individual tube well. In such case, deviation of agreement amount shall be measured / evaluated only according to the sum of absolute value of work done of all individual items. It shall be noted that variation in nos. of tube well as noted above shall not give arise to any additional claim or compensation to the contractor on any account.

38. Payment Certificates

38.1 The contractor shall submit to the Engineer-in-charge monthly statements of the estimated value of the work completed less the cumulative amount certified previously.

38.2 The Engineer-in-charge shall check the contractor’s monthly statement within 14 days.

38.3 The value of work executed shall be determined by the Engineer-in-charge.

38.4 The value of work executed shall comprise the value of the quantities of the items in the Bill of Quantities completed.

38.5 The Engineer-in-charge may exclude any item certified in a previous certificate or reduce the proportion of any item previously certified in any certificate in the light of later information.

39. Payments

39.1 Payment for the work done by the contractor will be made for the finished work (conforming to the provisions kept in the payment schedule) based on the measurements recorded in measurement books by any officer of the department not lower in rank than a Junior Engineer and check measured by any officer not lower in rank than an Assistant Engineer. The measurement shall be recorded at various stages of the work done and also after work is completed. The contractor shall be present at the time of recording of each set of measurement and their check measurement and accept them then and there so as to avoid disputes at a later stage. If the contractor is not available at the work spot at the time of recording measurements or check measurements, the particulars of measurements shall be signed by the authorized agent of contractor based on which the contractor shall accept the set of measurements without any further dispute. If for any reason the contractor's authorized agent is also not available at site when the department decides to suspend the work recording of measurements in the absence of the contractor or his authorized representative, the department shall not entertain any claim from the contractor for any loss incurred by him on this account.

The contractor shall however note that the Department cannot indefinitely wait for recording the measurement due to the absence of the contractor and his authorized agent and check measure them even in the absence of the contractor.

39.2 Payments and Certificates

39.2.1 Payments shall be adjusted for recovery of advance payments, liquidated damages in terms of tender conditions and security deposit for the due fulfilment of the contract. Payment will be made to the contractor strictly conforming to the provisions kept in payment schedule of this tender document under the certificate to be issued by the Engineer-in-charge and intermediate payment will be the sum equal to maximum 90% of the value of work done as so certified, less the amount of taxes, advances, other recoveries etc. due to be deducted in terms of conditions of the contract and balance 10% will be withheld and retained for the due fulfilment of the contract under the certificate to be issued by the Engineer-in-charge. On completion of the entire works, the contractor will receive the final payment of all the moneys due or payable to him under or by virtue of the contract except the earnest money deposit retained as security and a sum equal to 4% of the total value of the work done. The amount withheld from the final bill will be retained under deposits and paid to the contractor together with the earnest money deposit retained as security after a

period of 12 (Twelve) months from the actual date of completion of the works in all respects as all defects shall have been made good according to the true intent and meaning thereof.

39.2.2 In case of over payments or wrong payment if any made to the contractor due to wrong interpretation of the provisions of the contract, contract conditions etc., such unauthorized payment will be deducted in the subsequent bills or final bill for the work or from the bills under any other contracts with the Government or at any time thereafter from the deposits available with the Government.

39.2.3 Any recovery or recoveries advised by the Government Department either State or Central, due to non-fulfilment of any contract entered into with them by the contractor shall be recovered from any bill or deposits of the contractor.

39.2.4 No claim shall be entertained, if the same is not represented in writing to the Engineer-in-charge within 15 days of its occurrence.

39.2.5 The contractor is not eligible for any compensation for inevitable delay in handing over the site or for any other reason. In such case, suitable extensions of time will be granted after considering the merits of the case.

39.3 Intermediate Payments

39.3.1 For intermediate stage of works, if any payment is proposed by the contractor, only part rates as fixed by the Engineer-in-charge strictly conforming to the provisions kept in payment schedule will be paid subject to due fulfilment of all other relevant clauses, conditions etc. of this tender document.

39.3.2 Part amount shall be worked out for the work done portion based on the actual operations involved keeping in view the value of the balance work to be done, to avoid unintended benefit to the contractor in initial Stage.

39.3.3 Full rate shall be paid conforming to provisions kept in payment schedule when the work is completed to the full profile as per approved drawings, specifications, conditions of contract etc.

39.3.4 No payment or advance will be made for unfixed materials when the rates are for finished work in site.

40. Interest on Money due to the Contractor

40.1 No omission by the Executive Engineer or the Assistant Engineer to pay the amount due upon certificates shall vitiate or make void the contract, nor shall the contractor be entitled to interest upon any guarantee fund or payments in arrears, nor upon any balance, which may, on the final settlement of his accounts, found to be due to him.

41. Certificate of Completion of works

41.1 Certificate of Completion of works

41.1.1 When the whole of the work has been completed and has satisfactorily passed any final test that may be prescribed by the Contract, the contractor may give a notice to that effect to the Engineer-in-charge accompanied by an undertaking to carry out any rectification work during the defect liability period (i.e. 12 months from the actual date of completion of work in all respects), such notice and undertaking shall be in writing and shall be deemed to be request by the contractor for the Engineer-in-charge to issue a Certificate of completion in respect of the Works. The Engineer-in-charge shall, within twenty one days of the date of delivery of such notice either issue to the contractor, a certificate of completion stating the date on which, in his opinion, the works were completed in accordance with the Contract or give instructions in writing to the contractor specifying all the works which, in the Engineer-in-charge's opinion, required to be done by the contractor before the issue of such Certificate. The Engineer-in-charge shall also notify the contractor of any defects in the works affecting completion that may appear after such instructions and before completion of the works specified there in. The contractor shall be entitled to receive such Certificate of the Completion within twenty-one days of completion to the satisfaction of the Engineer-in-charge of the works so specified and making good of any defects so notified.

41.1.2 Similarly, the contractor may request and the Engineer-in-charge shall issue a Certificate of:

Completion in respect of:

a) Any section of the Permanent works in respect of which a separate time for completion is provided in the Contract, and

b) Any substantial part of the Permanent Works, which has been both completed to the satisfaction of the Engineer-in-charge and occupied or used by the department.

41.1.3 If any part of the Permanent Works shall have been completed and shall have satisfactorily passed any final test that may be prescribed by the Contract, the Engineer-in-charge may issue such certificate, and the contractor shall be deemed to have undertaken to complete any outstanding work in that part of the works during defect liability period.

42. Taxes included in the Tender

The percentage quoted by the tenderer shall be deemed to be inclusive of the Sales Tax / VAT / valid GST (as applicable) and all other taxes, duties etc. as applicable on all materials that the contractor will have to purchase for performance of the contact.

43. Schedule of Payment

a. For work costing upto Rs. 1.00 Lakhs – First & Final Bill

b. For work costing Rs. 1.00 Lakhs to Rs. 10.00 Lakhs – Running account payment bill shall not be less than Rs. 1.00 Lakh per bill

c. For work costing Rs. 10.00 Lakhs to Rs. 1.00 Crore – Running account payment bill shall not be less than Rs. 2.00 Lakhs.

d. For work costing Rs. 1.00 Crore to Rs. 3.00 Crore – Running account payment bill shall not be less than Rs. 20.00 Lakhs.

e. For work costing above Rs. 3.00 Crore – Running account payment bill shall not be less than Rs. 50.00 Lakhs.

44. Price Adjustment

No price adjustment shall be granted for the work where stipulated time for completion is less than or equal to twenty-four months. No claim of the contractor in this regard will be entertained.

45. Retention

45.1 The department shall retain from each payment due to the contractor @10% of bill amount until completion of the whole of the works.

45.2 On completion of the whole of the works, half of the total amount retained is re-paid to the contractor and half when defects liability period has passed and the Engineer-in-charge has certified that all the defects notified by the Engineer-in-charge to the contractor before the end of the period have been corrected.

45.3 On completion of the whole works in all respect to full satisfaction of the Engineer-in-charge, the contractor may substitute retention money with an “on demand” Bank Guarantee of any Schedule Bank, guaranteed by the Reserve Bank of India with due approval from the Engineer-in-charge.

46. Liquidated Damages

46.1 If for any reason, which does not entitle the contractor to an extension of time, the rate of progress of works, or any section is at any time, in the opinion of the Chief Executive Officer to slow to ensure completion by the prescribed time or extended time for completion, the Chief Executive Officer shall so notify the contractor in writing and the contractor shall there upon take such steps as are necessary and the Chief Executive Officer may approve to expedite progress so as to complete the works or such section by the prescribed time or extended time.

The contractor shall not be entitled to any additional payment for taking such steps. If as a result of any notice given by the Chief Executive Officer under this clause, the contractor shall seek the permission of the Chief Executive Officer to do any work at night or on Sundays, if locally recognized as days or rest, or their locally recognized equivalent, such permission shall not be unreasonably refused.

46.2 If the contractor fails to complete whole of the works or any part thereof or section of the works within the stipulated periods of individual milestones (including any bonafide extensions allowed by the competent authority without levying liquidated damages), the Chief Executive Officer may without prejudice to any other method of recovery will deduct one tenth of one percent of contract value per calendar day or part of the day for the period of delays subject to a maximum of 10% of the contract value not as a penalty from any moneys in his hands due or which may become due to the contractor. The payment or deductions of such damages shall not relieve the contractor from his obligation to complete the works, or from any other of his obligations and liabilities under the contract.

46.3 The liquidated damages for the whole of the work are:

PERIOD	RECOVERY RATE
For Milestone 1: 1/8th* of the contract value of work within 1/4th of the stipulated time for completion.	1/10th of 1 % of contract value of work per week subject to maximum 10% of 1/8th contract value of work.
For Milestone 2: 3/8th* of the contract value of work within 1/2th of the stipulated time for completion.	**1/10th of 1 % of contract value of work per week subject to maximum 10% of 2/8th Contract value of work.
For Milestone 3: Full contract value* of work within stipulated date for completion	**1/10th of 1 % of contract value of work per day subject to maximum 10% of 5/8th Contract value of work.

* To be decided on the measured value of work.

**** Note:** Days to be reckoned from the next day of achieving previous milestone as per approved work program.

The maximum amount of liquidated damages for the whole of the works is 10% (ten percent) of final contract price.

47. Incentives

47.1 An incentive to the maximum amount at the rate of ¼% of the contract value per week of early completion as per milestone achieved will be paid to the contractor. In no case the total respective value of the incentive should exceed 2% of the total value of works as per milestone.

48. Mobilization Advance

48.1 No mobilization advance shall be granted for this work. In general, no advance payment will be made to the contractor and no claim in this regard will be entertained

49. Securities

49.1 The Earnest Money Deposit and additional security (for discount tender percentage beyond 15%) shall be provided to the Department not later than the date specified in the Letter of Acceptance and shall be issued in an amount and form and by a Bank acceptable to the Department. The Earnest Money shall be valid until a date 28 days from the date of expiry of Defects Liability Period and the additional security shall be valid until a date 28 days from the date of issue of the certificate of completion.

50. Cost of Repairs

50.1 Loss or damage to the works or materials to the works between the Start Date and the end of the Defects Correction Periods shall be remedied by the contractor at the contractor's cost if the loss or damage arises from the contractor's acts or omissions.

E. FINISHING THE CONTRACT

51. Completion

51.1 The contractor shall request the Engineer-in-charge to issue a Certificate of completion of the Works and the Engineer-in-charge will do so upon deciding that the work is completed.

52. Taking Over

52.1 The Department shall take over the Site and the Works within seven days of the Engineer-in-charge issuing a certificate of Completion.

53. Final Account

53.1 The Contractor shall supply to the Engineer-in-charge a detailed account of the total amount that the Contractor considers payable under the contract before the end of the Defects Liability Period. The Engineer-in-charge shall issue a Defects Liability Certificate and certify any final payment that is due to the Contractor within 56 days of receiving the Contractor's

account if it is correct and complete. If it is not, the Engineer-in-charge shall issue within 56 days a schedule that states the scope of the corrections or additions that are necessary. If the final Account is still unsatisfactory after it has been resubmitted, the Engineer-in-charge shall decide on the amount payable to the Contractor and issue a payment certificate within 56 days of receiving the Contractor's revised account.

54. Termination

54.1 The Department may terminate the Contract if the Contractor causes a fundamental breach of the Contract.

54.2 Fundamental breaches of Contract include but shall not be limited to the following:

a) The Contractor stops work for 28 days when no stoppage of work is shown on the current program and the stoppage has not been authorized by the Engineer-in-charge.

b) The Contractor is made bankrupt or goes into liquidation other than for a reconstruction or amalgamation.

c) The Engineer-in-charge gives Notice that failure to correct a particular defect is a fundamental breach of Contract and the Contractor fails to correct it within a reasonable period of time determined by the Engineer-in-charge; and

d) The Contractor does not maintain a security which is required; and

e) The Contractor has delayed the completion of works by the number of days for which the maximum amount of liquidated damages can be paid as defined.

f) If the Contractor, in the judgment of the Department, has engaged in corrupt or fraudulent practices in competing for or in executing the contract. For the purpose of this paragraph: "corrupt practice" means the offering, giving, receiving or soliciting of anything of value to influence the action of a public official in the procurement process or in contract execution. "Fraudulent practice" means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the Government and includes collusive practice among tenderers (prior to or after tender submission) designed to establish tender prices at artificial non-competitive levels and to deprive the Government of the benefits of free and open competition.

54.3 Notwithstanding the above, the Department may terminate the contract for convenience.

54.4 If the Contract is terminated, the Contractor shall stop work immediately, make the Site safe and secured, leave the Site as soon as reasonably possible.

54.5 When the contractor has made himself liable for action under any of the cases aforesaid under clauses 52.2 the Engineer-in-charge on behalf of the Agartala Smart City Limited shall have powers:

(a) To determine or rescind the contract as aforesaid (of which termination or rescission notice in writing to the contractor under the hand of the Engineer-in-charge shall be conclusive evidence). Upon such determination or recession, the full security deposit recoverable under the contract shall be liable to be forfeited and shall be absolutely at the disposal of the Government. If any portion of the security deposit has not been paid or received, it would be called for and forfeited.

(b) To employ labour paid by the Department and to supply materials to carry out the work, or any part of the work debiting the contractor with the cost of the labour and the price of the materials (of the amount of which cost and price certified by the Engineer-in-charge shall be final and conclusive) against the contractor and crediting him with the value of the work done in all respects in the same manner and at the same rates as if it had been carried out by the contractor under the terms of his contract. The certificate of the Divisional Officer as to the value of the work
done shall be final and conclusive against the contractor provided always that action under the sub-clause shall only be taken after giving notice in writing to the contractor. Provided also that if the expenses incurred by the department are less than the amount payable to the contractor at his agreement rates, the difference shall not be paid to the contractor.

(c) After giving notice to the contractor to measure up the work of the contractor and to take such whole, or the balance or part thereof as shall be un-executed out of his hands and to give it to another contractor to complete in which case any expenses which may be incurred in excess of the sum which would have been paid to the original contractor if the whole work had been executed by him (of the amount of which excess the certificate in writing of the Engineer-in-charge shall be final and conclusive) shall be born and paid by the original contractor and may be deducted from any money due to him by Government under his contract or on any other account whatsoever or from his security deposit or the proceeds of sales thereof or a sufficient part thereof as the case may be. If the expenses incurred by the department are less than the amount payable to the contractor at his agreement rates, the difference shall not be paid to the contractor.

In the event of any one or more of the above courses being adopted by the Engineer-in-charge the contractor shall have no claim to compensation for any loss sustained by him by reasons of his having purchased or procured any materials or

entered into any engagements or made any advances on account or with a view to the execution of the work or the performance of the contract. And in case action is taken under any of the provision aforesaid the contractor shall not be entitled to recover or be paid any sum for any work thereof or actually performed under this contract unless and until the Engineer-in-charge has certified in writing the performance of such work and the value payable in respect thereof, and he shall only be entitled to be paid the value so certified.

Provided further that if any of the recoveries to be made, while taking action as per (b) and /or (c) above, are in excess of the security deposit forfeited, these shall be limited to the amount by which the excess cost incurred by the Department exceeds the security deposit so forfeited.

55. Payment upon Termination

55.1 If the Contract is terminated because of a fundamental breach of Contract by the Contractor, the Engineer-in-charge shall issue a certificate for the value of the work done less advance payments received upon the date of the issue of the certificate, less other recoveries due in terms of the Contract, less taxes due to be deducted at source as per applicable law and less the percentage to apply to the work not completed as indicated in the contract data. Additional liquidated damages shall not apply. If the total amount due to the Department exceeds any payment due to the Contractor, the difference shall be a debt payable to the Department. In case of default for payment within 28 days from the date of issue of notice to the above effect, the contractor shall be liable to pay interest at 12% per annum for the period of delay.

56. Property

56.1 All materials on the Site, Plant, Equipment, Temporary Works and Works are deemed to be the property of the Department if the Contract is terminated because of Contractor's default.

57. Release from Performance

57.1 If the Contract is frustrated by the outbreak of war or by any other event entirely outside the control of either the Department or the Contractor, the Engineer-in-charge shall certify that the contract has been frustrated. The Contractor shall make the site safe and stop work as quickly as possible after receiving this certificate and shall be paid for all works carried out before receiving it and for any work carried out afterwards to which commitment was made.

F. Special Conditions

58. Water Supply

58.1 The contractor has to make his own arrangement for water required for the work and to the colonies and work site, which are to be established by the contractor. No separate or additional payments are admissible in this regard.

59. Electrical Power

59.1 The contractors will have to make their own arrangements for drawing electric power at work place required for constructions, camps etc. from the nearest power line after obtaining

permission from the power supply authority (TSECL) at his own efforts and cost. In case of failure of electricity / non-availability of electricity, the contractor has to make alternative arrangements at his own effort & cost for supply of electricity by diesel generator set of suitable capacity at place of work. The power shall be used for bonafide departmental use only.

59.2 Electrical Power for Domestic Supply

a) The contractor has to make his own arrangements for the supply of electric power for domestic purposes and the charges for this purpose have to be paid by him at the rates as fixed by the Power Supply authority from time-to-time.

b) The contractor will have to make his own arrangements to lay and maintain the necessary distribution lines and wiring for the camp at his own cost. The layout and the methods of laying the lines and wiring shall have the prior approval of the Engineer-in-charge. All camp area shall be properly electrified. All lines, streets, approaches for the camp etc., shall be sufficiently lighted for the safety of staff and labour of the contractor, at the cost of the Contractor and it will be subject to the approval of the Engineer-in-charge.

60. Land

60.1 Land for Contractor's use

The contractor will be permitted to use Government land for execution of work. The contractor shall have to make his own arrangements for acquiring and clearing the site, levelling, providing drainage and other facilities for labour staff colonies, site office, workshop or stores and for related activities. The contractor shall apply to the Department within a reasonable time after the award of the contract and at least 30 days in advance of its use, the details of land required by him for the work at site and the land required for his camp and should any private land which has not been acquired, be required by the contractor for his use. The same may be acquired by the contractor at his own cost by private negotiations and no claim shall be admissible to him on this account. The Engineer-in-charge reserves the right to refuse permission for use of any government land for which no claim or compensation shall be admissible to the contractor. The contractor shall however, not be required to pay cost or any rent for the Government land given to him.

60.2 Surrender of Occupied Land

a) The Government land as in before mentioned shall be surrendered to the Engineer-in-charge within seven days, after issue of completion certificate. Also, no land shall be held by the contractor longer than the Engineer-in-charge shall deem necessary and the contractor shall on the receipt of due notice from the Engineer-in-charge, vacate and surrender the land which the Engineer-in-charge may certify as no longer required by the contractor for the purpose of the work.

b) The contractor shall make good to the satisfaction of the Engineer-in-charge any damage to areas, which he has to return or to other property or land handed over to him for purpose of this work. Temporary structures may be erected by the contractor for storage sheds, offices, residences etc., for non-commercial use, with the permission of the Chief Executive Officer / Executive Engineer on the land handed over to him at his own cost. At the completion of the work, these structures shall be dismantled**;** site cleared and handed over to the Chief Executive Officer / Executive Engineer. The land required for providing amenities will be given free of cost from Government lands if available otherwise the contractor shall have to make his own arrangements.

60.3 Contractor not to dispose off Spoil etc.

The contractor shall not dispose off or remove except for the purpose of fulfilment of this contract, sand, stone, clay ballast, earth, trees and shrubs or other materials obtained in the excavation made or lying on the site of the work, and all such materials and produce shall remain property of the Government. The Department may upon request from the contractor, or if so stipulated in the conditions of the contract allow the contractor to use any of the above materials for the works either free of cost or after payment as may be specifically mentioned or considered necessary during the execution of the work.

61. Roads

61.1 In addition to existing public roads and roads constructed by Government, if any, in work area, all additional approach roads inside work area and camp required by the contractor shall be constructed and maintained by him at his own cost. The layout, design, construction and maintenance etc. of the roads shall be subject to the approval of the Engineer-in-charge. The contractor shall permit the use of these roads by the Government free of charge. It is possible that work at, or in the vicinity of the work site will be performed by the Government or by other contractors engaged in work for the Government during the contract period. The contractor shall without charge permit the Government and such other contractor and other workmen to use the access facilities including roads and other facilities, constructed and acquired by the contractor for use in the performance of the works. The contractor's heavy construction traffic or tracked equipment shall not traverse any public roads or bridges unless the contractor has made
arrangement with the authority concerned. The contractor is cautioned to take necessary precautions in transportation of construction materials to avoid accidents.

62. Payment for Camp Construction

No payment will be made to the contractor for construction, operation and maintenance of camp and other camp facilities and the entire cost of such work shall be deemed to have been included in the tendered rate for the various item of work in the schedule of quantities and bids.

63. Explosive and Fuel Storage Tanks

No explosive shall be stored within ½ (half) Km. of the limit of the campsites. Storage of gasoline and other fuel oils or of Butane, Propane and other liquefied petroleum gases, shall confirm to the regulations of Government of Tripura and Government of India. The tanks having capacity in excess of 2000 litres, shall not be located within the camp area, not within 200 metre, of any building.

64. Labour

64.1 The contractor shall, make his own arrangements for the engagement of all staff and labour, local or other, and for their payment, housing, feeding and transport. Labour importation and amenities to labour, and contractor's staff shall be to the contractor's account. His quoted percentage shall include the expenditure towards importation of labour, amenities to labour and staff. The contractor shall, if required by the Engineer-in-charge, deliver to the Engineer-in-charge a written in detail, in such form and at such intervals as the Engineer-in-charge may prescribe, showing the staff and the numbers of the several classes of labour from time to time employed by the contractor on the site and such information respecting contractor's equipment as the Engineer-in-charge may require.

64.2 Transportation of Labour

I. The contractor shall make his own arrangement for the daily transportation of the labour and staff from labour camps colonies to the work spot and no labour or staff of the contractor shall stay at the work spot. No extra payment will be made to the contractor for the transportation of the labour and his quoted percentage to the work shall include the transportation charges of labour from colonies to work spot and back.

II. The contractor will at all times duly observe the provisions of employment of children Act XXVI of 1938 and any enactment or modification of the same and will not employ or permit any person to do any work for the purpose under the provisions of this agreement in contravention of said Act. The contractor hereby agrees to indemnify the department from and against all claims, penalties which may be suffered by the department or any person employed by the department by any default on the part of the contractor in the observance and performance of the provisions of the employment of children Act. XXVI of 1938 or any enactment or modification of the same.

65. Safety Measures

1. The contractor shall take necessary precautions for safety of the workers and preserving their health while working in such jobs, which require special protection and precautions. The following are some of the measures listed but they are not exhaustive and contractor shall add to and augment these precautions on his own initiative where necessary and shall comply with directions issued by the Chief Executive Officer / Executive Engineer or on his behalf from time to time and at all times.

2. Providing protective footwear to workers situations like mixing and placing of mortar or concrete, sand in quarries and places where the work is done under much wet conditions.

3. Providing protective headwear to workers at places like underground excavations to protect them against rock falls.

4. Providing masks to workers at granulates or at other locations where too much fine dust is floating about and sprinkling water at frequent intervals by water hoses on all stone crushing area and storage bins abate to dust.

5. Getting the workers in such jobs periodically examined for chest trouble due to too much breathing in to fine dust.

6. Taking such normal precautions like fencing and lightening in excavation of trenches, not allowing rolls and metal parts of useless timber spread around, making danger areas for blasting providing whistles etc.

7. Supply workmen with proper belts, ropes etc., when working in precarious slopes etc.

8. Avoiding naked electrical wire etc., as they would electrocute the works.

9. Taking necessary steps towards training the workers concerned on the machinery before they are allowed to handle them independently and taking all necessary precautions in around the areas where machines hoists and similar units are working.

66. Fair Wage Clause

1. The contractor shall pay not less than fair wages to labourers engaged by him on the work.

2. **“**Fair” wages mean wages whether for time of piecework notified by the Government from time to time in the area in which the work is situated.

3. The contractor shall not with-standing the revisions of any contract to the contrary cause to be paid to the labour, in directly engaged on the work including any labour engaged by the subcontractor in connection with the said work, as if the labourers had been directly employed by him.

4. In respect of labour directly or indirectly employed in the works for the purpose of the contractor’s part of the agreement the contractor shall comply with the rules and regulations on the maintenance of suitable records prescribed for this purpose from time-to-time by the Government. He shall maintain his accounts and vouchers on the payment of wages to the labourers to the satisfaction of the Chief Executive Officer / Executive Engineer.

5. The Chief Executive Officer / Executive Engineer shall have the right to call for such record as required to satisfy himself on the payment of fair wages to the labourers and shall have the right to deduct from the contract amount a suitable amount for making good the loss suffered by the worker or workers by reason of the “fair wages” clause to the workers.

6. The contractor shall be primarily liable for all payments to be made and for the observance of the regulations framed by the Government from time to time without prejudice to his right to claim indemnity from his sub-contractors.

7. As per contract labour (Regulation and Abolition) Act. 1970 the contractor has to produce the license obtained from the licensing officers of the labour department along with the tender or at the time of agreement.

8. Any violation of the conditions above shall be deemed to be a breach of his contract.

9. Equal wages are to be paid for both men and women if the nature of work is same and similar.

10. The contractor shall arrange for the recruitment of skilled and unskilled labour local and imported to the extent necessary to complete the work within the agreed period as directed by the Chief Executive Officer / Executive Engineer in writing.

67. Indemnity Bond

Name of Work**:**
.....
.....
.....

I, ……., Contractor,
S/o……aged……. years, Resident of ……..……..……do hereby bind myself to pay all the claims may come (a) under Workmen’s Compensation Act. 1933 with any statutory modification thereof and rules there under or otherwise for or in respect of any damage or compensation payable in connection with any accident or injury sustained (b) under Minimum Wages Act 1948 (c) under payment of wages Act.1936 (d) under the contractor labour (Regulation and Abolition) Act. 1970 by workmen engaged for the performance of the business relating to the above contract i.e., failing such payment of claims of workmen engaged in the above work, I abide in accepting for the recovery of such claims, effected from any of my assets with the departments.

68. Compliance with Labour Regulations

During continuance of the contract, the contractor and his sub-contractors shall abide at all times by all existing labour enactments and rules made there under, regulations, notifications and bye laws of the State or Central Government or local authority and any other labour law (including rules), regulations, bye laws that may be passed or notifications that may be issued under any labour law in future either by the State or the Central Government or the local authority and also applicable labour regulations, health and sanitary arrangements for workmen, insurance and other benefits.
Salient features of some of the major labour laws that are applicable to construction industry are given below. The contractor shall keep the Department indemnified in case any action is taken against Department by the competent authority on account of contravention of any of the provisions of any Act or Rules made there under, regulations or notifications including amendments. If the Department is caused to pay or reimburse, such amounts as may be necessary to cause or observe, or for non-observance of the provision stipulated in the notifications/bye laws/ Acts/ Rules/ regulations including amendments, if any, on the part of the contractor, the Engineer-in-charge /Department shall have the right to deduct any money due to the contractor including his amount of performance security. The Department/ Engineer-in-charge shall also have right to recover from the contractor any sum required or estimated to be required for making good the loss or damage suffered by the Department. The employees of the contractor and the Sub-contractor in no case shall be treated as the Department of the Department at any point of time.

69. Salient features of some major labour laws applicable to establishment engaged in buildings and other construction work.

a) Workmen Compensation Act 1923: The Act provides for compensation in case of injury by accident arising out of and during the course of employment.

b) **Payment of Gratuity Act 1972:** Gratuity is payable to an employee under the Act on satisfaction of certain conditions on separation if an employee has completed the prescribed minimum years (say, five years) of service or more or on death the rate of prescribed minimum days' (say, 15 days) wages for every completed year of service. The Act is applicable to all establishments employing the prescribed minimum number (say, 10) or more employees.

c) **Employees P.F. and Miscellaneous Provision Act 1952:** The Act Provides for monthly contributions by the Employer plus workers at the rate prescribed (say, 10% or 8.33%). The benefits payable under the Act are:

i) Pension or Family pension on retirement or death as the case may be.

ii) Deposit linked insurance on the death in harness of the worker.

iii) Payment of P.F. accumulation on retirement/death etc.

d) **Maternity Benefit Act 1951:** The Act provides for leave and some other benefits to women employees in case of confinement or miscarriage etc.

e) **Contract Labour (Regulation & Abolition) Act 1970:** The Act provides for certain welfare measures to be provided by the contractor to contract labour and in case the contractor fails to provide, the same are required to be provided, by the Principal Employer by Law. The Principal Employer is required to take Certificate of Registration and the contractor is required to take license from the designated Officer. The Act is applicable to the establishments or contractor of Principal Employer if they employ prescribed minimum (say 20) or more contract labour.

f) **Minimum Wages Act 1948:** The Employer is to pay not less than the Minimum Wages fixed by appropriate Government as per provisions of the Act if the employment is a scheduled employment. Constructions of buildings, roads, runways are scheduled employment.

g) **Payment of Wages Act 1936:** It lays down as to by what date the wages are to be paid, when it will be paid and what deductions can be made from the wages of the workers.

h) **Equal Remuneration Act 1979:** The Act provides for payment of equal wages for work of equal nature to male and female workers and for not making discrimination against female employees in the matters of transfers, training and promotions etc.

i) **Payment of Bonus Act 1965:** The Act is applicable to all establishments employing prescribed minimum (say, 20) or more workmen. The Act provides for payments of annual bonus within the prescribed range of percentage of wages to employees drawing up to the prescribed amount of wages, calculated in the prescribed manner. The Act does not apply to certain establishments. The newly set-up establishments are exempted for five years in certain circumstances. States may have different number of employment size.

j) **Industrial Disputes Act 1947:** The Act lays down the machinery and procedure for resolution of industrial disputes, in what situations a strike or lock-out becomes illegal and what are the requirements for laying off or retrenching the employees or closing down the establishment.

k) **Industrial Employment (Standing Orders) Act 1946:** It is applicable to all establishments employing prescribed minimum (say, 100 or 50). The Act provides for laying down rules governing the conditions of employment by the Employer on matters provided in the Act and gets these certified by the designated Authority.

l) **Trade Unions Act 1926:** The Act lays down the procedure for registration of trade unions of workmen and Employers. The Trade Unions registered under the Act have been given certain immunities from civil and criminal liabilities.

m) **Child Labour (Prohibition & Regulation) Act 1986:** The Act prohibits employment of children below 14years of age in certain occupations and processes and provides for regulations of employment of children in all other occupations and processes. Employment of child labour is prohibited in building and construction industry.

n) **Inter-State Migrant Workmen's (Regulation of Employment & Conditions of Service) Act 1979:** The Act is applicable to an establishment which employs prescribed minimum (say, five) or more inter-state migrant workmen through an intermediary (who has recruited workmen in one state for employment in the establishment situated in another state). The Inter-State migrant workmen, in an establishment to which this Act becomes applicable, are required to be provided certain facilities such as Housing, Medical-Aid, Travelling expenses from home up to the establishment and back etc.

o) **The Building and Other Construction workers (Regulation of Employment and Conditions of Service) Act 1996** and **the Cess Act of 1996:** All the establishments who carry on any building or other construction work and employ the prescribed minimum (say, 10) or more workers are covered under this Act. All such establishments are required to pay cess at the rate not exceeding 2% of the cost of construction as may be modified by the Government. The Employer of the establishment is required to provide safety measures at the building or construction work and other welfare measures, such as canteens, first-aid facilities, ambulance, housing accommodations for workers near the work place etc. The Employer to whom the Act applies has to obtain a registration certificate from the Registering Officer appointed by the Government.

p) **Factories Act 1948:** The Act lays down the procedure for approval of plans before setting up a factory, health and safety provisions, welfare provisions, working hours, annual earned leave and rendering information regarding accidents or dangerous occurrences to designated authorities. It is applicable to premises employing the prescribed minimum (say, 10) persons or more with aid of power or another prescribed minimum (say, 20) or more persons without the aid of power engaged in manufacturing process.

70. Liabilities of the Contractor

70.1 Accident Relief and Workmen Compensation

The contractor should make all necessary arrangements for the safety of workmen on the occurrence of the accident, which results in the injury or death of any of the workmen employed by the contractor, the contractor shall within 24 hours of the happenings of the accident and such accidents should intimate in writing to the concerned Assistant Engineer / Executive Engineer / Chief Executive Officer of the Department the act of such accident. The contractor shall indemnify Government against all loss or damage sustained by the Government resulting directly or indirectly from his failure to give intimation in the manner aforesaid including the penalties or fines if any payable by Government as a consequence of Government failure to give notice under workmen's compensation Act or otherwise conform to the provisions of the said Act. in regard to such accident.

70.2 In the event of an accident in respect of which compensation may become payable under the workmen's compensation Act VIII 23 whether by the contractor, by the Government it shall be lawful for the Chief Executive Officer / Executive Engineer to retain such sum of money which may in the opinion of the Chief Executive Officer / Executive Engineer be sufficient to meet such liability. The opinion of the Chief Executive Officer / Executive Engineer shall be final in regard to all matters arising under this clause.

70.3 The contractor shall at all times indemnify the Government of Tripura against all claims which may be made under the Workmen's Compensation Act or any statutory modification thereafter or rules there under or otherwise consequent of any damage or compensation payable in consequent of any accident or injuries sustained or death of any workmen engaged in the performance of the business relating to the contractor.

71. Contractor's Staff, Representatives and Labour

(**a**) The contractor shall, at all times, maintain on the works, staff of qualified Engineers and Supervisors of sufficient experience of similar other jobs to assure that the quality of work turned out shall be as intended in the specifications. The contractor shall also maintain at the works, a Work Manager or sufficient status, experience and office and duly authorize him to deal with all aspects of the day-to-day work. All communications to any commitments by the Work Manager shall be considered as binding on the contractor.

(**b**) The contractor shall at all times submit details of skilled and unskilled labour and equipment employed to the Engineer-in-charge in prescribed proforma as he may require to assess and ensure the proper progress of work.

(**c**) If the contractor does not employ the technical person agreed to on the work within 30 days from the date of issue of work order, the contractor shall be liable to pay a sum of Rs. 4,000.00 (Rupees Four Thousand) only per month in the case of graduate engineer (for the work costing more than Rs.3.00 crore) and Rs. 2,000.00 (Rupees Two Thousand) only per month in the case of diploma holder engineer (for the work costing Rs. 1.00 crore to Rs. 3.00 crore) as penalty, without prejudice to any other action to be taken against the contractor as per conditions of contract.

72. Accommodation and food

The contractor should arrange accommodation he needs, at his own cost. The contractor shall make his own arrangements for supply of food grains, fuel and other provision to his staff and labourers including controlled commodities.

73. Relationship

Contractor shall have to furnish information along with tender, about the relationship he is having with any officer of the Department, Government of Tripura of the rank Assistant

Engineer and above engaged in the work and any officer of the Divisional Accounts officer and above of the Department of Government of Tripura.

74. Protection of adjoining premises

The contractor shall protect adjoining sites against structural, decorative and other damages that could be caused by the execution of these works and make good at his cost any such damages.

75. Work during night or on Sundays and holidays

The works can be allowed to be carried out during night, Sundays or authorized holidays in order to enable him to meet the schedule targets and the work shall require almost round the clock working keeping in view:

(i) The provisions of relevant labour laws being adhered to**;**

(ii) Adequate lighting, supervision and safety measures are established to the satisfaction of the Engineer-in-charge**;** and

(iii) The construction programme given by the contractor and agreed upon by the Engineer-in-charge envisages such night working or working during Sundays or authorized holidays.

76. Layout of materials stacks

The contractor shall deposit materials for the purpose of the work on such parts only of the ground as may be approved by the Engineer-in-charge before starting work. A detailed survey, clearly indicating position and areas where materials shall be stacked and sheds built is to be conducted by the contractor at his own cost and only after obtaining necessary approval of the plan for use of sites by the Engineer-in-charge, the contractor can use the sites accordingly.

77. Use of blasting materials

Procurement of blasting materials and its storage is the responsibility of the contractor.
The contractor shall engage licensed blaster for blasting operation. The contractor is to act in accordance with Indian Explosive Act and other rules prevailing, during the execution of work. It is the responsibility of the contractor to see, that works by other agencies in the vicinity are not hampered, in such cases if any claim is made by other agencies that should be borne by the contractor. Carriage of blasting materials, from the magazine to the work site, is the responsibility of the contractor.

78. Plant and Equipment

78.1 The Contractor shall have to arrange Drilling rig, drill rods, drill bits of every kinds, Air compressor, Welding set etc. of required sizes & capacities and all other tools & plants including operating personals for operating the machineries & equipments whatsoever required at his own effort & cost for successful completion of this work in all respect as per specifications & conditions of the contract. The contractor shall also arrange necessary consumable materials for operating the machineries during work, i.e. diesel, fuel, petrol, grease, lubricants etc. Whatsoever at his own effort & cost.

78.2 The contractor shall specifically note that all sorts of drill bits (Drag bit and R.R. bit) of required quantities & sizes shall be arranged by the contractor at his own cost and efforts without any claim to the department for successful execution of this work in all respect. In general, department will not take any responsibility for issue / arrangement of any kind of drill bits to the contractor for execution of this work. No plea / claim of the contractor in this regard will be entertained by the department.

79. Inconvenience to public

The contractor shall not deposit materials at any site, which will cause inconvenience to public. The Engineer-in-charge may direct the contractor to remove such materials or may undertake the job at the cost of the contractor.

80. Conflict of interest

Any bribe, commission, gift or advantage given, promised or offered by on behalf of contractor or his partner, agent or servant or any one on his behalf to any Officer, servant, representatives, agents of Engineer-in-charge, or any persons on their behalf, in relation to the obtaining or to execution of this, or any other contract with Engineer-in-charge shall in addition to any criminal liability, which it may occur, subject to the cancellation of this or all other contracts and also to payment of any loss or damage resulting from any such cancellation. Engineer-in-charge shall then be entitled to deduct the amount, so payable from any money, otherwise due to the contractor under this or any other contract.

81. Contract documents and materials to be treated as confidential

All documents, correspondences, decisions and orders, concerning the contract shall be considered as confidential and/or restricted in nature by the contractor and he shall not divulge or allow access to them by any unauthorized person.

82. General Obligations of Contractor

82.1 The contractor shall, subject to the provision of the contract and with due care and diligence, execute and maintain the works in accordance with specifications and drawings.

82.2 The contractor shall promptly inform the Department and the Engineer-in-charge of any error, omission, fault and inherent defect in the design of or specifications for the works

which are discovered when reviewing the contract documents or in the process of execution of the works.

82.3 If contractor believes that a decision taken by the Engineer-in-charge was either outside the authority given to the Engineer-in-charge by the Contract or that the decision was wrongly taken, the decision shall be referred to the technical expert within 14 days of the notification of the Engineer-in-charge's decisions.

82.4 Pending finalization of disputes, the contractor shall proceed with execution of work with all due diligence.

83. Security Measures

a) Security requirements for the work shall be in accordance with the Government's general requirements including provisions of this clause and the contractor shall conform to such requirements and shall be held responsible for the actions of all his staff, employees and the staff and employees.

b) All contractors' employees, representatives shall wear identifications badges provided by the contractor. Badges shall identify the contractor, showing and employee's number and shall be worn at all times while at the site. Individual labour will not be required to wear identification badges.

c) All vehicles used by the contractor shall be clearly marked with contactor's name.

d) The contractor shall be responsible for the security of the works for the duration of the contract and shall provide and maintain continuously adequate security personnel to fulfil these obligations. The requirements of security measures shall include, but not limited to maintenance of order on the site, provision of all lighting, fencing, guard flagmen and all other measures necessary for the protection of the works within the colonies, camps and elsewhere on the site, all materials delivered to the site, all persons employed in connection with the works continuously throughout working and non working period including nights, Sundays and holidays for duration of the contract.

e) Other contractors working on the site concurrently with the contractor will provide security for their own plant and materials. However, their security provisions shall in no way relieve the contractor of his responsibilities in this respect.

f) Separate payment will not be made for provision of security services.

84. Fire Fighting Measures

a) The contractor shall provide and maintain adequate fire fighting equipment and take adequate fire precaution measures for the safety of all personnel and temporary and permanent works and shall take action to prevent damage to destruction by fire of trees shrubs and grasses.

b) Separate payment will not be made for the provision of fire prevention measures.

85. Sanitation

The contractor shall implement the sanitary, watch and ward rules and regulations for all forces employed under this contract, and if the contractor fails to enforce these rules, the Engineer-in-charge may enforce them at the expenses of the contractor.

86. Ecological Balance

a) The contractor shall maintain ecological balance by preventing de-forestation, water pollution and defacing of natural landscape. The contractor shall so conduct his construction operation as to prevent any unnecessary destruction, scarring, or defacing of the natural surroundings in the vicinity of the work. In respect of the ecological balance, contractor shall observe the following instructions.

i) Where unnecessary destruction, scarring, damage or defacing may occur, as result of the operation, the same shall be repaired replanted or otherwise corrected at the contractor's expense. The contractor shall adopt precautions when using explosives, which will prevent scattering of rocks or other debris outside the work area. All work area including borrow areas shall be smoothened and graded in a manner to conform to the natural appearances of the landscape as directed by the Engineer-in-charge.

ii) All trees and shrubbery, which are not specifically required to be cleared or removed for construction purposes, shall be preserved and shall be protected from any damage that may be caused by the contractor's construction operation and equipment. The removal of trees and shrubs will be permitted on after prior approval by the Engineer-in-charge. Special care shall be exercised where trees or shrubs are exposed to injuries by construction equipment, blasting, excavating, dumping, chemical damage or other operation and the contractor shall adequately protect such
trees by use of protective barriers or other methods approved by the Engineer-in-charge. Trees shall not be used for anchorages. The contractor shall be responsible for injuries to trees and shrubs caused by his operations. The term 'injury'" shall include, without limitation bruising, scarring, tearing and breaking of roots, trunks or branches. All injured trees and shrubs be restored as nearly as practicable without delay to their original condition at the contractor's expense.

iii) The contractor's construction activities shall be performed by methods that will present entrance or accidental spillage of solid matter contaminants, debris and other objectionable pollutants and wastage into river. Such pollutant and waste include earth and earth products, garbage, cement concrete, sewage effluent, industrial wastes,

radioactive substances, mercury, oil and other petroleum products, aggregate processing, mineral salts and thermal pollution. Pollutants and wastes shall be disposed off in a manner and at sites approved by the Engineer-in-charge.

iv) In conduct of construction activities and operation of equipments, the contractor shall utilize such practicable methods and devices as are reasonably available to control, prevent and otherwise minimize the air pollution. The excessive omission of dust in to the atmosphere will not be permitted during the manufacture, handling and storage of concrete aggregates and the contractor shall use such methods and equipment as a necessary for collection and disposal or prevention of dust during these operations. The contractor's methods of storing and handling cement shall also include means of eliminating atmospheric discharges of dust, equipment and vehicles that give objectionable omission of exhaust gases shall not be operated. Burning of materials resulting from clearing of trees, bushes, combustible construction materials and rubbish may be permitted only when atmospheric conditions for burning are considered favourable.

b) Separate payment will not be made for complying with the provisions of this clause and all cost shall be deemed to have been included in the amount of the contract. If any provision is not complied with within a reasonable time even after issue of a notice in this respect, the necessary operations would be carried out by the Engineer-in-charge at the cost of the contractor; Orders of the Engineer-in-charge in this respect would be final and binding on the contractor.

87. Preservation of existing vegetation

a) The contractor will preserve and protect all existing vegetation such as trees, on or adjacent to the site which do not unreasonably interfere with the construction as may be determined by the Engineer-in-Charge. The contractor will be held responsible for all unauthorized cutting or damage of trees, including damage due to careless operation of equipment, stockpiling of materials or trekking of grass areas by equipment. Care shall be taken by the contractor in felling trees authorized for removal to avoid any unnecessary damages to vegetation and tress that are to remain in place and to structures under construction or in existence and to workmen.

b) All the produce from such cutting of trees by the contractor shall remain the property of Government and shall be properly stacked at site, approved by the Engineer-in-charge. No payment whatsoever shall be made for such cutting and its stacking by the contractor. If any produce from such cutting is not hand over to the Government by the contractor, he shall be charged for the same at the rates to be decided by the Engineer-in-charge. The recovery of this amount shall be made in full from the intermediate bill that follows.

c) The contractor shall also make arrangements of fuel deposits for supply of required fuel for the labourers to be employed for cooking purpose at his own cost in order to prevent destruction of vegetation growth in the surrounding area of the work site.

88. Possession prior to completion

The Engineer-in-charge shall have the right to take possession of or use any completed part of work or works or any part thereof under construction either temporarily or permanently. Such possession or use shall not be deemed as an acceptance of any work either completed or not completed in accordance with the contract with in the interest of Clause of contract except where expressly otherwise specified by the Engineer-in-charge.

89. Payment upon termination

If the contract is terminated because of a fundamental breach of contract by the contractor, the Engineer-in-charge shall issue a certificate for the value of the work done less advance payment received upon the date of issue of the certificate and less the percentage to apply to the work not completed as indicated in the contract data. Additional liquidated damages shall not apply. If the total amount due to the department exceeds any payment due to the contractor the difference shall be a debt payable to the department. In case of default of payment within 28 days from the date of issue of notice to the above effect, the contractor shall be liable to pay interest at 12% per annum for the period of delay.

90. Access to the Contractor's books

Whenever it is considered necessary by the Engineer-in-charge to ascertain the actual cost of execution of any particular extra item of work or supply of the plant or material on which advance is to be made or of extra items or claims, he shall direct the contractor to produce the relevant documents such as payrolls, records of personnel, invoices of materials and any or all data relevant to the item or necessary to determine its cost etc. and the contractor shall when so required furnish all information pertaining to the aforesaid items in the mode and manner that may be specified by the Engineer-in-charge.

91. Drawing to be kept at site

One copy of the drawings furnished to the contractor shall be kept by the contractor on the site and the same shall at all reasonable time be available for inspection and use by the Engineer-in-charge and the Engineer-in-charge's representative and by any other persons authorised by the Engineer-in-charge in writing.

92. Litho Log sheet to be kept at site

One copy of the litho log sheet duly approved by the department shall be kept by the contractor on the site and the same shall at all reasonable time be available for inspection and use by the Engineer-in-charge and the Engineer-in-charge's representative and by any other persons authorized by the Engineer-in-charge in writing.

93. Site Order Book

An order book shall be kept at the site of the work. As far as possible, all orders regarding the work are to be entered in this book. All entries shall be signed and dated by the Departmental Officer in direct charge of the work and by the contractor or by his representative. In important cases, the Executive Engineer or the Chief Executive Officer will countersign the entries, which have been made. The order book shall not be removed from the work site, except with the written permission of the Executive Engineer.

94. Variations by way of modification, omissions or additions

For all modifications, omissions from or additions to the drawings and specifications, the Chief Executive Officer / Executive Engineer will issue revised plans, or written instructions, or both and no modification, omission or addition shall be made unless so authorized and directed by the Chief Executive Officer / Executive Engineer in writing.

The Chief Executive Officer / Executive Engineer shall have the privilege of ordering modifications, omission or additions at any time before the completion of the work and such orders shall not operate to annual those portions of the specifications with which said changes do not conflict.

Engineer-in-charge's Decisions

It shall be accepted as in separable part of the contract that in matters regarding materials, workmanship, removal of improper work, interpretation of the contract drawings and contract specification, mode of the procedure and the carrying out of the work, the decision of the Engineer-in-charge, which shall be given in writing, shall be binding on the contractor.

95. Care and diversion of river / stream

The contractor shall submit regarding the diversion and care of river or stream during construction of the work along with a separate printout of the timetable showing earliest and latest start and finish dates of various activities. He should submit a detailed layout plan with drawings for the diversion and car of river during construction of work. The above arrangements shall be at contractor's cost.

96. Income tax

a) During the currency of the contract deduction of Income Tax @2% shall be made from the gross value of each bill of the contract and procedure stipulated under section 194-C (4) of Income Tax Act, 1961 with latest amendments shall be followed. However, the

deduction shall be made according to the applicable rate as notified by the Govt. of Tripura time to time during currency of the contract.

b) Income Tax clearance certificate should be furnished before the payment of final bill.

c) The contractor's staff, personnel and labour will be liable to pay personnel income taxes in respect of their salaries and wages as are chargeable under the laws and regulations for the time being in force, and the contractor shall perform such duties in regard to such deductions thereof as may be imposed on him by such laws and regulations.

97. Sales Tax / VAT/ valid GST (as applicable)

97.1 In addition to deduction of Income Tax at source, Tripura Value Added Tax shall be deducted at source from the gross amount of contractor's each bill according to the applicable rate as notified by the Government of Tripura time to time during currency of the contract. No claim and / or plea of the Contractor in this regard will be entertained.

97.2 The Contractor should produce a valid VAT Clearance Certificate/ valid GST (as applicable) before the payment of the final bill, otherwise payment to the Contractor will be withheld.

98. Compulsory deduction for all works

98.1 As per Building and Other Construction Workers Welfare Cess Act 1996, an amount @1% of gross amount of contractor's each bill shall be deducted at source.

99. Supply of construction materials

99.1 The contractor has to make his own arrangements for procurements, supply and use of all required construction materials, fittings, machineries, equipments etc. at his own without any claim to the department, except those, which are to be supplied by the department as specified in the tender document.

99.2 All materials so procured should confirm to the relevant specifications indicated in the tendering documents.

99.3 The contractor shall follow all regulations of the Government of India / Department in respect of import licences etc., of the procurement of the materials and he shall be responsible for the payment of applicable duties and taxes, port clearances, inland transportation etc.

99.4 The contractor shall make his own arrangements for adequate storage of the materials.

100. SCOPE OF SERVICES FOR OPERATION AND MAINTENANCE (O&M)

100.1 SCOPE OF SERVICES

The Scope of work / service to be done / provided by the contractor under this bid will be as under:
The Contractor shall operate and maintain the entire Pond area (Under their executed scope of work) for a total operation and maintenance period of 05 (five) years including 01 (one) year Defects Liability Period from the date of completion of work. All necessary repairs, maintenance, overhaul, replacements etc. shall be made during the O&M period to maintain the Pond area at the status of formal handing over. At the end of O&M period the ponds shall be handed over to the Employer in functional condition.

The scope of work for Operation & Maintenance shall include but not limited to the following items:

i. The Operation and Maintenance shall consist of all kind of routine and breakdown maintenance of the following:

   a. All electro-mechanical equipment

   b. Any type of repair or refurbishment of Civil or allied works

   c. Maintenance of pavement / pathways

   d. Upkeep of lawns including trimming and irrigation

   e. Upkeep of gardens, plant, trees, shrubs and climbers etc. Including irrigation

ii. O&M of all functional infrastructure and common areas within the Pond premises.

iii. The contractor shall consider painting of all MS surfaces like Gates, Grills etc. by the end of 3rd year and also by the end of 5th year, prior to handover, as a part of their operation and maintenance work.

iv. Proper maintenance / repair / replacement of facilities as required for Irrigation Work

v. Security of the campus and contents therein

vi. The Contractor shall be responsible for cleaning of the total pond area. At all times the pond, the garden area and surroundings shall be kept clean and in order.

vii. Maintenance of log books of all the machineries connected and hardcopy along with soft copy shall be got approved from the Employer or his authorised representatives. These reports shall contain sufficient appropriate and adequate data to make the records

meaningful and amenable to analysis for evaluating the performance of the Contractor as well as to help in O&M decisions.

viii. The records maintained by the Contractor shall be produced periodically to the Employer or his authorised representatives for proper monitoring. The Employer or his authorised representatives' remarks shall be attended to on next submission. Consolidated summary reports shall be furnished to the Employer monthly, quarterly and yearly containing salient features.

ix. The Contractor shall also maintain history sheets of overhauling, maintenance, replacement of all the important electrical and mechanical equipment.

x. The O&M shall include the appropriate preventive maintenance of equipment as per the manufacturer's recommendation.

The operation, maintenance and repairs services shall be performed according to the following:

Awareness & Cleanliness

The Contractor and his staff shall maintain a high degree of awareness in operation and maintenance of the Ponds and all relevant safety codes and procedures. At all times the Ponds, its equipment and surrounds shall be kept clean and in order. including the pavement, railings and garden etc.

Frequency of Preventive maintenance

The preventive maintenance shall be carried out according to the preventive maintenance schedule of the Plant. The regular staff may be reinforced with short-term specialists by the Contractor for special maintenance tasks, after duly informing the Engineer-In-Charge of the need and the schedule.

Repairs

Repairs shall be made as and when needed very promptly on the spot or at the Contractor's / Manufacturer's workshop. The need of repair on the spot or at the Contractor's workshop has to be defined in co-ordination with the Engineer-In-Charge and according to the status of spare parts availability.

Replacement

Spare parts

The Contractor shall keep a reasonable stock of spare parts so that the down time of equipment can be kept within the limits specified. The contents of the stock and the reorder level of the inventory have to be approved by the Engineer-In-Charge.

Transportation

All necessary transportation shall be arranged and made by the Contractor at his own expense.

Consumables

The Contractor has to ensure that there is always there is sufficient stock of 15 days of consumables.

100.2 GENERAL OBLIGATION

The Contractor shall operate and maintain the plant under this contract for the period specified in this contract.

The Contractor will submit a detailed operation and maintenance plan for approval of Engineer-In-Charge. All operation and maintenance activities shall be carried out strictly in accordance with the approved plan.

The services shall include but not be limited to the following items:

a) Training for the O&M staff designated by Employer's requirement.

b) Generation and maintenance of periodic reports.

100.3 OPERATION

100.3.1 Operational Services

The Contractor shall operate the complete Pond and associated services on a continuous 24-hour basis. The Contractor shall operate as per the stipulations maintained in the technical document.

If it is determined that the facility is not capable of meeting the design parameters for any reason beyond the Contractor's control and not attributable to him, the Contractor shall determine the specific cause of failure/ abnormality in the Pond functioning and report to the Employer or his authorised representatives and seek his directives on the necessary corrective action to be taken/adopted.

The Contractor will be required to furnish the details of electricity consumption in the format prescribed by the Employer or his authorised representatives.

The Contractor at his own expense shall provide all tools, cleaning, and housekeeping equipment, security and safety equipment.

100.3.2 Manpower

The Contractor shall provide experienced managerial, technical, supervisory, and non-technical personnel, security personnel and labour necessary to operate and maintain the Ponds and allied works properly, safely and efficiently on a continuous 24 hour basis for the full term of the O&M period. While doing so due consideration shall be given to the labour laws in force.

The qualification and capability of Contractor's personnel shall be appropriate for the tasks they are assigned to perform. The staff provided shall be fully trained in the operation of the works before being given responsibility. If, in opinion of the Engineer-In-Charge, a member of Contractor's staff is considered to be insufficiently skilled or otherwise inappropriate for the assigned task, and Engineer-In-Charge informs the Contractor in writing, the Contractor shall replace him with a person of appropriate skills and experience for the task, approved by the Engineer-In-Charge, within one month of being so informed.

The bidder shall propose in his tender a staff management structure for the operation and maintenance of works. The minimum manpower requirement shall be as given in Table – 1 below.

Table – 1

Sl. No.	Position	Minimum Qualification	Experience in Years	Proposed Minimum No. of Posts
1.	Electrician	ITI (Elec.)	3	1
2.	Gardener / Mali	-	3	1
3.	Security Staff	Class 8 Pass	--	1

Key staff: The Employer may require a suitable change in the structure on the basis of design and other relevant parameters it deems fit.

The Contractor shall provide all secretarial support, printing and publishing services, office furniture and office supplies as required. It shall also ensure that all labour welfare laws and regulations are followed, including weekly rests, rotation of duties

The CV resumes of the Contractor personnel shall be submitted to the Engineer-In-Charge for acceptance at least two months before anticipated commencement of the pre-commissioning of test. Normal time duty hours for the Contractor's O&M personnel may be modified as necessary and agreed by the Engineer-In-Charge. A rotating shift schedule shall be established by the Contractor and approved by the Engineer-In-Charge who will

ensure that an adequate number of the Contractor's staff will be available for duty at Pond premises 24 hours each day, 7 days week, including national holidays.

In the event, that it is necessary for more than one of the Contractor's O&M personnel be absent from the Plant, for whatever reason, the Contractor shall provide a qualified replacement at his own expense and ensure that specified project duty coverage is maintained. If substitute key personnel are required for a period longer than 15 days, their CV must be approved in advance by the Engineer-In-Charge.

The O&M personnel shall be dedicated solely to the specified duties and responsibilities and shall not be diverted to perform Contractor's administrative duties, construction arrangement, office management, or other activities not related to O&M. Adequate supports staff shall be provided by the Contractor in order avoid any such diversion.

The bidder shall provide justification of the labour cost proposed by him for all personnel

The Contractor shall include in his cost medical and accident insurance expenses of all the staff employed by him along with all provisions of the labour welfare acts prescribed from time to time by the State and Central Government. Adequate insurance cover shall also be maintained during O&M period for all short-term employees, as well as casual, temporary employees and visitors.

Employer is not liable for any situation arising due to any accident/mishap of whatever nature occurring in the Plant premises.

100.3.3 Safety

The Contractor shall be responsible for safety of his staff during O&M of the Plant and shall procure, provide and maintain all safety equipment necessary for satisfactory O&M such as gasmasks, gloves, boots, mats etc.,

1. The Contractor shall utilize safety awareness procedures in every element of operation and maintenance.
2. The Contractor shall emphasize site safety including adoption of

   (a) Safe working procedures

   (b) Cleanliness and care of the pond premises as a whole

   (c) Accident and hazardous conditions prevention and reporting.

The Contractor shall impart safety training to all members at regular intervals, especially for new comers.

The Contractor shall provide Notice boards and display boards at appropriate locations detailing precautions to be taken by O&M personnel to work in conformity to regulations and procedures and by the visitors to the Pond areas.

The Contractor shall notify the Engineer in Charge representative immediately if any accident occurs whether on-site or off site in which Contractor is directly involved and results in any injury to any person, whether directly concerned with the site or a third party. Such initial notification may be verbal and shall be followed comprehensive report within 24 hours of the accident.

100.3.4 Reporting

The Contractor shall prepare consolidated daily reports, weekly and monthly reports on Pond areas operation and maintenance and submit to the Engineer-In-Charge. The daily reports are to be submitted within first working hour of the next day. The monthly reports shall be submitted on the first day of the next month and within two working hours with monthly record data to Engineer-In-Charge.

Overall reporting formats shall be approved by Engineer-In-Charge and may have to be modified from time to time as required and approved by Engineer-In-Charge. Contractor may have to prepare and submit additional reports on particular matters and incidents as and when required by the Engineer-In-Charge for each significant occurrence.

100.4 MAINTENANCE

100.4.1 Maintenance of Installed Part of the Pond

The Contractor shall ensure the continuity of the ponds operations and in case of the breakdown or the deterioration in performance of any equipment at the Pond areas under normal operating conditions of any items of the Plant and equipment and component parts thereof shall be minimized.

The classes of maintenance provided shall comprise full Operational maintenance and standby Maintenance.

Full operational maintenance comprises the planned and regular maintenance carried out by the Contractor on a day-to-day basis, including cleaning, lubricating, minor adjustment, together with the preventive and corrective maintenance plan for those items of the Plant and equipment within the treatment works which have been commissioned and made operational.

Standby maintenance comprises the planned and regular maintenance carried out by the Contractor including cleaning, lubricating, periodic, and minor adjustment of all items of Plant and equipment within the treatment works which have been installed but have not yet been made operational.

The Contractor shall carry out the maintenance of the Ponds in accordance with the requirements of the O&M Manual and to the approved maintenance plan. The Contractor shall strictly adhere to the manufacturers' recommendations with respect to equipment maintenance, and only use types and grades of lubricants to be used. The frequency of lubrication, adjustments to be made regularly, and recommended spare parts by the equipment / machine/ instrument manufacturer /supplier shall be carried out and appropriate inventory shall be held in store.

100.4.2 Preventive Maintenance

The Contractor shall plan the day-to-day and the preventive maintenance. This planning must include for each equipment the estimated necessary hours in preventive maintenance and break down maintenance. It shall also include the qualification of the foreseen maintenance personnel.

The Contractor shall provide the yearly requirement of spare parts and consumable needed for the maintenance of each piece of equipment for the day-to-day maintenance, preventive maintenance, and foreseen break down maintenance/overhaul, if any.

100.5 TRAINING

100.5.1 General

a) The Contractor shall be responsible for instruction and training of all his personnel in all aspects of Plant operation and maintenance till the end of the operation and maintenance period. The Contractor shall also be responsible for training personnel designated by the Employer who will operate the Plant at the expiry of the contract.

The Contractor will make available for this purpose competent staff and as well as propose schedule information that may be necessary for effective execution of the training programs.

The training shall be organised in two (2) stages as follows:

Basic technical training education to be carried out during the final stages of the execution of work of the contract through literature, manuals, handouts demonstration at site, etc.

b) By the end of this training period these personnel should be able to carry out their respective duties efficiently under the supervision of Engineer-In-Charges and supervisory staff of the Employer.

The Contractor shall provide at his cost all local transportation, literature, computers, CDs and other related hardware and stationery to be used by trainers and trainees during the training period.

c) Towards end of O&M contract period, training shall be conducted once again to Employer's personnel or their authorized personnel. This training shall be for duration of 30 working days.

100.6 Operation and Maintenance records

The following are a typical sample form of records (not an exhaustive and comprehensive) that are required to the maintained by the O&M Contractor. The details of complete records shall be prepared and submitted by the O&M Contractor to the Engineer-In-Charge for approval prior to completion.

100.7 Penalties Due to shortfall in performance of Operation & Maintenance Facilities

The contractor shall be subject to the following penalties for failure to carry out its operations as indicated below during "Performance Based O&M period" 05 (five) years including 01 (one) year of Defects Liability Period under Normal Operating Conditions.

Sl. No.	**Basis of Penalty**	**Benchmark**	**Penalty Value for each Parameter specified in the bid document**
1.	Inadequate Maintenance of the Pond, Facilities, Greenery and ambience	For each case detected	Rs.1,000/- per case detected
2.	Not using PPP devices, Non-compliance to Occupational Safety, Health & Environment guidelines, Non-Compliance to State & Central Statutes	Up to 2 occurrences / Month	No penalty
		>2 & up to 5 Occurrences/Month	Rs.1,000/- per Occurrence
		>5 & up to 10 Occurrences/Month	Rs. 2,500/- per Occurrence

101. GENERAL INSTRUCTIONS

The following general instructions are not exclusive and the same are issued for general guidance of the bidder and shall in no way constitute any promise or Covenant on part of Agartala Smart City Limited but shall be binding obligations for all intents and purposes, the same are included in the Bid.

101.1 PLANNING, DESIGNING AND EXECUTION OF THE WORKS

101.1.1 SITE RESPONSIBILITY CHART

The Contractor shall submit, within 15 days after the Date of Commencement of the Contract, a site responsibility chart to show the functions and responsibilities of various personnel from the Project Manager to the workmen responsible for executing the Works, as well as the functions and responsibilities of the sub-contractors involved.

101.1.2 SETTING OUT AND EXISTING LEVELS

The Contractor shall take levels and set out for the whole of the Works. The information on existing levels as shown on the Drawings is provided in good faith for the general guidance of the Contractor. The Contractor is to note that accuracy of information shown on the Drawings is not guaranteed. The Contractor shall visit the site and carry out field surveys if he considers it necessary to ascertain the full extent of the Works. Within one week after the commencement of the Works, the Contractor shall submit to the Engineer-in-Charge for his verification and endorsement, records of levels of the existing site condition. Similarly, the Contractor shall submit the as-constructed levels of the site to the Engineer-in-Charge upon completion of the Works. Such records shall be certified and endorsed by a Registered Surveyor engaged by the Contractor at his own cost.

101.1.3 AS-BUILT DRAWINGS

The Contractor shall prepare, and keep up-to-date, a complete set of "as-built" records of the execution of the Works, showing the exact as-built locations, sizes and details of the work as executed. These records shall be kept at the Site and two sets of such records shall be submitted to Engineer-in-Charge.

In addition, the Contractor shall supply to the Engineer-in-charge as-built drawings of the Works, showing all Works as executed.

SECTION - V

TECHNICAL SPECIFICATION

(ATTACHED SEPARATELY)

SECTION - VI

FORMS OF SECURITY

Annexure - G

(i) FORM OF SOLVENCY CERTIFICATE FROM A SCHEDULED BANK

This is to certify that to the best of our knowledge and information Ms/Sri …… …… …… ……having marginally noted address, a customer of our bank are/is respectable and can be treated as good for any engagement up-to a limit of Rs. …… ……..……(Rupees……..……). This certificate is issued without any guarantee or responsibility on the Bank or any of the officers.

(Signature for the Bank)

NOTE: In case of partnership firm, certificate to include names of all partners as recorded with the Bank.

Annexure - H

(ii) FORM OF PERFORMANCE GUARANTEE

To
…….. **(Name of the Employer)**
…… **(Address of Employer)**

WHEREAS…… …… (Name and address of contractor) (Herein after called "the contractor") has undertaken, pursuance of contract No. ……. dated..... ……..... to execute .... (name of contract and brief description of works) herein after "The Contract."

AND WHEREAS it has been stipulated by you in the said contract that the contractor shall furnish you with a bank guarantee by a Nationalized bank for the sum specified therein as security for compliance with his obligation in accordance with the contract.

AND WHEREAS we have agreed to give the contractor such bank guarantee.

NOW THEREFORE, we hereby affirm that we are the Guarantor and responsible to you on behalf of the contractor, up to a total of……. (amount of guarantee) ……..(in words), such sum being payable in the types and proportions of currencies in which the contract price is payable, and we undertake to pay you, up on first written demand and without cavil or argument, any sum or sums within the limits of……(amount of guarantee) as aforesaid without your needing to prove or to show grounds or reasons for a demand for the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the contractor before presenting us with the demand.
We further agree that no change or addition to or other modification of the terms of the contract or of the works to be performed hereunder or of any of the contract documents which may be made between you and the contractor shall in any way release us from any liability under this guarantee and we hereby waive notice of any such change, addition or modification.
This guarantee shall be valid until a date 28 days from the date of expiry of Defects Liability Period of 12 (twelve) months after intended completion date.

Signature and Seal of the Guarantor ..……..
Name of the Bank ……
Address ……
Date……..

Annexure - F

Date……..

To
The Chief Executive Officer,
Agartala Smart City Limited,
Agartala, West Tripura

Telephone No:

Email ID:

Name of Work: Development of Three Ponds on the Way to MBB College Near Tarun Sangha at Shiv Nagar and Post Completion Operation & Maintenance for 05 (five) years including Defects Liability Period of 01 (one) year.

1. I/We offer to execute the work(s) described above and remedy any defects therein with conditions of the contract, specifications, drawings, bill of quantities and addenda.

2. I/ We undertake to execute work at the same rate as filled up / quoted online by me / us in Bill of Quantity (in downloaded macro enabled MS-Excel sheet) of the same bid as referred to **Clause -12 (in Section-II, Instruction to Bidders).**

3. I/ WE undertake to commence the work(s) on receiving the notice to proceed with work in accordance with the contract documents.

4. This bid and your written acceptance of it shall constitute a binding contract between us. I understand that you are not bound to accept the lowest or any bid you receive.

5. I / We hereby confirm that this bid complies with the bid validity and earnest money required by the bid documents as specified in NIe-T.

Authorized Signature…….

Name and Title of Signatory……

Name of the Bidder……

Address……..

Telephone No……..

Cell Phone

SECTION - VII

DRAWINGS

(ATTACHED SEPARATELY)

VOLUME - II

SECTION - VIII

BILL OF QUANTITIES

BILL OF QUANTITIES

PREAMBLE:

1. The Bill of quantity shall be read in conjunction with the **NIT instruction** to Bidder, conditions of contract, Specifications and drawings.

2. Bill of Quantity (BOQ), which is the Rate quoting sheet in MS-Excel shall be downloaded from e-procurement application, filled up properly and uploaded in the financial bid after digital signing.

3. The Bidder shall always open the BOQ sheet with Macro Enabled.

4. Name of bidder must be written in the appropriate field of rate quoting sheet by each bidder.

5. For the construction works, the quantities given in the Schedule of quantities are estimated and given to provide a common basis for bidding. The basis of payment will be the actual quantities of the work ordered and carried out, as measured and verified by the Engineer and valued.

a. At the rates bided in the Schedule of quantities in the case of item rate bids; and

b. At percentage rate above / below / at par of the schedule of rates as bided by the Bidder.

6. The rates bided in the priced bill of quantity(BOQ) shall, except in so far as it is otherwise provided under the contract, include all constructional plant, labour, supervision, materials, erection, maintenance, insurance, profit, taxes and duties, together with all general risks, liabilities and obligations, etc. Set out in the contract.

7. When percentage rate bids are invited, the Schedule of quantities will show the rates used for different items.

8. **BOQ TAMPERING**:

a. The provided BOQ in the Bid is, meant for downloading in the Bidders machine, for entering the relevant fields meant for rates & bidders particulars and finally uploading along with the Bid. The BOQ Excel Sheet is Macro enabled and working with the Sheet requires the Macro to be allowed /enabled to run.

b. Bidders are hereby warned not to tamper with the MS-Excel Sheet, make copies and work in a copied Sheet or break through the default Work-Sheet Security. Such BOQs with stated violations will be treated as Tampered BOQs and Bids uploaded with Tampered BOQs will be summarily rejected.

AGARATALA SMART CITY PROJECT

ABSTRACT OF COST

NAME OF WORK: **DEVELOPMENT OF THREE PONDS ON THE WAY TO MBB COLLEGE NEAR TARUN SANGHA AT SHIV NAGAR AND POST COMPLETION OPERATION & MAINTENANCE FOR 05 (FIVE) YEARS INCLUDING DEFECTS LIABILITY PERIOD OF 01 (ONE) YEAR**

SL. NO.	SUB-HEAD OF WORKS	TOTAL AMOUNT (INR)
I	LAND SCAPE WORK	72,754.25
II	FOUNTAIN WORK	29,23,245.00
III	CIVIL WORK	2,50,26,138.14
IV	ELECTRICAL WORK	47,30,619.11
V	OPERATION AND MAINTENANCE FOR FIVE YEARS	21,20,041.00
	TOTAL COST (I + II + III + IV + V)	**3,48,72,797.50**

Validate Print Help

Tender Inviting Authority: Agartala Smart City Limited

Name of Work: DEVELOPMENT OF THREE PONDS ON THE WAY TO MBB COLLEGE NEAR TARUN SANGHA AT SHIV NAGAR AND POST COMPLETION OPERATION & MAINTENANCE FOR 05 (FIVE) YEARS INCLUDING DEFECTS LIABILITY PERIOD OF 01 (ONE) YEAR

Contract No: Nle-T No. ASCL/RFP/12/17

Name of the Bidder/ Bidding Firm / Company :	

PRICE SCHEDULE

(This BOQ template must not be modified/replaced by the bidder and the same should be uploaded after filling the relevent columns, else the bidder is liable to be rejected for this tender. Bidders are allowed to enter the Bidder Name and Values only)

NUMBER #	TEXT #	NUMBER #	TEXT #	NUMBER	NUMBER #	TEXT #
Sl. No.	Item Description	Quantity	Units	Estimated Rate Considering all Taxes & Duties in Rs. P	TOTAL AMOUNT Considering all Taxes & Duties in Rs. P	TOTAL AMOUNT In Words
1	2	4	5	6	53	55
1	LANDSCAPE					
1.01	Good earth					
1.02	Trenching in ordinary soil up to a depth of 15 cm including removal and stacking of serviceable materials and then disposing of surplus soil, by spreading and neatly leveling within a lead of 50 m and making up the trenched area to proper levels by filling with earth or earth mixed with sludge or / and manure before and after flooding trench with water (excluding cost of imported earth, sludge or manure) complete as required.	3.750	Cum	115.60	433.50	INR Four Hundred & Thirty Three and Paise Fifty Only
1.03	Supplying and stacking of good earth suitable for horticulture at site including royalty & carriages (earth measured in stacks will be reduced by 20% for payment) complete as required.	15.000	Cum	235.00	3525.00	INR Three Thousand Five Hundred & Twenty Five Only
1.04	Supplying and stacking of sludge at site including royalty & carriages (sludge measured in stacks will be reduced by 8% for payment) complete as required.	1.500	Cum	189.90	284.85	INR Two Hundred & Eighty Four and Paise Eighty Five Only
1.05	Supplying and stacking dump manure from approved source & carriage (manure measured in stacks will be reduced by 8% for payment), Screened through sieve of I.S. designation 20 mm.	1.500	Cum	162.60	243.90	INR Two Hundred & Forty Three and Paise Ninety Only
1.06	Mixing earth and sludge or manure in required proportion specified or directed complete as required and Spreading of sludge, dump manure and or good earth in required thickness (Cost of sludge, dump manure and or good earth is to be paid separately) complete as required.	25.000	Sqm	1.00	25.00	INR Twenty Five Only
1.07	Rough dressing the trenched ground including breaking clods complete as required: Uprooting weeds from the trenched area after 10 to 15 days of its flooding with water including disposal of uprooted vegetation complete as required: Fine dressing the trenched ground including breaking clods complete as required.	25.000	Sqm	2.80	70.00	INR Seventy Only
1.1	Trees - The rate of the following items include for supply and plantation of plants as specified, transportation to site and excavation of pits as follows:					
1.11	Digging holes 1.2m dia x1.2m depth in ordinary soil and refilling the same with the excavated earth mixed with manure or sludge in the ratio of 2:1 by volume (2 parts of stacked earth after reduction by 20% : one part of stacked sludge or manure after reduction by 8%), flooding with water, dressing, levelling etc. including removal of rubbish stacking and disposal of materials declared un-serviceable and surplus earth by spreading and levelling as directed with all leads and lifts complete (cost of sludge, manure or extra earth to be paid separately) as required.	13.000	Each	274.00	3562.00	INR Three Thousand Five Hundred & Sixty Two Only
1.12	Albizzia lebbek (Shirish) (height-165 cm) in bag	1.000	Each	60.00	60.00	INR Sixty Only
1.13	Cassia fistula (Amaltas) (height-135 cm) in big polybag	1.000	Each	60.00	60.00	INR Sixty Only
1.14	Delonix regia (Gulmohar) (height- 165 cm) in big polybag	6.000	Each	60.00	360.00	INR Three Hundred & Sixty Only
1.15	Peltophorum species (Radhachura / Copperpod) (height- 165 cm) in big poly bag	3.000	Each	60.00	180.00	INR One Hundred & Eighty Only
1.16	Plumeria alba (height-135 cm) in bag	2.000	Each	120.00	240.00	INR Two Hundred & Forty Only
1.2	Lawn (Grassing)					

1.21	Uprooting rank vegetation and weeds by digging the area to a depth of 60 cm removing all weeds and other growth with roots by forking, repeatedly breaking clods, rough dressing, flooding with water, uprooting fresh growths after 10 to 15 days and then fine dressing for planting new grass including disposal of all rubbish with all leads and lifts complete as required.	25.000	Sqm	40.10	**1002.50**	INR One Thousand &Two and Paise Fifty Only
1.22	Supplying and Grassing with 'Doob' grass in rows 15 cm apart in either direction, including watering and maintenance of the lawn for 30 days or more till the grass forms a thick lawn free from weeds and fit for mowing including supplying of good earth if needed (good earth will be paid separately) complete as required.	25.000	Sqm	5.90	**147.50**	INR One Hundred & Forty Seven and Paise Fifty Only
1.3	**Garbage Bin**					
1.31	Movable Dustbins with capacity of 120 lt. of make Arihant PGGD37, Nilkamal or equivalent	10.000	Each	6256.00	**62560.00**	INR Sixty Two Thousand Five Hundred & Sixty Only
2	**FOUNTAIN**					
2.01	**Fountain at the Center of the Circular Area in the Lake - 1 as per Technical Specification**					
2.02	i) Design, supply, installation and commissioning of 01 (one) no. Fountain with foaming Aerating Jet with: a) 01 (one) no. 3 HP submersible pump having steel mounting frame, b) 04 (four) nos. light system comprising of LED 21 Watt, RGB Light with waterproof luminaries and array of high output of LEDs housed in compact enclosure of stainless steel body and c) 01 (one) set of cable consisting of 3-core PVC double insulated flat copper flexible submersible cable for pump and 2-core double insulated flexible copper conductor for light system. ii) Design, supply, installation and commissioning of 05 (five) nos. Calyx Aerating Jet with effect diameter of around 5 m and at a PCD of around 8 m around the central Foaming Jet Fountain as per design with: a) 05 (five) nos. 3 HP submersible pump having steel mounting frame, b) 20 (twenty) nos. light system comprising of LED 21 Watt, RGB Light with waterproof luminaries and array of high output of LEDs housed in compact enclosure of stainless steel body and c) 05 (five) sets of cables consisting of 3-core PVC double insulated flat copper flexible submersible cable for pump and 2-core double insulated flexible copper conductor for light system. iii) Design, supply, installation and commissioning of 01 (one) no. Composite Panel enclosed in Outdoor electrical enclosure for Pump and Lighting for all the 06 (six) nos. of fountains with 06 (six) sets of Circular GRP Floats built to international standards in GRP with aluminum sub frame for complete corrosion resistance.	1.000	Job	1512548.00	**1512548.00**	INR Fifteen Lakh Twelve Thousand Five Hundred & Forty Eight Only
2.1	**Fountain at Lake - 3 as per Technical Specification**					
2.11	i) Design, supply, installation and commissioning of 05 (five) nos. Foaming Aerating Jet Fountain with aluminium alloy epoxy fountain Nozzle and gate valves for fine tuning with: a) 05 (five) nos. 3 HP submersible pump having steel mounting frame, b) 20 (twenty) nos. light system comprising of LED 21 Watt, RGB Light with waterproof luminaries and array of high output of LEDs housed in compact enclosure of stainless steel body and c) 05 (five) set of cables consisting of 3-core PVC double insulated flat copper flexible submersible cable for pump and 2-core double insulated flexible copper conductor for light system. ii) Supply, Installation and commissioning of 01 (one) no. Composite Panel enclosed in Outdoor electrical enclosure for Pump and Lighting for 05 (five) nos. of fountains with 05 (five) sets of Circular GRP Floats built to international standards in GRP with aluminum sub frame for complete corrosion resistance.	1.000	Job	1410697.00	**1410697.00**	INR Fourteen Lakh Ten Thousand Six Hundred & Ninety Seven Only
3	**CIVIL**					
3.01	**Demolishing and Site Clearance**					
3.02	Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 50 m outside the periphery of the area cleared.	1798.000	Sqm	6.20	**11147.60**	INR Eleven Thousand One Hundred & Forty Seven and Paise Sixty Only
3.03	Pumping out water from the pond and discharging the same to nearest drain / nullah all as per the direction of the Engineer-in-Charge	5271.000	KL	52.99	**279310.29**	INR Two Lakh Seventy Nine Thousand Three Hundred & Ten and Paise Twenty Nine Only
3.1	**Excavation**					
3.11	Earth work in excavation by mechanical means (Hydraulic excavator) / manual means over areas (exceeding 30cm in depth, 1.5m in width as well as 10 sqm on plan) including disposal of excavated earth, lead upto 50m and lift upto 1.5m, disposed earth to be levelled and neatly dressed all as per the drawing, specifications and direction of the Engineer-in-Charge	3875.000	Cum	128.80	**499100.00**	INR Four Lakh Ninety Nine Thousand One Hundred Only

3.2	**Backfilling**					
3.21	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. For all kinds of soil	1953.500	Cum	116.40	**227387.40**	INR Two Lakh Twenty Seven Thousand Three Hundred & Eighty Seven and Paise Forty Only
3.22	**Good Earth**-Carriage by Mechanical Transport including loading, unloading and stackin as per the direction of the Engineer-in-Charge.	2250.000	Cum	184.90	**416025.00**	INR Four Lakh Sixteen Thousand &Twenty Five Only
3.23	Supplying and filling in plinth, under floor, foundations etc. with sand (fine) from local quarry with all lifts including spreading in horizontal layers, watering, grading to required slope, ramming, consolidating and compacting each layer by using plate compactor or by any suitable method complete as per the drawing, specifications and direction of the Engineer-in-Charge.	74.500	Cum	615.70	**45869.65**	INR Forty Five Thousand Eight Hundred & Sixty Nine and Paise Sixty Five Only
3.24	Brick Aggregate (Single size) : 40 mm nominal size (mix class) as per the direction of the Engineer-in-Charge.	225.900	Cum	2240.00	**506016.00**	INR Five Lakh Six Thousand &Sixteen Only
3.25	Loading and unloading of Stone Boulder, stone aggregate, Brick Aggregate, Kankar, earth, Crushed slag, Stone for Masonry Work by Manual Means including a lead upto 30m as per the drawing, specifications and the direction of the Engineer-in-Charge.	225.900	Cum	99.30	**22431.87**	INR Twenty Two Thousand Four Hundred & Thirty One and Paise Eighty Seven Only
3.3	**P.C.C.**					
3.31	Providing and laying in position cement concrete of specified grade excluding the cost of centring and shuttering - All work upto plinth level: 1:3:6 (1 Cement: 3 fine sand : 6 graded stone aggregate 20 mm nominal size) all as per drawings, specifications and the direction of the Engineer-in-Charge	75.300	Cum	7567.60	**569840.28**	INR Five Lakh Sixty Nine Thousand Eight Hundred & Forty and Paise Twenty Eight Only
3.4	**BRICKWORK**					
3.41	**Brickwork upto PL** First class brick work in foundation and plinth including cost of all materials as required complete: 1:4 (1 cement : 4 fine sand) all as per drawings, specifications and as per the direction of the Engineer-in-Charge	26.800	Cum	5408.60	**144950.48**	INR One Lakh Forty Four Thousand Nine Hundred & Fifty and Paise Forty Eight Only
3.42	**Brickwork above PL** First class brick work in superstructure above plinth level & upto floor-five level including cost of all materials as required complete:In cement mortar 1:4 (1 cement : 4 fine sand) all as per drawings, specifications and the direction of the Engineer-in-Charge	13.100	Cum	5930.80	**77693.48**	INR Seventy Seven Thousand Six Hundred & Ninety Three and Paise Forty Eight Only
3.5	**R.C.C.**					
3.51	**R.C.C. upto PL** Providing and laying in position machine batched, machine mixed and machine vibrated design mix Reinforced cement concrete grade M-25 using 410 kg of cement per cum including pumping of concrete to site (If required) of laying but excluding the cost of centring, 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 all as per drawings, specifications and the direction of the Engineer-in-Charge	390.400	Cum	9896.50	**3863593.60**	INR Thirty Eight Lakh Sixty Three Thousand Five Hundred & Ninety Three and Paise Sixty Only
3.52	**R.C.C. above PL** Providing and laying in position machine batched, machine mixed and machine vibrated design mix Reinforced cement concrete grade M-25 using 410 kg of cement per cum including pumping of concrete to site (If required) of laying but excluding the cost of centring, 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 all as per drawings, specifications and the direction of the Engineer-in-Charge	97.500	Cum	10044.60	**979348.50**	INR Nine Lakh Seventy Nine Thousand Three Hundred & Forty Eight and Paise Fifty Only
3.6	**REINFORCEMENT**					
3.61	Supplying and fixing of Thermo-Mechanically Treated bars/ Cold twisted deformed steel bars for reinforcement for R.C.C. work including straightening, cutting, bending, placing in position and binding all complete upto floor five level.	48790.000	Kg	59.70	**2912763.00**	INR Twenty Nine Lakh Twelve Thousand Seven Hundred & Sixty Three Only
3.7	**SHUTTERING / FORMWORK**					
3.71	**Shuttering / Formwork upto PL** Centering shuttering including struttings, propping etc. and removal of form work for foundations, footings, bases for columns etc. for mass concrete with 12mm thick wooded ply board all as per specifications and the direction of the Engineer-in-Charge	1331.800	Sqm	327.70	**436430.86**	INR Four Lakh Thirty Six Thousand Four Hundred & Thirty and Paise Eighty Six Only
3.72	**Shuttering / Formwork above PL** Centering shuttering including struttings, propping etc. and removal of form work for foundations, footings, bases for columns etc. for mass concrete with 12mm thick wooded ply board all as specifications and the direction of the Engineer-in-Charge	741.000	Sqm	327.70	**242825.70**	INR Two Lakh Forty Two Thousand Eight Hundred & Twenty Five and Paise Seventy Only
3.8	**PLASTERING**					

3.81	Providing and laying 20 mm cement plaster of mix : In cement mortar 1 : 6 (1 cement : 6 fine sand) all as per drawings, specifications and the direction of the Engineer-in-Charge	279.700	Sqm	187.50	**52443.75**	INR Fifty Two Thousand Four Hundred & Forty Three and Paise Seventy Five Only
3.9	**PAINTING**					
3.91	Supplying and finishing walls with textured exterior paint of required shade of approved brand and manufacture on new work (two or more coats applied @ 3.28 litre/10 sqm) over and including priming coat of exterior primer applied @ 2.20 kg/10 sqm complete. [Payment shall be made after submission of Test Certificate issued by the Manufacturer] all as per drawings, specifications and the direction of the Engineer-in-charge.	600.000	Sqm	155.10	**93060.00**	INR Ninety Three Thousand &Sixty Only
4	**FLOORING AND STONE WORK**					
4.01	Providing and laying at or near ground level precast cement concrete 1:2:4 (1 cement: 2 fine sand : 4 graded stone aggregate 20mm nominal size) kerbs stones of 0.45MX0.3MX0.15M size other-wise specified as per approved pattern and setting in position with cement mortar 1 : 3 (1 cement : 3 fine sand) including the cost of required centering, shuttering and finishing smooth with 6 mm thick cement plaster 1:3 (1 cement : 3 fine sand) on exposed surface complete and as per the direction of the Engineer-in-charge.	31.730	Sqm	10275.00	**326025.75**	INR Three Lakh Twenty Six Thousand &Twenty Five and Paise Seventy Five Only
4.02	Providing and fixing Natural Finish Cobble stone of size 100x100x75mm laid over pcc bed with 25 mm thick cement mortar 1:4(1 cement: 4 coarse sand) and making grooves of size 6mm deep and 6 to 10mm wide including jointed with grey cement slurry mixed with pigment to match the shade etc. complete as per design and drawing and the direction of the Engineer-in-charge. Sample should be approved by Landscape Architect before execution.	1400.000	Sqm	1560.00	**2184000.00**	INR Twenty One Lakh Eighty Four Thousand Only
4.1	**MISCELLANEOUS WORK LIKE MS RAILING, BOLLARD, LAMP POST, WALK WAY WOOD BRIDGE CONSTRUCTION**					
4.11	**MS RAILING**					
4.12	**Around Pond** Steel work welded in built up section/framed work including supply of all materials, cutting, hoisting, fixing in position and applying a priming coat of approved steel primer using steel etc. complete as required all as per drawings, specifications and as per the direction of the Engineer-in-charge	30000.000	Kg	88.70	**2661000.00**	INR Twenty Six Lakh Sixty One Thousand Only
4.2	**BOLLARD**					
4.21	Providing and fixing Cast iron Bollard of size 200 mm Dia or 200mm x 200mm with 1.5 mts Height shall be fixed in ground with 1:3 Concrete of volume 0.2 Cum with sutable shuttering and water curing complete and as per the direction of the Engineer-in-charge.	44.000	Nos	23393.00	**1029292.00**	INR Ten Lakh Twenty Nine Thousand Two Hundred & Ninety Two Only
4.3	**GRANITE -** Providing and fixing gang saw cut of approved thickness mirror polished, premoulded and prepolished, machine cut for kitchen platforms, vanity counters, window sills, facias and similar locations of required size, approved shade, colour and texture laid over 20 mm thick base of cement mortar 1:4 (1 cement : 4 fine sand) with joints treated with white cement, mixed with matching pigment, epoxy touch ups, including rubbing , curing, moulding and polishing to edges to give high gloss finish etc. complete at all levels: 18 mm thick Granite of any colour and shade duly approved Area of slab over 0.50 sqm and as per the direction of the Engineer-in-charge.	37.000	Sqm	3271.10	**121030.70**	INR One Lakh Twenty One Thousand &Thirty and Paise Seventy Only
4.4	**LAMP POST**					
4.41	**Electrical lamp post Metal** Providing and fixing electric lamp post of approved size, patern and height as per Drawing shall be Anchored in concrete bed as per drawings, specifications and direction of the Engineer-in-charge.	86.000	Nos	3899.00	**335314.00**	INR Three Lakh Thirty Five Thousand Three Hundred & Fourteen Only
4.5	Providing and placing in position FRP manhole Covers with supporting edge on drains of 1mx 1m sizes, properly fixed and cost of cartage, all leads & lift, handling at site etc. all complete as per direction of Engineer-in-Charge	2.000	Nos	3554.00	**7108.00**	INR Seven Thousand One Hundred & Eight Only
4.6	**Wooden Trellis -** Providing and fixing of Sal wood timber planks, Sal Timber Beams, fischer bolt fixing including polish and painting as per approved drawings and the direction of Engineer-in-charge	96.900	Cum	67196.70	**6511360.23**	INR Sixty Five Lakh Eleven Thousand Three Hundred & Sixty and Paise Twenty Three Only
4.7	**WAY WOOD BRIDGE CONSTRUCTION**					
4.71	Construction of Wood walk way Bridge of Span 33M x 2.5 M Wide including all fixing arrangements, Labors,Carpenters Class 1 and class 2, over heads, painting,Tightening Bolting complete as per approved drawings and direction of the Engineer-in-charge.	1.000	Job	470770.00	**470770.00**	INR Four Lakh Seventy Thousand Seven Hundred & Seventy Only
5	ELECTRICAL					
5.01	**SECTION I - POWER SUPPLY ARRANGEMENT**					

5.02	Supply, testing, tagging, laying and commissioning following sizes of 1100 Volt grade, XLPE / PVC insulated multistrand Al. / Cu. Conductor armoured / unarmoured cables (As Per IS 1554 & IS 7098) in readymade RCC trench, in provided DWC pipe, RCC pipe hume pipe, on provided cable trays / ladders etc. as. required complete with clamps, hardware for fixing tagging, identification etc.					
5.03	4C x 35 sq mm A2XFY armoured AL Cable	45.000	RM	257.20	**11574.00**	INR Eleven Thousand Five Hundred & Seventy Four Only
5.1	Supply, Installation, Testing of End termination for above cables including supply of Brass heavy duty, double compression glands, Al/ Cu lugs, consumable like insulation adhesive tape etc. as required. as specified and directed by the Dept.					
5.11	4C x 35 sq mm A2XFY armoured AL Cable	2.000	Nos.	264.25	**528.50**	INR Five Hundred & Twenty Eight and Paise Fifty Only
5.2	Supply, installation, testing and commissioning of Earthing System. The complete installation and materials shall be complied to enclosed technical specifications.					
5.21	Supply, installation & testing of Copper Plate earth station with 600 mmx600 mmx3 mm copper earth plate with necessary 40 mm dia. G.I. medium duty watering pipe with G.I. Fittings such as Socket, Tee, elbow, nipple and 50 mmx40 mm G.I. reducing socket for funnel including locking arrangement with 300 mmx300 mmx6 mm C.I. hinged cover plate complete with digging of earth pit, construction of brick chamber and plastering of both inner & outer surface of wall as specified and directed by the dept. (The Contractor has to ensure the all earthing shall be TSECL standards)	2.000	Nos.	13218.00	**26436.00**	INR Twenty Six Thousand Four Hundred & Thirty Six Only
5.3	Supply, fabrication & erection, finishing, painting etc. The supports shall be painted with 2 coats of red oxide primer and 2 coats of epoxy paint. Type of structural items required, but not limited to, shall be ISMC 100, ISMC 75, ISA 50x50x6mm, ISA 65x65x6, ISA 40x40x3, MS plate 3/ 6/ 10mm or any other size as per requirement.	0.150	Ton	75800.00	**11370.00**	INR Eleven Thousand Three Hundred & Seventy Only
5.4	Supply, Installation, Testing and Commissioning of LT 3 ph Meter, as per TERC specifications, complete in all aspect including CT, PT, etc.	1.000	Nos	6136.00	**6136.00**	INR Six Thousand One Hundred & Thirty Six Only
5.5	SITC of Providing & laying approved make Double walled corrugated pipes (DWC) of polyethylene (conforming to IS 14930 II) with necessary connecting accessories of same material at required depth for laying of cable. below ground/ road surface for enclosing cable and back filling the same to make ground as per original.					
5.51	75MM	10.000	RM	204.00	**2040.00**	INR Two Thousand &Forty Only
5.6	Earth work in excavation by mechanical means (Hydraulic excavator) / manual means over areas (exceeding 30cm in depth, 1.5m in width as well as 10 sqm on plan) including disposal of excavated earth, lead upto 50m and lift upto 1.5m, disposed earth to be levelled and neatly dressed. For All kinds of soil.	7.650	Cum	128.80	**985.32**	INR Nine Hundred & Eighty Five and Paise Thirty Two Only
5.7	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. For All kinds of soil.	7.450	Cum	116.40	**867.18**	INR Eight Hundred & Sixty Seven and Paise Eighteen Only
5.8	**SECTION II - LANDSCAPE LIGHTING**					
5.81	**9 WATT LED UPLITE** - Supply installation, testing Commissioning of 9 Watt IP 67, IK10 floor recessed uplite with LED Lamp. The luminaire should be minimum 769 lumens output and the color temperature of this fixture should be 3000K (Warm white). The Optics should be present to produce 36 degree beams. (The cable from Lighting fixture to connection should be min 1.5 meter) Make- Philips cat no BBP330 9xLED HP/WW 220-240V 12 1N- or equivalent. (@tree uplighters at seating)	22.000	Nos	14695.00	**323290.00**	INR Three Lakh Twenty Three Thousand Two Hundred & Ninety Only
5.82	**POST TOP- 27** - Watt IP65, IK07 LED Post Top lantern with die casting aluminum housing. The Luminaire shall be with 3000 color temperature and Min Lumen Output shall be 2300. Make Philips cat no - BGP161 LED2300/WW PSU 220-240V 7043 IN or equivalent. These lights shall be mounted on the railings around the ponds. (Along the Pond on the railings).	89.000	Nos	23512.00	**2092568.00**	INR Twenty Lakh Ninety Two Thousand Five Hundred & Sixty Eight Only
5.9	**SECTION III - LV SWITCHGEAR**					
5.91	**SUPPLY, INSTALLATION, TESTING & COMMISSSIONING (SITC) OF 415V SWITCHGEAR PANEL**					
5.92	Design, manufacturing, Supply, Loading, Packing, forwarding, Unloading, handling (shifting from place of unloading to place of storage and shifting from the place of storage to the place of installation including insurance), storage at site, assembly, installation, conducting pre-commissioning test as per IS & IEC Standards, commissioning & performance demonstration of following 415V LV Switchgear Panels including setting of releases. Testing kit shall be arranged by contactor. For Details SLD shall be referred. , Aluminium earth bus bar for entire length as per SLD, detail specifications & data sheet including required testing @ factroy as per applicable IS/ IEC standards. lighting bus with MCBs and contactors shall be provided in a separate compartment ; Incoming components shall be provided in separate compartment; outgoing MCBs and Terminals shall be provided in separate compartments.					

5.93	**Outdoor Main Incoming Panel - IP55** Outdoor Type IP 55 double door Main DB with 1. 63A FP MCCB - 1 no. 2. 16A FP MCB as outgoing- 3 nos. 3. 32A FP MCB as outgoing.- 5 nos. 4. MFM , RYB Indications etc. Refer SLD and technical specifications for the details	1.000	Nos	29743.54	**29743.54**	INR Twenty Nine Thousand Seven Hundred & Forty Three and Paise Fifty Four Only
5.94	**Outdoor Lighting Panel-1** Outdoor Type IP 55 double door Main DB with 1. 32A ,30mA FP RCBO as incomer- 1 nos. 2. 40A FP Contractor with 1 no of 24 Hr Astronomical time switch for street lighting. 3. 6A DP MCB as outgoing- 9 nos. Refer SLD and technical specifications for the details.	1.000	Nos	41740.78	**41740.78**	INR Forty One Thousand Seven Hundred & Forty and Paise Seventy Eight Only
5.95	**Outdoor Lighting Panel-2** Outdoor Type IP 55 double door Main DB with 1. 32A ,30mA FP RCBO as incomer- 1 nos. 2. 40A FP Contractor with 1 no of 24 Hr Astronomical time switch for street lighting. 3. 6A DP MCB as outgoing- 9 nos. Refer SLD and technical specifications for the details.	1.000	Nos	41740.78	**41740.78**	INR Forty One Thousand Seven Hundred & Forty and Paise Seventy Eight Only
5.96	Supply, fabrication & erection, finishing, painting etc. The supports shall be painted with 2 coats of red oxide primer and 2 coats of epoxy paint. Type of structural items required, but not limited to, shall be ISMC 100, ISMC 75, ISA 50x50x6mm, ISA 65x65x6, ISA 40x40x3, MS plate 3/ 6/ 10mm or any other size as per requirement.	0.450	Ton	75800.00	**34110.00**	INR Thirty Four Thousand One Hundred & Ten Only
5.97	Supply, fabrication & erection, finishing, painting etc. The supports shall be painted with 2 coats of red oxide primer and 2 coats of epoxy paint. Type of structural items required, but not limited to, shall be ISMC 100, ISMC 75, ISA 50x50x6mm, ISA 65x65x6, ISA 40x40x3, MS plate 3/ 6/ 10mm or any other size as per requirement.	2.000	Nos	1455.00	**2910.00**	INR Two Thousand Nine Hundred & Ten Only
6	**SECTION IV - CABLING SYSTEM**					
6.01	Supply, testing, tagging, laying and commissioning following sizes of 1100 Volt grade, XLPE / PVC insulated multistrand Al. / Cu. Conductor armoured / unarmoured cables (As Per IS 1554 & IS 7098) in readymade RCC trench, in provided DWC pipe, RCC pipe hume pipe, on provided cable trays / ladders etc. as. required complete with clamps, hardware for fixing tagging, identification etc.					
6.02	4C x 16 sq mm A2XFY armoured AL Cable	30.000	RMT	153.50	**4605.00**	INR Four Thousand Six Hundred & Five Only
6.03	4Cx10 SQ.MM. Al 2XFY Cable	160.000	RMT	138.26	**22121.60**	INR Twenty Two Thousand One Hundred & Twenty One and Paise Sixty Only
6.04	4C x 4 Sq mm 2XFY armoured CU Cable	822.000	RMT	220.61	**181341.42**	INR One Lakh Eighty One Thousand Three Hundred & Forty One and Paise Forty Two Only
6.05	4C x 2.5 Sq.mm. 2XFY CU Cable.	160.000	RMT	162.66	**26025.60**	INR Twenty Six Thousand &Twenty Five and Paise Sixty Only
6.1	Supply, Installation, Testing of End termination for above cables including supply of Brass heavy duty, double compression glands, Al/ Cu lugs, consumable like insulation adhesive tape etc. as required. as specified and directed by the Dept.					
6.11	4C x 16 sq mm A2XFY armoured AL Cable	2.000	RMT	292.79	**585.58**	INR Five Hundred & Eighty Five and Paise Fifty Eight Only
6.12	4Cx10 SQ.MM. Al 2XFY Cable	8.000	RMT	159.91	**1279.28**	INR One Thousand Two Hundred & Seventy Nine and Paise Twenty Eight Only
6.13	4C x 4 Sq mm 2XFY armoured CU Cable	188.000	RMT	159.15	**29920.20**	INR Twenty Nine Thousand Nine Hundred & Twenty and Paise Twenty Only
6.14	4C x 2.5 Sq.mm. 2XFY CU Cable.	32.000	RMT	159.15	**5092.80**	INR Five Thousand &Ninety Two and Paise Eighty Only
6.2	Supply including fitting and fixing of outdoor cable 4 way Polycarbonate Junction Boxes IP 67 & IK08 halogen free and weather proof for outdoor installation Base with metric knock-outs and PUR gasket, screws for mounting plate/DIN-rail and cover with polyamide cover screws. including all accessories complete as specified and directed by the Dept.					
6.21	Junction Box Size with 100x100x75 mm for Cable size 4Cx2.5 sq.mm & 4Cx4 Sq.mm. YWY cable	25.000	Nos	561.47	**14036.75**	INR Fourteen Thousand &Thirty Six and Paise Seventy Five Only
6.3	SITC of Providing & laying approved make Double walled corrugated pipes (DWC) of polyethylene (conforming to IS 14930 II) with necessary connecting accessories of same material at required depth for laying of cable. below ground/ road surface for enclosing cable and back filling the same to make ground as per original					
6.31	75MM	632.400	RMT	204.00	**129009.60**	INR One Lakh Twenty Nine Thousand &Nine and Paise Sixty Only
6.4	Earth work in excavation by mechanical means (Hydraulic excavator) / manual means over areas (exceeding 30cm in depth, 1.5m in width as well as 10 sqm on plan) including disposal of excavated earth, lead upto 50m and lift upto 1.5m, disposed earth to be levelled and neatly dressed. For all kind of soil	483.790	Cum	128.80	**62312.15**	INR Sixty Two Thousand Three Hundred & Twelve and Paise Fifteen Only

6.5	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. For all kinds of soil	471.080	Cum	116.40	**54833.71**	INR Fifty Four Thousand Eight Hundred & Thirty Three and Paise Seventy One Only
6.6	**SECTION V - EARTHING SYSTEM**					
6.61	SITC of Earth conductor of the following sizes to be laid in ground / in cable trays, jointing by welding, connecting to equipments, painting to welded portion by black bitumen paint and with all necessary hardware. For outdoor areas excavation, backfilling and removal of excess soil etc.					
6.62	25 x 3 mm GI Strip (for Outdoor DB)	192.000	Kg	158.00	**30336.00**	INR Thirty Thousand Three Hundred & Thirty Six Only
6.63	8 SWG GI wire	320.400	RM	21.00	**6728.40**	INR Six Thousand Seven Hundred & Twenty Eight and Paise Forty Only
6.64	Supply, installation, testing and commissioning of Earthing System. The complete installation and materials shall be complied to enclosed technical specifications.					
6.65	Supply, installation & testing of G.I. earth station with perforated 50 mm dia and 3.00 Metre long heady duty G.I. pipe with necessary 50 mm dia. G.I. Fittings such as Socket, Tee, elbow, nipple and 65 mmx50 mm G.I. reducing socket for funnel including locking arrangement 300 mmx300 mmx6 mm hinged cover C.I. earth plate complete with digging of earth pit, construction of brick chamber and plastering of both inner & outer surface of wall as specified and directed by the dept. (The contractor has to ensure the all earthing shall be TSECL standards)	16.000	Nos	5342.00	**85472.00**	INR Eighty Five Thousand Four Hundred & Seventy Two Only
6.7	**SECTION VI - TELEPHONE LINE U/G CONVERSION**					
6.71	Dismantling of Telephone poles on the 3 sides of the proposed pond development	1.000	Job	19551.24	**19551.24**	INR Nineteen Thousand Five Hundred & Fifty One and Paise Twenty Four Only
6.72	Supply, Laying through HDPE pipes, Testing and Commissioning of XLPE Multi-core armoured cable of the following size: 24Cx2.5 sq mm Copper FRLS (Telephone lines)	300.000	RM	750.26	**225078.00**	INR Two Lakh Twenty Five Thousand &Seventy Eight Only
6.73	Supplying, installation, testing & commissioning of Distribution Box 50 pairs with Krones (SIEMENS or equivalent as approved by the Dept.)	6.000	Nos	2035.00	**12210.00**	INR Twelve Thousand Two Hundred & Ten Only
6.74	SITC of Providing & laying approved make Double walled corrugated pipes (DWC) of polyethylene (conforming to IS 14930 II) with necessary connecting accessories of same material at required depth for laying of cable. below ground/ road surface for enclosing cable and back filling the same to make ground as per original.					
6.75	75 MM	300.000	RM	204.00	**61200.00**	INR Sixty One Thousand Two Hundred Only
6.76	Earth work in excavation by mechanical means (Hydraulic excavator) / manual means over areas (exceeding 30cm in depth, 1.5m in width as well as 10 sqm on plan) including disposal of excavated earth, lead upto 50m and lift upto 1.5m, disposed earth to be levelled and neatly dressed. For all kind of soil	229.500	Cum	128.80	**29559.60**	INR Twenty Nine Thousand Five Hundred & Fifty Nine and Paise Sixty Only
6.77	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. For all kinds of soil	223.470	Cum	116.40	**26011.91**	INR Twenty Six Thousand &Eleven and Paise Ninety One Only
6.8	**SECTION VII - ELECTRICAL LINE U/G CONVERSION**					
6.81	Dismantling of Electrical poles, conductor, etc on the 3 sides of the proposed pond development	1.000	Job	19551.24	**19551.24**	INR Nineteen Thousand Five Hundred & Fifty One and Paise Twenty Four Only
6.82	Supply, testing, tagging, laying and commissioning following sizes of 1100 Volt grade, XLPE / PVC insulated multistrand Al. / Cu. Conductor armoured / unarmoured cables (As Per IS 1554 & IS 7098) in readymade RCC trench, in provided DWC pipe, RCC pipe hume pipe, on provided cable trays / ladders etc. as. required complete with clamps, hardware for fixing tagging, identification etc.					
6.83	3.5Cx185 sq mm AL Arm XLPE (For O/H line)	350.000	RM	910.86	**318801.00**	INR Three Lakh Eighteen Thousand Eight Hundred & One Only
6.84	4Cx10 sq mm AL Arm XLPE (For House Service Connection)	240.000	RM	138.26	**33182.40**	INR Thirty Three Thousand One Hundred & Eighty Two and Paise Forty Only
6.85	Supply, Installation, Testing of End termination for above cables including supply of Brass heavy duty, double compression glands, Al/ Cu lugs, consumable like insulation adhesive tape etc. as required. as specified and directed by the Deptt. 3.5Cx185 sq mm AL Arm XLPE					
6.86	3.5Cx185 sq mm AL Arm XLPE	18.000	Nos	1044.87	**18807.66**	INR Eighteen Thousand Eight Hundred & Seven and Paise Sixty Six Only
6.87	4Cx10 sq mm AL Arm XLPE	18.000	Nos	159.91	**2878.38**	INR Two Thousand Eight Hundred & Seventy Eight and Paise Thirty Eight Only

6.88	Supply, Installation, Testing and Commissioning of Outdoor Sub Feeder Pillars (SFP) conforming to IP55 with Rain Hood made of 2mm thick CRCA Sheet, compartmentalised construction with Aluminium busbars with epoxy insulators; suitable for termination of 2R 3.5 C 400 Sqm Al XLPE Armoured cables for each incomer and outgoing feeder; SC rating - 10 kA for 1 Sec; incomer and outgoing MCCBs with Microprocessor based OL/SC/EF releases of the following rating and nos.; The FP shall be mounted on steel structure alteast 400mm height from the FGL. The FP shall be provided with RYB LED indication lamps. All MCCBs shall be TPN. The system shall be A.C. 3 phase, 4 wire, 433 V, 50 Hz with effectively grounded neutral. 1 No. Incomer MCCB rating 160A and 12 Nos. 25A DP Outgoing MCB and 4 Nos 25-63A FP MCB	6.000	Nos	2473.56	**14841.36**	INR Fourteen Thousand Eight Hundred & Forty One and Paise Thirty Six Only
6.9	SITC of Providing & laying approved make Double walled corrugated pipes (DWC) of polyethylene (conforming to IS 14930 II) with necessary connecting accessories of same material at required depth for laying of cable. below ground/ road surface for enclosing cable and back filling the same to make ground as per original.					
6.91	200 MM	350.000	RM	1102.00	**385700.00**	INR Three Lakh Eighty Five Thousand Seven Hundred Only
7	Earth work in excavation by mechanical means (Hydraulic excavator) / manual means over areas (exceeding 30cm in depth, 1.5m in width as well as 10 sqm on plan) including disposal of excavated earth, lead upto 50m and lift upto 1.5m, disposed earth to be levelled and neatly dressed. For all kinds of soil	327.250	Cum	128.80	**42149.80**	INR Forty Two Thousand One Hundred & Forty Nine and Paise Eighty Only
7.1	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. For all kinds of soil	258.530	Cum	116.40	**30092.89**	INR Thirty Thousand &Ninety Two and Paise Eighty Nine Only
7.2	SITC of Earth conductor of the following sizes to be laid in ground / in cable trays, jointing by welding, connecting to equipments, painting to welded portion by black bitumen paint and with all necessary hardware. For outdoor areas excavation, backfilling and removal of excess soil etc.					
7.21	25 x 3 mm GI Strip.(for RMU)	28.800	Kg	158.00	**4550.40**	INR Four Thousand Five Hundred & Fifty and Paise Forty Only
7.3	Supply, installation, testing and commissioning of Earthing System. The complete installation and materials shall be complied to enclosed technical specifications.					
7.31	Treated Earth pits as per CEIG specific requirements 50 mm Internal Diameter, Heavy Duty 3000 mm long GI pipe (Class B or better) earth pit as per IS 3043. The earth pit shall be provided with 25 x 6 mm GI Strip up to chamber, disconnecting links with 600 x 600 mm (clear) precast RCC chamber & 3mm thick MS chequered plate cover with hinge. Fine mixture of charcoal & salt shall be provided for earth pits. Excavation, backfilling, removal of excess soil is included in the scope. (The contractor has to ensure the all earthing shall be TSECL standards)	12.000	Nos	5342.00	**64104.00**	INR Sixty Four Thousand One Hundred & Four Only
7.4	Construction of Manhole Chamber of 750x750x800 mm with common burnt clay FPS brick including RCC cover and associated excavation, PCC, shuttering, etc.	14.000	Nos	10186.36	**142609.04**	INR One Lakh Forty Two Thousand Six Hundred & Nine and Paise Four Only
8	**OPERATION & MAINTENANCE**					
8.01	**Operation & Maintenance for 1st Year**	1.000	Job	328641.60	**328641.60**	INR Three Lakh Twenty Eight Thousand Six Hundred & Forty One and Paise Sixty Only
8.02	**Operation & Maintenance for 2nd Year**	1.000	Job	338245.40	**338245.40**	INR Three Lakh Thirty Eight Thousand Two Hundred & Forty Five and Paise Forty Only
8.03	**Operation & Maintenance for 3rd Year**	1.000	Job	523387.20	**523387.20**	INR Five Lakh Twenty Three Thousand Three Hundred & Eighty Seven and Paise Twenty Only
8.04	**Operation & Maintenance for 4th Year**	1.000	Job	360426.00	**360426.00**	INR Three Lakh Sixty Thousand Four Hundred & Twenty Six Only
8.05	Operation & Maintenance for 5th Year	1.000	Job	569340.80	**569340.80**	INR Five Lakh Sixty Nine Thousand Three Hundred & Forty and Paise Eighty Only
Total in Figures					**34872797.50**	INR Three Crore Forty Eight Lakh Seventy Two Thousand Seven Hundred & Ninety Seven and Paise Fifty Only
Quoted Rate in Figures			**Select**		0.00	INR Zero Only
Quoted Rate in Words		**INR Zero Only**				

SECTION – V

TECHNICAL SPECIFICATION

CONTENTS

PART – A

TECHNICAL SPECIFICATION
FOR
LANDSCAPE WORKS

TECHNICAL SPECIFICATION FOR LANDCAPE WORK

IMPROVEMENT OF THREE PONDS
NEAR MODERN CLUB AND MBB COLLEGE GATE AT SHIVNAGAR

Improvement of Three Ponds by providing peripheral metal railing, pathways, pedestrian bridge, seating arrangements, landscaping, fountains, decorative illumination, area lighting & allied works at Shivnagar (near Modern Club and MBB College Gate) and post completion operation & maintenance for 05 (five) years including Defects Liability period of 01 (one) year.

CONTENTS

SCOPE OF WORK

Note: The contractor has to make all effort to save energy and water.

1.0 BROAD SCOPE OF WORK

The broad scope of work for improvement of three ponds near Modern Club and MBB College Gate at Shivnagar under smart city proposal implementation shall include execution of all civil, architectural (including horticulture and landscaping), electrical works and irrigation works as per the schedule of rates (S.O.R), specifications, engineering standards & all relevant codes and standards, provisions and construction drawings.

Contractor shall have to take all the necessary approvals, if any, from respective authorities. Contractor shall do all necessary co-ordination activities with the Client & Engineer-in-charge for seamless implementation of the said works.

1.1 AREA OF WORKS

Improvement of Three Ponds by providing peripheral metal railing, pathways, pedestrian bridge, seating arrangements, landscaping, fountains, decorative illumination, area lighting, tree/plants, which shall specifically include the following areas:-

a) Construction of earthen embankment for all the edges of all water bodies.
b) Realignment of pond's edge wherever required.
c) Uprooting rank vegetation and weeds of entire area.
d) Providing of metal railing with light post around the entire periphery of water bodies.
e) Constructing continuous sidewalk all around the water bodies.
f) Covering of open drain between Lake-2 and Lake-3.
g) Providing seating facilities with trees on and along the covered drain.
h) Demolition of the narrow earthen bund between Lake-1 and Lake-2.
i) Construction of a pedestrian bridge at the place of the above mentioned narrow earthen bund.
j) Creating space for bus shelter.

k) Improvement of the water quality of these three ponds only initial cleaning of ponds (removal of algae, dry leaves etc.) with some lime dosing (to settle the suspended solids for better clarity of water).
l) Installation of fountains in the middle of ponds to aerate the water.
m) Providing lighting arrangement.
n) Landscaping and plantation.
o) Removal of existing bill boards.
p) Provide required garbage bins.
q) Provide required signages.

Above mentioned works are based on the initial concept but not limit to this. The contractor shall have to develop these areas complete in all sense as per best in practice with Five year of maintenance.

SPECIFICATIONS : SITE DRESSING AND LAND MODULATION

2.0 SCOPE

- The Scope consists of clearance of the Site of Works and preparation of the same to commence the proposed landscape execution activities. Wherever applicable, this is deemed to include all preliminary works like Dismantling/Demolition, Site Clearance, and General Leveling etc.
- In the event of any element of specification not available in any of the documents the instructions of the Engineer-in-Charge in writing shall be followed by the Contractor.
- The work shall be carried out in accordance with the drawings and designs duly approved by the Engineer-in-Charge
- The work shall be executed and measured as per metric dimensions given in the Schedule of Quantities, drawings etc.

2.1 GENERAL ITEMS

The more important Codes, Standards and publications applicable to this section are listed hereinafter.

2.1.1 SETTING OUT THE WORKS

- The Contractor shall supply without additional charges the requisite number of persons with the means and material necessary for the purpose of setting out works and checking, weighing and assisting in the measurement or examination at any time and from time to time, of the work or the materials. Failing this, the same may be provided by the client's designated representative In-charge at the expense of the Contractor and the expenses shall be deducted from any money due to the Contractor under the contract or from his security deposit.
- The Contractor shall arrange for a qualified surveyor to set out the works and obtain certification of its accuracy from the surveyor. The Contractor shall then set out the works and shall be responsible for the true and perfect setting out of the same and for the correctness of the positions, levels, dimensions, and alignment of all parts thereof and for provision of all necessary instruments, appliances and labour in connection therewith.
- Mark the layout on the site. All bench marks, levels should be properly established and preserved for future use.
- Clearly check the surveyed map provided by the client and mark all drainage lines, water pipe lines, electrical lines, etc. It needs to be checked by Contractor to satisfy him / her from safety point of view before starting of work.
- The checking of any setting out or of any line or level by the Engineer-in-Charge shall not in any way relieve the Contractor of his responsibilities, for the correctness thereof. The Contractor shall carefully protect and reserve all benchmarks and other things used in setting out of the work.
- Site Clearing / Excavation / Site Grading
- Light irrigation, by flooding the whole site with water. The water should penetrate up to depth of 15-20 cm only so that the weeds can germinate. Remove all grasses, small shrubs/weeds etc. with roots. Excavating the site as marked on the drawing/as instructed at the site, up to any lead and lift.
- Verify the levels and bench-marks from the up-dated surveyed drawing made available by the client. If there are any discrepancies between the site and the survey drawing, the same

are to be brought to the client's notice by addressing a letter to the client and copy marked to the Engineer-in-Charge.

- Grading and levelling of site as shown in drawing / specified on site by Engineer-in-Charge. This will include spreading manually or by help of soil unloaded at different working areas in the site so as to obtain basic datum levels and grades.
- Excavated material shall be stacked off in the manner indicated at the site including stacking of excavated material up to any lead and lift. The rate shall only cover the cost of excavation, stacking and/or spreading of the material, if required at the site.
- Clearing the area of unwanted materials including the weeds, stones, masonry pieces etc. and all such matter that may cause damage to growth of the plant materials immediately or in future.

2.2 EARTH WORKS

- Earthworks shall involve the grading of soil for earth mounding, the excavation of trenches and soil for formation levels of pathways and foundations, and the fine grading of earth banks and landscape areas roughly graded by others.
- Excavation shall be carried out to the depth shown on or implied in the drawings or to such greater or lesser depths as the Engineer-in-Charge may direct. The Contractor shall supply and fit all shoring, sheeting, strutting and walling required to maintain the sides of excavations as long as necessary and to remove them as required. The Contractor is to allow for making all necessary adjustments to existing manholes in accordance to bring them to the same level as the required profiled grades. No claim shall be entertained for either bulking or compacting and all other quantities shall be measured net from the drawings.
- The stripping and replacement of the subsoil shall only be done in dry weather and ground conditions unless in exceptional circumstances the Engineer-in-Charge authorizes otherwise. Subsoil in heaps or dumps shall not be sited so as to damage or impede water courses or other drainage so long as they are capable of remaining in operation. Any weeds which may grow on the heaps of subsoil shall be sprayed with an approved selective weed-killer to prevent seeding.

- Notwithstanding the general description for the type of material to be excavated, if original bed rock is encountered during these operations which can only be removed by blasting or compressed air tools this work will be paid for separately as an extra over item for that given for normal excavation. This work shall only be undertaken when authorized in writing by the Engineer-in-Charge.
- During excavation it is expected that the Contractor will take every prudent step or precautions such as tests or borings in order to prove the nature or type of material underneath or the ground bearing capacity in order to protect his workmen, plant or machinery employed in these operations.
- In the event of the Contractor excavating below the proper levels or otherwise in excess of the dimension given, he shall at his own expenses, remove all loose excavated material and replace the soil excavated in error.
- If, in the opinion of the Engineer-in-Charge the bottoms of any excavation or any material to be excavated become unsuitable due to the Contractor's operations, the Contractor shall, at his own expenses, carry out any necessary excavation and make up in a similar manner to the above.
- If, in the opinion of the Engineer-in-Charge the weather conditions are such as to preclude the satisfactory completion of any operation or cause unnecessary nuisance or disturbance to other parties, the Contractor shall, on receiving directions from the Engineer-in-Charge suspend operations on that particular portion of the work until the Engineer-in-Charge considers that weather conditions are satisfactory, or issues a direction to re-commence operations. The absence of such a direction shall in no way constitute the basis of a claim for delay or remedial work to a formation which is unsuitable.

2.2.1 MAJOR GRADING

- Site shall be complete with rough dressing including the base levels by civil contractor before handed over to landscape contractor for execution.
- Role of Landscape contractor involves major grading forming earth mounds / hillocks from imported fill materials where specified, or from the site debris and soil generated by excavations. The soil shall be graded using suitable earth moving machinery to the contoured earth forms indicated on the drawings. Soil, when in a dry enough state for easy

working, shall be distributed to the correct areas and laid in layers not exceeding 100mm thick and compacted by at least 2 passes of the earth moving machine in each direction for each 100mm layer.

- Earth slopes are to be formed from the compacted mounds to the gradients and levels shown on the drawings, accounting for the topsoil depths to be included after subsoil formation is complete. If insufficient fill is available to complete the levels shown, additional suitable subsoil is to be imported to make up the required quantities. Importation of additional fill shall only be carried out with written permission of the Engineer-in-Charge.
- Earthworks levels are to be carried out to the contours shown on the drawings to a maximum tolerance of 150mm measured vertically, and to a maximum gradient of 1:2. All subsoil levels are to account for the later additional of specified depths of topsoil.
- The Contractor shall be responsible for protection of completed subsoil mounds and shall take preventative measures to control erosion and siltation restore or replace any portion of the earthwork areas which erodes, slumps, silts or is otherwise damaged by the out-washing of soil.

2.2.2 EXCAVATION FOR FORMATION LEVELS AND TRENCHES

- For footpath areas or other paving areas, excavate subsoil to create a smooth formation for taking the sub-base for the paved area, to levels shown on the drawings accounting for the depth of the paving build up.
- Firmly compact sub-grade with a smooth wheeled vibratory roller to achieve an even level. Finished sub-grade is to be protected until the path sub-base or other construction such as pool sub-base is laid. If sub-grade is too dry to be compacted, water shall be added until suitable texture is achieved. If sub-grade is too wet, the material shall be left to dry out until workable.
- A completed sub-grade/formation on which there is standing water, soft spots or slurry shall be deemed to be unsuitable and shall be rectified at the Contractor's expense including making up of additional material as required to bring the formation to line and level again.
- Where soft or wet ground is encountered prior to preparation of the sub-grade and this soft or wet ground cannot satisfactorily be compacted, the Contractor shall submit a written

request for this to be inspected and the area to be dug out and replaced with suitable material shall be evaluated by the Engineer-in-Charge and directed accordingly.

- Surplus material resulting from excavations for path formation or drainage trenches shall be taken off site at Contractor's own expense unless otherwise directed by the Engineer-in-Charge in writing.
- Excavation of drainage or formation trenches shall be carried out after the major grading has been completed and approved. Trenches shall be cut to lines and gradients shown on the drawings. Planking and strutting shall be carried out as required to make the sides of the trenches safe. The Contractor will be responsible for ensuring that drainage trenches are kept free from mud and water and side slippage.

2.2.3 FINE GRADING AND SHAPING

- Slight unevenness, ups and downs and shallow depressions shall be removed by fine dressing the surface to the formation levels of the adjoining land, as directed by Engineer-in-charge and adding suitable quantities of Good earth, brought from approved source, if necessary.
- Fine grading shall be carried out using small sized earth moving equipment or by hand, and shall involve final modelling of the earth contours produced by the major grading exercise. The shaping will follow the contours shown on the plans in general terms, but the final forms will be developed by eye to create smoothly flowing and pleasing contours.
- The Fine Grading will provide the detailed earth contouring prior to cultivation of soil. Soil cultivation and the application of topsoil mixes shall not take place until the Fine Grading is completed.

2.3 DRAINAGE

The existing drain shall be covered and remodel as per requirement.

2.3.1 FIELD DRAINS AND TRENCH DRAINS

- The Contractor shall survey the existing drainage at site and used it for drainage. Further, if required to lay the additional storm water drainage, contractor shall submit the drainage scheme and take the approval from Client /Engineer-in-Charge.

- Before beginning installation of drain lines establish invert elevation of city storm drains at points where tree drains will tie in and prepare schematic layout for approval of Engineer-in-Charge before digging trench.
- Surplus material resulting from excavations shall be carted to other fill areas within the site. If no additional fill sites are available the Contractor shall remove all surplus material from site and deposit it in a Local Authority approved tip.
- The Contractor shall survey the gradient levels of all trench bases to ensure that all falls are continuous from the highest point down to the outlet point at the sump. These findings shall be submitted to the Engineer-in-Charge for verification before any further work is undertaken, either pipe laying or backfilling.

SPECIFICATIONS : HORTICULTURE WORKS

3.0 SCOPE

- No trees shall be cut but it can be replanted within the campus.
- Bidder shall to follow the concept as shared in the bid document drawings.
- The scope of services covers all horticultural operations and services including, labour, equipment, services and transport for all plant materials, Good earth, top soil conservation, manures, pesticides etc. completing the entire work within the scheduled time, maintaining the entire Softscaping work for Five year after virtual completion of the work.
- The Contractor shall refer to Specifications provided in this document for relating to formation levels, sub-bases, concrete footings, foundations and all associated works. The specifications are to be read along with necessary specifications from other consultants.
- Vendors' shop drawings shall be submitted for all such items where the Contractor will procure and install items from/by a reputed vendor. Execution of all such items shall be done after such drawings are approved by the Client/ Engineer-in-Charge.
- Defects Liability Period (DLP) shall be of one year after completion of Landscape Execution.

3.1 SPECIAL CONDITION

The Contractor will have to provide the following items at no extra cost to Client:

- The Contractor will supply and install 2.0 meters high barricades for safeguarding landscape development area and works, as indicated in the drawing. He may also install

the barricades in the landscape development area according to his own understanding if he feels that any part of the landscape area is bound to be damaged for any reason, after taking prior permission from the Client/ Engineer-in-Charge.

- The Contractor will supply, install and maintain at his own cost, the most modern, automated watering system for the landscape, which will take care of the requirement for particular plants, save water and does not waste water, including any requirements specified by the Engineer-in-Charge appointed by contractor. He will give full details of the layout, size of the pipe, size of the sprinklers, bubblers, etc. and their warranty period. All equipment must conform to international standards and / or Indian Standards if available. The design of the irrigation system has to be approved by Client/ Engineer-in-Charge.
- All equipment required for development shall be made available by Contractor, and its maintenance shall be his responsibility. This includes Tagara, Phawdas, Hose Pipes, Ground Roller, Manual and/or Electric lawn Mowers, Sprinklers, etc.
- Contractor will ensure that all plants remain free of diseases, pests, etc. during development and maintenance periods. The contractor shall, without any additional charge renew any dead or defective plant material and shall fully maintain including watering, de-weeding etc. of the whole landscape as mentioned above.
- Contractor shall follow pre construction and during construction soil erosion control measures as per the NBC Part 10, section 1, Chapter 4 – Protection of Landscape during Construction.
- The contractor in co-ordination with the Client as applicable shall ensure conservation and storage of top soil: Topsoil shall be stripped to a depth of 200 mm from areas proposed to be occupied by buildings, roads, paved areas and external services. It shall be stockpiled to a height of 400 mm in designated areas and shall be re-applied to site during plantation of the proposed vegetation. Topsoil shall be separated from sub-soil debris and stones larger than 50 mm diameter. The stored topsoil may be used as finished grade for planting areas. It is the landscape contractor's responsibility to conserve top soil that is not disturbed by the civil contractor.

(a) The Contractor shall:

- Furnish the source of top soil to Client/ Engineer-in-Charge.

- Contractor to carry out a detail soil report, providing soil details such as pH, alkalinity, total soluble salts, porosity, sodium content and organic matter and submit the same to Engineer in charge for approval.
- Use the restored soil at site for landscape purpose, manure mixture, Neemcake, weedicide shall be added if required.
- Not consider any external soil source unless the existing soil conserved from site is lacking in quality and/or quantity.

Soil Analysis for Top Soil fertility determination

- To determine the fertility of top soil for conservation, soil investigation shall be carried out by an NABL accredited laboratory.
- Adequate number of test samples of soil from a depth of 10-200mm below ground level shall be collected from at least 5 representative locations from site, preserved and transported (as per standard procedures specified by the laboratory) carefully to the laboratory for carrying out necessary tests.
- All relevant Indian Standards for sampling and conducting laboratory tests shall be followed.
- This soil samples shall be analysed to determine soil type, texture, total organic content, pH, extractable nutrients such as nitrogen, phosphorus, potassium, salinity, cation exchange capacity, % base saturation and extractable heavy metals.
- The soil analysis report from the laboratory shall also include a statement on the fertility and suitability of the soil for plant growth based on the analysis, in addition to the test results.

Top Soil conservation

- Topsoil shall be removed for conservation to a depth of 200 mm (not more than 400 mm) and shall be separated from subsoil debris and stones larger than 50 mm diameter.
- It shall be stockpiled to a height of 400 mm in designated areas. The stockpiled topsoil shall be protected from erosion during storage by installing earthen berms/solid walls, temporary seeding (using native grass), covering with mulch or plastic, etc.
- The topsoil shall be protected with sand bags/solid walled enclosures (2 feet high) on all sides for containment.

- Appropriate drainage channels shall be dug around the storage area to prevent flooding of the top soil storage area.
- The top soil shall be reapplied to site during plantation of the proposed vegetation as finished grade for planting areas.
- Seeding will take place immediately after re-spreading topsoil and de-compacting, unless timing is inappropriate (for e.g., not in mid-summer).

(b) The contractor to identify erosion prone areas on site and protect them from construction activities throughout the construction period. Prevent / mitigate the disturbances caused to site due to construction activity.

(c) The contractor shall execute a sedimentation and erosion control plan that conforms to the best management practices highlighted in the National Building Codes of India (NBC) Part 10, section 1, Chapter 4 – Protection of Landscape during Construction. This standard describes two types of measures that can be used to control sedimentation and erosion. Stabilization measures include temporary seeding, permanent seeding and mulching. Structural control measures include earth dikes, silt fence, sediment trap, and sediment basin. All of these measures are intended to stabilize the soil to prevent erosion.

(d) The erosion and sedimentation control plan must be approved by Client/ Engineer-in-Charge and the erosion sedimentation control plan must be maintained throughout the execution period.

(e) The contractor shall execute measures of protection and preservation of existing landscape on site during entire construction time.

(f) Design, execute and maintain a temporary storm water management layout for the duration of construction activity. The storm water management layout should conform to National Building Codes of India (NBC) Part 10, section 1, chapter 4 – Protection of Landscape during Construction.

Contractor should take measures to prevent entry of any soluble/ insoluble construction waste to enter the water table/ water ways/ ravines on site.

3.2 SPECIFICATIONS- PLANTATION WORK

(a) Provision of Site Utilities

The Contractor is to allow for the provision at his own cost of all site utilities for the duration of the contract including but not limited to water, electricity and telephone.

(b) Landscape Development Technique

- The contractor will not be allowed to use different techniques or quality criteria or materials unless his alternative system has been confirmed in writing by the Client/Clients representative.
- No cost increases for alternative specifications will be entertained unless formally submitted in writing as an improvement in the quality of a product and accepted in writing, following Client/Engineer-in-Charge approval, by the Client/Clients representative.

(c) Quality of Workmanship and Materials

- All materials and workmanship shall be of the high standards and quality demanded by this specification. Sub-standard work and materials identified by the Client/Engineer-in-Charge will be rejected and will be required to be rebuilt or replaced at the Contractor's costs.
- All plant material shall be of the genus, species and variety specified and substitutions will not be permitted unless authorized in writing by the Client/Engineer-in-Charge. The sizes and plant description set out in the section headed Plant Material.
- All trees and shrubs supplied for the contract shall be free of pest, disease, discolouration and damage. Plants shall be well branched with vigorous shoots. The root system of each plant shall contain a good proportion of fibrous roots.
- All materials are to be approved by the Client/Engineer-in-Charge prior to use on site. Materials shall be obtained from approved sources/manufacturers and/or suppliers. All guarantees and warranties shall be copied and submitted to the Client/Engineer-in-Charge prior to requests for approval.
- Where particular products are specified, the Main contractor's specialists subcontractors if he wishes to use similar products from other manufacturers must seek prior confirmation from the Client/Engineer-in-Charge.

(d) Site Responsibilities

- From the commencement of the works until the Certificate of virtual Completion has been issued by the Client/Engineer-in-Charge, the Main contractors specialists subcontractors shall, in respect of all areas of soft landscape works, adjacent areas and parts of the site used by him, be responsible as follows:
- For adequate protection to grassed areas, planted areas and trees and for making good Softscape works on removal of any protective measures at completion.
- For any damage to existing works and features and any necessary rectification work required to obtain approval from Client/Engineer-in-Charge.
- For keeping all paved surfaces used by him in a clean and tidy condition.
- For periodic removal of all surplus excavations and waste matter produced by his operations to a Local Authority registered tip off site, to be found by the Main contractors specialists subcontractors.
- For keeping all Softscape areas in a weed-free and tidy condition and adequately watered.
- The Main contractor's specialist subcontractors shall make appropriate allowance for these requirements in his rates.
- The Main contractor's specialist subcontractors shall, within 24 hours of notification and as directed by the Client/Engineer-in-Charge, undertake at his own expense any remedial works arising from the stated requirements.

(e) Tree conservation:

- All trees to be conserved shall be protected with a 3-4 foot high enclosure constructed using brick/fencing (with an access gate for tree maintenance) .
- This tree enclosure shall be erected before demolition, grading, or construction begins and remain until final inspection of the project. A 'Warning" sign of size 8.5"x 11" shall be prominently displayed on each protective enclosure to state the following:
- The following activities are prohibited within and in the vicinity of the tree protection zone throughout the entire duration of the construction project:

- Cutting of tree roots by utility trenching, foundation digging, placement of curbs and trenches, or other miscellaneous excavations soil disturbance or grade change drainage changes storage of material, topsoil, vehicles, or equipment .
- Activity including but not limited to compaction, grading, construction etc.
- Dumping of any material including but not limited to paint, petroleum products, concrete, mortar, dirty water, waste use of the tree trunks as a backstop, support or anchorage as a temporary power pole, signpost or other similar function .
- The following activities are permitted or required within the Tree Protective Zone with approval from Engineer-in-Charge:
- Mulching with wood chips (unpainted/untreated) or approved material to a four to six inch depth, leaving the trunk clear of mulch to prevent inadvertent soil compaction and moisture loss.
- Irrigation, Aeration, fertilization indicated by Engineer-in-Charge for the healthy growth/maintenance of the tree if tree is adjacent to or in the immediate proximity to a grade slope of 8% or more, e erosion control measures shall be installed outside the Tree Protection Zone to prevent siltation and/or erosion within the zone.

(f) Plant Protection

- All plant material is to be carefully protected and if necessary wrapped in the nursery during lifting, awaiting transportation, during transportation, unloading and during storage on site.
- Any evidence of unsatisfactory protection to roots, stems, branches and leaves will result in plants being rejected.
- Unprotected plants must not be transported during very hot weather, and all plants must be kept moist during transportation and storage. No plant material shall be left on site unplanted for more than two days.

(g) Work by Machine or Hand

- All operations herein described shall be carried out by suitable approved machines or by hand.

- Any work around the base of existing trees, in confined spaces or which is impractical to carry out by machine for any reason shall executed by hand and the contractor shall include for this in his rates.

(h) Notice of Intentions

- The contractor shall give forty-eight hours written notice to the Client/Engineer-in-Charge of his intention to commence any of the following operations:
- Setting out, Planting, Top soiling, Turfing, Sprigging, Maintenance visits, etc.

(i) Heavy Machinery

- Heavy machinery, which would excessively consolidate the sub-soil, shall not be used during any operations nor shall heavy machinery be taken over areas prepared for planting or grassing.

(j) Substitutions

- If the Main contractor's specialist subcontractor is unable to supply a particular species of plant he is to notify the Client/Engineer-in-Charge in advance of his intention to make a substitution. No substitution will be allowed without prior written agreement of the Client/Engineer-in-Charge.
- Notices of substitutions are to be made sufficiently for in advance of installation to ensure that the substituted material conforms to specifications. Substitutions requested by the Main contractor's specialist subcontractor after work has started on site will not be entertained.

(k) Setting Out

- The Contractor shall be responsible for accurately setting out all the works prior to the commencement of the works and shall rectify errors in setting out at his own expense.
- Any discrepancy in site area between that shown on the drawings by Engineer-in-Charge appointed by contractor and the actual area on the ground shall be notified to the Client/ Engineer-in-Charge.
- The Contractor shall supply all necessary materials, equipment and labour to enable the Engineer-in-Charge to check the setting out, levels and dimensions on the site along with the Client/ Engineer-in-Charge.

(l) Tools and Equipment

- The Contractor shall use proper tools and equipment for the carrying out of the works and is to ensure that the work force is fully and properly equipped with the correct equipment and experience for the job at hand.

(m) Failures of Plants (Pre-practical completion)

- Any trees, grass or other plants (other than those found to be missing or not in accordance with the Contract Documents as a result of theft or malicious damage and which shall be replaced), which are dead, dying, missing or found not to be have been in accordance with the Contract Documents at practical completion of the Works shall be replaced by the Contractor entirely at his own cost unless the Contract Administrator shall otherwise instruct.
- The Contract Administrator shall certify the dates when in his opinion the Contractor's obligations under this clause have been discharged.

(n) Plants Defects Liability and Post Practical Completion Care by Contractor

- Any grass which is found to be defective within 12 months, any shrubs, ordinary nursery stock trees or other plants found to be defective within 12 months and any semi-mature, advanced or extra-large nursery stock trees found to be defective within 12 months of the date of virtual completion due to materials or workmanship not in accordance with the Contract Documents shall be replaced by the Contractor entirely at his own cost unless the Contract Administrator shall otherwise instruct.
- The Contract Administrator shall certify the dates when in his opinion the Contractor's obligations under this clause have been discharged.
- Malicious Damage or Theft (Before Practical Completion): All loss or damage arising from any theft or malicious damage prior to practical completion shall be made good by the Contractor at his own expense.

(o) Submittals

- The Contractor shall submit for review drawings by Engineer-in-Charge appointed by contractor completely dimensioned, indicating any pattern layouts, special installation procedure, cutting, fitting, sinking and adjacent equipment materials for coordination.
- The Contractor shall submit samples of all materials and samples of workmanship for approval by Client/Engineer-in-Charge.
- The Contractor shall be responsible for producing and submitting for comment and approval to the Client/Engineer-in-Charge the shop drawings and samples of all elements indicated in this section. All should be based on the drawings provided by Engineer-in-Charge appointed by contractor. All submissions should be reviewed, approved and endorsed by the Contractor.

(p) Handling, Storage And Delivery

The Contractor shall:

- Coordinate delivery with suppliers, to minimize handling.
- Handle and store equipment and materials in such a manner that no damage will be done to the materials or the work of other trades.
- Store packaged materials, undamaged in their original wrappings, or containers with manufacturer's labels and seals intact.
- Stack equipment and materials on wooden platforms at least 150mm clear of the ground and protect with weatherproof covers.
- Damaged equipment, material or works will be rejected by the Client/Engineer-in-Charge whether built-in or not.
- For equipment, materials and work, covering shall be of suitable material containing nothing that may injure or stain the materials.

(q) Protection of Work

- The Contractor shall protect all equipment, materials and completed work from damage until final completion of the work.
- The Contractor shall remove and replace damaged work at no extra cost.

(r) Reference Standards

- The Contractor shall comply with all relevant Indian Standards, ASTM, NBC, British Standard Code of Practice, Draft BS or DIN Standard applicable to elements indicated in this section, the recommendations and requirements of such documents shall be considered a minimum standard of such work described and must be complied with.
- Nothing shall relieve the Contractor of his responsibility for providing a higher standard than the relevant Code or Standard where it is required to comply with other sections of the Specification.

3.3 PLANT MATERIALS AND PLANTING OPERATIONS

- The following plant descriptions cover the different categories of plant material to be used on the site. These descriptions and their accompanying drawings requirements must be studied carefully and adhered to.
- Plants that do not reach the specified dimension or quality, characteristics in this section or in the sizes and descriptions set out in the Bill of Quantities will be rejected and will have to be replaced at the Contractor's cost.
- Trees and palms and large feature plants that are growing in open ground are to be prepared for transplanting at least 2 months before moving, either to containers in the nursery or direct to the site. Preparation of in-ground trees and palms shall be by root pruning to the stated rootball dimensions.
- Trenching around the outer edge of the rootball using pruning and a sharp spade shall be done in four separate stages trenching in quarters, with one quarter of the tree roots being cut and backfilled each week, the next quarter the following week, with all of the ball being cut in one month.
- If roots over 25mm are encountered these are to be cleanly cut with large secateurs or pruning saw.
- For trees and palms that are to be containerised or root wrapped, the lifting and placing in containers or being wrapped is to be done immediately after the root trenching operation is complete.

- Rootballs are to be wrapped and tied with Gunny sack or hessian sacking if not containerised.
- Exposed trunks are to be wrapped in rice straw including the lower parts of the branch system.
- Damaged trees will automatically be rejected on arrival at site.
- All trees and palms are to be purchased, stored and grown on in suitable nursery conditions within one month of the contract and made ready for direction by the Engineer-in-Charge appointed by Contractor.
- Failure to procure within this time and to reveal the source of supply and location will result in the Client/Engineer-in-Charge sourcing the plant materials for the Contractor, and the cost of this sourcing operation will be deducted from the Contractor's payments.
- All dimensions shown with tolerances (that is 120 - 150mm) refer to maximum and minimum dimensions that will be accepted. Measurement of all plants of one species shall, as a minimum, average between the upper and lower figures (that is in the above case 135mm).
- All trees and palms specified for containerising or root wrapping after root pruning operations are to be well furnished with leaves over the crown of the tree. Thinning of leaves to reduce transpiration to give a 50% cover is permissible providing due notification is given that thinning is required to ensure that the trees can be inspected before thinning work is done. Bare crowned trees will not be permitted.

3.3.1 TREES

- These are nursery grown trees pruned during growth to produce a tight well rounded head, and a straight stem clear of leaves or twigs.
- Trees shall have a clear straight stem of minimum 1.5mm.
- The head shall be well balanced and rounded and contain at least four main branches with a well-developed secondary branch system and a defined central leader that has not been pruned at the time of planting.
- Pruning at the time of removal from the nursery will not be permitted.
- In dry weather conditions, trees are to be sprayed with approved Anti-transparent.

- Rootball dimensions: diameter 500mm (1.6") x 300mm (1') deep minimum. Branching/leaf spread shall be of 1.5 - 1.8m diameter.

3.4 PLANTING TECHNIQUES AND ACCESSORIES

- All plants shall be planted to accommodate the spreading root system of the plant to the same soil depth as in the nursery and shall be well watered before removing them from containers. Plants are to be positioned upright and the soil firmed around the roots.
- Planting shall be carried out in accordance with the schedule of plants and drawings supplied by Engineer-in-Charge appointed by contractor. The number of each species and variety shall be evenly distributed over the area as indicated on the drawings by Engineer-in-Charge appointed by contractor.
- For large areas the outer rows are to be set out first to ensure the correct shape to the bed is established. The remaining plants are then to be evenly distributed to cover the planting area. The Engineer-in-Charge is to be notified in advance if there are too many or too few plants to fill the area required and an assessment of setting out adjustments will be directed accordingly.
- Setting out of plants is to be completed and approved by Engineer-in-Charge appointed by contractor before planting into the soil bed can commence.

3.4.1 STAKING AND SUPPORTS

Stakes shall always be used when planting instant trees, standards and single stem palms and for tall shrubs when directed by the Engineer-in-Charge appointed by Contractor.

Stakes shall be in sawn timber of an approved type and be carried out according to the size of plant to be supported. The types of approved staking methods are:

(a) Tripod or Quadro pod staking for large trees or palms

- Three or four stakes each 50 x 50mm section shall be positioned equidistantly around the tree and firmly driven into the ground at angles of between 30 - 40 degrees.
- The inner ends of the stakes shall extend beyond the tree stem by not more than 150mm and shall not be higher than 300mm below the lowest branch.
- The tree stem shall be wrapped in hessian or gunny sacking at the point where the tree stakes are to be fastened in order to prevent bark damage.

- The stakes shall be neatly and firmly fastened to the tree stem using rubber hose or cord; String are not be used.
- The stakes are to be adjusted and the position of the protective wrapping is to be altered up or down every month.
- The hessian wrapping is to be sprayed with an approved horticultural pesticide.

(b) Climber wires

- Wires for training climbing plants against walls shall be approved lightweight PVC mesh, fixed at 600mm intervals to screw eyes supplied under the sub contract.
- Maximum mesh coverage shall be 180mm high x 240mm wide.
- The climbing plants shall be trained through the wire mesh with the shoots directed upwards and tied.

3.4.2 TURFING: FINE TURF

- Fine Turf shall consist of fine bladed rhizomatous grass such as Bermuda grass or cultivar specified by Engineer-in-Charge appointed by the Contractor.
- Fine Turf shall be a live grass sod or mat at least 300mm square with a well-developed root system growing in a minimum of 25mm soil bed, free from stones or extraneous roots, cut mechanically or by hand to give an even thickness and texture.
- A sample of one square meter of Fine Turf or both types shall be submitted to the Client/Engineer-in-Charge for approval before fine Turf is brought in for use on site. The source of the material shall be stated by the Contractor.
- Fine Turf shall be free from weeds, fungus, pest or disease and contaminants or pollutants. Fine Turf sods shall be kept moist and in shade and shall be planted within 24 hours after lifting.

(a) Fine Turfing Operations

- Subsoil mix shall be hand raked to provide an even and fine tilth to an even and accurate level matching kerb edge levels. Any lumps or stones over 25mm in diameter brought up in this operation shall be removed from site.

- Soil areas shall be lightly sprinkled with water to moisten surface in dry weather before laying turf. Pre-Turfing fertiliser shall be applied to all areas to be turfed prior to turfing at the rate of 40gm per square meter evenly spread over the whole area and lightly worked into the soil. The turves shall be laid on the prepared soil bed and firmed into position in consecutive rows with broken joints, closely butted and to the correct levels. The turf shall be laid off planks working over turves previously laid.
- Where necessary, the turves shall be lightly and evenly firmed with wooden beaters, the bottom of the beaters being frequently scraped clean of accumulated soil and mud.
- A dressing of finely sifted topsoil/sand/compost mix shall be applied and well brushed into the joints to give an overall even surface.
- Watering shall take place over the area that has been turfed immediately after planting. Watering shall be undertaken by use of a fine spray to avoid disturbance of soil particles.
- Fine turfing shall only be accepted as complete when new growth has caused turves to knit together and adhere by rooting to the soil bed. Any areas not covered by green healthy grass to the satisfaction of the Engineer-in-Charge within 28 days after fine turfing shall be re-laid as specified at the Contractor's own expense.
- If shrinkage occurs or the joints open, finely sifted topsoil/ sand/ compost mix shall be brushed into the gaps and shall be watered in.
- Any inequalities in finished levels owing to variation in turf thickness or uneven consolidation of soil shall be adjusted by lifting turves and by re-spreading fine soil mix to correct levels and relaying turves as specified.
- The finished level of the Fine Turf shall be 25mm above adjoining paved surfaces or other hard edges after allowing for final settlement.
- Turf edges and margins shall be laid with whole turves and uneven edges trimmed to give an even line.

(b) Maintenance of Fine Turfing before Completion

- Watering shall be carried out as often as necessary before completion to allow a satisfactory green sward to develop over the whole fine turfed area.
- Cutting before completion shall be carried out as necessary to keep the grass to a maximum height of 25mm.

- One extra fertilizer application is to be allowed for before completion, to be used if directed by the Engineer-in-Charge appointed by Contractor.
- Completed fine turfed areas are to be kept in a weed free inset free, fungus free and tidy condition until completion (that is start of maintenance period).
- Edge cutting shall be carried out as required along edges of paths, plant beds or other junctions with other materials. Only sharp edge cutting tools are to be used for this operation.
- Over cutting or ragged edges will require the relaying of the turf edge strip as specified (that is 300mm wide).

(c) Specification for Sourcing of Turf Types

Fine Turf is to be specially prepared horticultural turf, re-lawn or turf-carpet, mechanically cut to specified tolerances.

3.4.3 SLOPE RETENTION WORK WITH COIR MAT TURFING

(a) Site Preparation

- Sub-grade shall be excavated to proper lines and grades based on construction plans.
- The sub-grade shall be fairly smooth and free of sharp objects and debris that may damage the Coir Mat. The soils should be proof rolled prior to Coir Mat and backfill placement.
- The soils should be compacted to 95 Percent of the relative density based on the Site Engineer's recommendations.
- Above the compacted soil, Top soil mix 'A' to be laid upto 150 mm thick layer for planting turf. Coir mat to be laid first and then planting operation should take place.

(b) Laying of Coir Mat

- Coir Mat should be placed in correct orientation as shown on the construction plans and approved by the Engineer.
- The Contractor should verify the orientation. The orientation of the Coir Mat should be such that it is rolled in the direction of the slope – not perpendicular to it.
- The Coir Mat should be cut to length based on construction plans using an Engineer approved cutting tool.

- Each sheet of Coir Mat should be pulled taut by hand to get rid of any wrinkles.
- Adjacent sheets should be overlapped for minimum width of 0.30 M.
- Each sheet may be secured in place using staples, pins, sandbags, backfill, or by other Engineer approved methods to help prevent disruption during the installation of adjacent sheets
- Turfing should be done as per procedures mentioned above once Coir mat is installed.

3.4.4 WATERING OF ALL PLANTS

- After planting all plants are to be thoroughly watered to soak the ground all around the rootball.
- After watering and the water has percolated away leaving e surface relatively dry the soil is to be lightly cultivated to give an even soil tilth.

3.4.5 MULCHING

- After completion of planting and watering and light cultivation operations a 50mm deep layer of approved mulch shall be spread and forked in overall cultivated planting areas.
- Around each tree and palm and around the base of each climber, additional mulch is to be applied to a 50mm depth to a diameter of 600mm.
- Mulching is to be done within 2 days of completing planting and watering in.

3.4.6 FERTILIZING

After a period of settling in of at least one month, all pit planted materials shall be fertilised with an approved slow release fertiliser at the rate of:

Trees	: 250gm per tree
Shrubs/climbers	: 50gm per plant
Ground Cover/Herbaceous	: 100gm per square meter spread
Rooted Shoots	: around the base of the plants - 40gm per square meter

All fertilised areas are to be watered immediately after fertiliser application.

3.4.7 DISEASE CONTROL

The Contractor shall take all necessary precautions to prevent or eradicate any outbreak of disease or insect attack.

3.4.8 PLANTING INTO TURF AREAS

Where planting is to be carried out in areas of turf, the turf shall be carefully cut to the size of the tree or shrub pit, rolled and stored for re-use, being kept moist and in shade.

After planting is complete stored turf shall be re-laid around the base of the plant.

The Contractor shall replace at his own expense, any turf which is damaged during planting operations.

3.4.9 PROTECTION OF PLANTED AREAS

The contractor shall be responsible for protecting all planted areas.

If it is necessary for the Contractor to erect protective fencing, the Contractor shall be responsible for keeping the fencing in position and in good repair until the end of the maintenance period.

Fencing proposals shall be submitted to the Client/Engineer-in-Charge for approval.

Post and string fences shall not be acceptable.

3.4.10 MAINTENANCE PRIOR TO COMPLETION

After planting and prior to the onset of the maintenance period, the Contractor shall be responsible for carrying out all necessary measures to ensure that the plant material thrives and becomes established and that the landscape areas are kept in a clean and tidy condition.

The Contractor shall allow for carrying out the following maintenance operations when necessary prior to the onset maintenance period.

The Contractor shall be responsible for replacing any plants which fail to survive as a result of inadequate maintenance operations, poor workmanship or poor quality of plant material prior to completion.

The Virtual Completion Certificate will not be issued until all plants scheduled on the Drawings and Schedule of Works is installed in a healthy condition in the manner specified.

3.4.11 IRRIGATION WORK

Scope –

The contractor should have to make the arrangement of irrigation complete in all sense covered all the planting areas.

The irrigation scheme shall be submitted by contractor and get the approval from client/Engineer-In-Charge.

Manual irrigation with hosepipe or irrigation hydrant shall be provided at equal distance (30m) to cover entire landscape areas but not limit to this

The contractor can propose the better scheme which shall be review and approve by client/ Engineer-In-Charge.

Contractor shall have to maintain the entire irrigation system as per the O & M condition and adhere to the defect liability period.

3.5 SPECIFICATIONS: MAINTENANCE WORKS

3.5.1 GENERAL

The Contractor shall maintain the landscape for a Five year period after the date certified by the Engineer-in-Charge that the work has been satisfactorily completed (issue of Certificate of Completion).

The extent of the landscape to be maintained by the Contractor shall be deemed to cover and include all soft landscape areas within the overall project boundaries as shown on the drawings including all existing soft landscape not affected by the contract works and retained intact or nearly so through the end of the contract period as well as all the landscape works covered in the contract scope of works. No additional maintenance charges will be allowed unless specifically agreed to by the Engineer-in-Charge in writing.

- The Contractor shall ensure that a senior qualified supervisor is made available for organizing and running the maintenance programme. The Contractor shall also have available an experience foreman who can supervise the workers on a day-to-day basis. An

adequate trained labour force of at least 3 workers must be available for routine work and they must be on site for at least half a working day, 5 days per week during the maintenance period. Additional grass cutting operators will be needed to ensure adequate cutting and cleaning.

- The Contractor's Supervisor shall inspect the site once per week during the maintenance period and shall prepare a brief schedule of operations required for the coming week. The format for the schedule of operations will cover each distinct areas of the site such as frontage, rear, courtyard, roof, interior, etc. The schedule shall describe the operations the Contractor intends to carry out in the coming week to cover the items listed in the specification and to ensure that the current weather conditions and growing performances, insect attack etc. is taken into account.
- A copy of this schedule is to be submitted to the Engineer-in-Charge and Client every week so that a running record of proposed operations can be checked at the maintenance inspections each month. If in the opinion of the Engineer-in-Charge the maintenance works have not been satisfactorily carried out according to site conditions and the specifications, part of the monthly payment will be withheld until the works have been satisfactorily carried out.
- The contractor shall carry out all necessary measures to ensure that all pot plants, trees and shrubs and other plants shall thrive and become established within this period. All landscape areas will be inspected monthly and lists of remedial works issued after each inspection. All items on the remedial lists are to be carried out by the time of the next inspection, i.e. within one month.
- The Contractor shall keep the landscape areas clean and tidy at all times and dispose of all waste materials arising from the cleaning.
- Fresh water only shall be used for the Works. Water shall be supplied to the Contractor from agreed points on the site. However, it will be only to necessary for the Contractor to supply his own means of transport from the watering points to the plant beds.
- An inspection of watering requirements is to be made by the Contractor at least two times a week in dry weather.

- Water shall be supplied using an approved hose or sprinkler so as not to cause compaction or wash-outs of the soil or loosening of plants. The Contractor shall immediately make good any such damage, soil erosion or outwash and plants loosened by erosion are to replanted or if damaged, replaced.
- All plant beds are to be kept in a weed free condition with a weeding operation once a month. All weeds, stones and rubbish collected from this operation shall be removed from the site to a tip to be found by the Contractor. Herbicides may not be used on this site unless a specific application in writing is made by the Contractor with full back up data on the performance of the chemicals and the particular need for the chemicals use. Approval will in all cases be subject to the Engineer-in-Charge's decision.
- After weeding, at least once per month the soil surface is to be lightly broken up between plants using a pronged fork up to maximum depth of 100mm. Contractor shall Take care not to disturb the root systems of plants. After forking the soil loose, the mulch and loosened soil are to be raked to give an even re-distribution of the mulching materials
- Firming up and adjusting of stakes/ties shall be carried out monthly to ensure that the trees and shrubs are firmly held in the ground. If required guy ropes or tree pits shall be adjusted, tightened or loosened. If tree ties or ropes are rubbing the bark of the trees, the ties are to be taken off and retied. Any damaged branches are to be carefully pruned and the wounds sealed.
- All protective fencing is to be maintained and kept in good condition and in position until the end of the maintenance period.

3.5.2 PRUNING OF TREE

(a) Trees shall be pruned if dead, rotten or crossed branches are present or to maintain a clear stem up to the specified height using the methods described below. Tree pruning is to be reviewed monthly.

Pruning for all plants shall be carried out as follows:

- Pruning is to be done with the cut just above and sloping away from an outward facing health bud.

- Removal of branches is to be done by cutting flush with the adjoining stem and in such a way that no part of the stem is damaged or torn. Ragged edges of bark are to be trimmed with a sharp knife.
- Any cuts or wounds over 25mm diameter are to be painted with an approved sealant after trimmed. All pruning to be cleared up and removed from site after pruning.
- The Contractor shall allow for monthly fertilizer operations during the Maintenance Period. An approved slow release fertilizer shall be applied to each plant at the rate of 50gm per shrub and 200gm per tree, one month after planting and thereafter monthly. After spreading the fertilizer around the base of the plant the granules shall be lightly forked into the soil, and the plant well-watered. Herbaceous and ground cover areas shall receive 25mm of approved soil conditioner, evenly spread and mixed with 50gm/m2 of approved slow release fertilizer, evenly spread over entire area and lightly forked into the soil to break up the top layer, and the area well-watered on a month by month basis.
- The horticultural requirements of different plants or areas may involve variations to those techniques (such as the use of organic liquid fertilizer's for sensitive plants) and variations in method will be authorized as required.
- Heavy feeding plants such as Canna, Heliconia and Lantana shall be dressed with a 25mm mulch of approved organic compost or similar approved compost every 2 months, lightly forked in around the base of the plants.
- Additional mulching layer, 25mm deep to be spread and forked in overall planted areas at 3 monthly intervals.
- The Contractor shall make regular weekly checks to ensure that the plant material is insect and pest and fungus free. No pesticides may be used unless approval from the Engineer-in-Charge is given from the Contractor stating the chemical intended for use; concentration, spraying programme and including full technical details of the product.

3.5.3 MAINTENANCE OF LAWN/GRASS AREAS

- The Contractor shall mow all lawn areas using approved cutting equipment to maintain a close sward to a height of not less than 20mm and not more than 30mm for all grass types.
- Mowing shall be carried out generally weekly, except in dry weather and grass shall not be allowed to flower between cuts.

- Weekly inspections are to be made to ensure adequate planning of grass cuts to suit growth and weather conditions. All clippings to be gathered up and removed from site.
- All grass areas are to be watered by means of sprinklers during dry weather as often as is required to keep the grass green and the soil moist.
- The Contractor shall provide hoses and sprinklers for use from water points provided. Weekly inspections are to be made to determine the need for water and, in dry weather watering must be done to moisten the soil to a depth of 100mm.
- Fertilizer of NPK value 10-15-15 or similar approved be spread at a rate of 40gm/sq m over all grass areas at monthly intervals, using approved spreading equipment to give an overall even spread. Grass areas that have been fertilized shall be watered if no rain falls within 24 hours.
- The Contractor shall apply top-dressing of not more than 15mm depth fine sand and granulated compost raked and spread evenly over the lawn areas. The next top-dressing shall be applied only after the grass has grown through to a mowable height.
- There shall be at least two applications of topdressing during the maintenance period, to be directed by the Engineer-in-Charge appointed by Contractor.
- If depressions or bumps over 25mm deep or high in turf areas during the maintenance period these are to be levelled out by lifting the turf and raising the soil level with sand/compost mix or trimming to level grades, followed by re-turfing.
- Grass areas are to be kept free of weeds, annual grasses, fungus and insect attack and free of stones or other debris throughout the maintenance period as often as is required.
- All chemicals used shall be to the approval of the Client/Engineer-in-Charge. Assessment of these operations is to be prepared on the basis of the weekly maintenance inspection chart.
- If compaction or consolidation takes place or hard passing or baking of the soil occurs, the soil areas are to be well watered first and lightly loosened by mechanical means such as spiking, slitting or hollow tinning using equipment approved by the Client/Engineer-in-Charge.

3.5.4 REPLACEMENT PLANTING

- If during the course of the Maintenance Period trees or shrubs or other plants die because of a fault by the Contractor, the Contractor shall replace the plant at no cost to the Client.
- All questions related to responsibility for the replacement planting will be subject to site inspection and agreement of the appointment of responsibility.
- This will be done very month at the monthly maintenance inspections.

3.5.5 FINAL HANDOVER

- Two weeks before the end of the Maintenance Period a joint inspection shall be held with the Maintenance Agency, Contractor and the Client/Engineer-in-Charge review the requirements for alteration or replacement in order to gain approval for Final Handover.
- In order to ensure satisfactory handover procedures, the site meetings held each month between the Contractor and Client/Engineer-in-Charge will be used to inspect and approve the maintenance works which will be reviewed to ensure adequate work has been done.
- At the time of the final inspection, all areas under this contract shall be free of weeds, neatly cultivated and raked, and all plant boxes in good order.
- Grass shall be neatly cut and all clippings removed. No bare patches of earth shall be visible in turf or planting areas unless specified (that is rings around tree trunks).
- If, after this inspection, the Client/Engineer-in-Charge is of the opinion that all work has been performed in accordance with the drawings and specifications, the Client/Engineer-in-Charge will give written letter of acceptance and completion of the project.
- If, all or certain portions of the work are not acceptable under the terms and intent of the drawings and specifications, the formal maintenance period for all the work shall be extended at no cost to the Client/Engineer-in-Charge until the defects in the work have been corrected and the work is accepted by the Client/Engineer-in-Charge.

3.6 SPECIFICATIONS :LIST OF PLANTS

List of Plants Envisaged For Gardening

Trees

	Albizzia lebbek (Shirish)
	Cassia fistula (Amaltas)
	Delonix regia (Gulmohar)
	Peltophorum species (Radhachura / Copperpod)
	Plumeria alba

This is the limited plant list but not limit to this bidder can use good native plants as per the concept and approved by Client/Engineer-In-Charge.

SPECIFICATIONS : DUSTBINS

4.0 DUSTBINS

The bidder shall to submit the garden furniture like dustbins etc.

Garbage bins (segregated type) colour coded twin bins 60 ltr. or more shall be consider at the distance of 30mt. Quality, make, colour, material shall be approved by the client/ Engineer-In-Charge of all the garden furniture. Bidder shall have to submit the catalogue and detail specification of the furniture and garbage bins.

LIST OF APPROVED MAKES/BRANDS OF MATERIALS

5.0 DETAILS OF MATERIALS / EQUIPMENT & MANUFACTURERS

Details of Materials / Equipment	Manufacturer's Name
Erosion control mats (for slope retention)	Octan Exports Sri Venkateshwara Fibre Udyog Surajbhan Commodities Private Limited Or Approved Equivalent
Plant material	Reputed Nursery or nurseries (Shall be approved by Engineer-in- Charge & Engineer-In-Charge)
Stainless Steel Sections	Salem Steel, Jindal Steel

Anchor Fasteners/ Couplers	Hilti, Canon
Block Board, Ply Wood	Century (3626045), Duro, V.I.Ply, Jyoti Ply
Penetrating Sealer (Aquamix)	Pristine(6405480) Or Approved Equivalent
Polish Protector (Aquamix)	Pristine(6405480) Or Approved Equivalent
Putty	Shalimar Or Approved Equivalent
Fire Sealant	Navair (6491167) Or Approved Equivalent
Paints/Polish	ICI, Berger, Asian
Textured Paint	Spectrum (6836587), Heritage, Asian, Nerolac.
Details of Materials / Equipment	**Manufacturer's Name**
Pigment	Sudershan Chemicals, TATA Pigments
Integral Water Proofing	Pidilite, Polydee, Roff, Or Approved Equivalent
Taps and other accessories	Jaquar, Hindware, Kohler

Note: The contractor shall produce all samples including natural stones, before procurement of the materials, for approval of the Engineer-in-charge

Where more than one manufacturer is listed, the names are given in the order of preference. The contractor shall quote the rates for the various items of work based on the materials of first preference after ascertaining the availability, delivery schedule of the same. Unless the contractor stipulates in this tender, it shall be presumed that the rates quoted are for material of first preference only.

In the event, the contractor is permitted to use the material of lower preference because of valid reasons, then the contract rates for the relevant items of work shall be suitably adjusted on the basis of variation in prices of the materials of first preference and those actually used. If the

prices of the materials used are higher than the material of the first preference, the owner shall not be liable to make any enhanced payment for the affected items of work on this account.

In respect of materials for which approved makes are not specified above, those shall be decided by the Engineer-in-charge as per samples approved.

PART- B

TECHNICAL SPECIFICATIONS

FOR

FOUNTAIN WORKS

TECHNICAL SPECIFICATION FOR FOUNTAIN WORKS

IMPROVEMENT OF THREE PONDS

NEAR MODERN CLUB AND MBB COLLEGE GATE AT SHIVNAGAR

Improvement of Three Ponds by providing peripheral metal railing, pathways, pedestrian bridge, seating arrangements, landscaping, fountains, decorative illumination, area lighting & allied works at Shivnagar (near Modern Club and MBB College Gate) and post completion operation & maintenance for 05 (five) years including Defects Liability period of 01 (one) year.

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TECHNICAL SPECIFICATIONS FOR FOUNTAINS

SCOPE OF WORK

There are three ponds near Modern Club and MBB College Gate at Shivnagar Fountains are proposed in the middle of ponds to aerate ponds' water.

For Pond 1 : It is propose to provide one central Foaming Jet Fountain- 5m high surrounded by 5 numbers of Calyx Aerating Jet Fountain - 3 m high, in form of a circle as shown in Fig 1.

It is propose to provide one Foaming Aerating Jet at centre with a height of around 5 m, surrounded by 5 numbers Calyx Aerating Jet with effect diameter of around 4.5 m and at a PCD of around 8 m.

For Pond 3 : It is propose an array of 5 numbers of Foaming Jet fountain - 5m height water effect along a straight line with a distance of 14m in between each jets as shown in fig.2 each fountain will be provided with four concrete boulders and steel rope. Each fountain will be provided with gate valve . A composite outdoor panel will be provided. Copper earthling wire, cable for pump and light.-

Composite Panel enclosed in Outdoor electrical enclosure for Pump and Lighting for all the six fountains. Panel to have incoming main switch, contactor, overload relays, switch, fuses, etc, all housed in sheet steel paint finish enclosure complete with internal wiring.

ITEM NO 01: AERATING FOUNTAIN

Calyx Aerating Fountain is to aerate, distribute and circulate water in pools, lakes, water bodies etc to improve and maintain water quality.
The Fountain is mounted on an unobtrusive circular float built to international standards in GRP with aluminium sub frame for complete corrosion resistance. The Floats to be enclosed with closed cell foam, which prevents the entry of water even if a float is holed. The floats in circular array will be interlinked by MS link bar. All the floats will be anchored through concrete boulders and steel rope. All the fountains will be provided with gate valves for fine tuning.

Calyx	**:**	1.25m High with 4.5m diameter of water effect.
Canter Jet	**:**	3m High
Pump	**:**	3HP Mono Submersible Pump
Light	**:**	4 Nos of LED Fixed White or Choice of RGB Colours. (Power consumption – 0.084 Kw) White Light – 18W, 12V, and RGB Light – 21W, 12v
Control valves	**:**	Gun metal
Pump set	**:**	3 HP Mono Submersible Pump Set
Cable	**:**	Copper conductor cable for connection between Panel to fountain, length – 30.0 Mtr

ITEM NO 02: FOAMING JET FOUNTAIN

Foaming Jet fountains are designed to throw jet of water at a height of 5m and above.
The Fountain is mounted on an unobtrusive circular float built to international standards in GRP with aluminium sub frame for complete corrosion resistance. The Floats to be enclosed with closed cell foam, which prevents the entry of water even if a float is holed.

Foaming Jet fountains are designed to throw jet of water at a height of 5m and above,

Approx. height of water effects	**:**	5.0 Mtr
Min. depth of water	**:**	1.7 mtr
No. of Circular Float	**:**	1 No
Nozzles	**:**	Aluminium Alloy – Epoxy
Control valves	**:**	Gun metal
Pump set	**:**	3 HP Mono Submersible Pump Set
Cable	**:**	Copper conductor cable for connection between Panel to fountain, length – 30.0 Mtr
Light System	**:**	4 nos LED 21 Watt , RGB Light for each

The floats in circular array will be interlinked by MS link bar. All the floats will be anchored through concrete boulders and steel rope. All the fountains will be provided with gate valves for fine tuning.

ITEM NO 03: PUMP

SUBMERSIBLE MONOBLOC PUMPS

1 SCOPE:

This specification covers the general design, materials, manufacture, shop inspection and testing at manufacturer's works, delivery at site, handling at site, installation, testing, commissioning and carrying out performance test of submersible pumps for water with their accessories.

2 STANDARDS & CODES:

The design, materials, manufacture, inspection, testing and performance of the submersible pumps shall comply with all currently applicable statutes, regulations and safety codes in the locality where equipment is to be installed. The equipment shall also conform to the latest editions of the relevant codes and standards existing as on the date 180 days prior to the deadline for submission of bids, unless otherwise specified. Nothing in this specification shall be construed to relieve the vendor of this responsibility.

3 DESIGN REQUIREMENTS :

Pump shall be submersible monobloc type.

The pump shall be capable of delivering the required flow rate for both continuous and intermittent operations, at the specified operating conditions. The pump shall be designed to have minimum maintenance and easy accessibility to all components.

Flow rate versus head curve shall have stable and continuously rising characteristics towards the shut-off with the highest at shut off. In case of unstable (dropping) characteristics the duty point shall be well away from the unstable region. Besides the actual flow rate versus head curve, curves for minimum and maximum impeller diameters shall also be shown.

Pumps of a particular category shall be identical and shall be suitable for single as well as parallel operation with equal load division at any point in between the maximum and minimum system resistance. Components of identical pumps shall be inter-changeable.

Pumps shall run smooth without undue noise and vibration. Noise level produced individually or collectively shall not exceed 85 dB (A) measured at a distance of 1.0 metres from the source in any direction. The overall vibration level shall be as per zones A and B of ISO 10816-1.

The power rating of the pump driver shall be the larger of the following considering the frequency variation:

(a) The maximum power required from zero discharge to run-out discharge at site climatic condition.
(b) 110% of the power required at any operating point in between the maximum and minimum system resistance curves for any combinations of pumping.
(c) 115% of the power required at the design point.

The critical speed of the pump shall be not less than 130% of the normal operating speed of the pump.

The pump set shall be capable of withstanding the accidental rotation in reverse direction. The direction of rotation shall be clockwise viewed from the drive end.

4 CONSTRUCTION FEATURES

Pump casing shall be of robust construction. The pump suction casing between the pump and motor shall be guarded by a perforated strainer to prevent the entry of any suspended materials in the water.

Closed Impeller shall be equipped with seal rings on their hubs.

The impeller shall be statically and dynamically balanced. Pump bearings shall be water - lubricated and protected against ingress of sand and other suspended particles.

In case of open impeller, the pump shall be designed to take care of the additional thrust produced.

Double Mechanical seals shall be provided to protect the motor from ingress of water along the shaft. The preliminary and secondary seals shall be oil-lubricated with tungsten carbide or silicon-carbide faces and they should be equipped with an electrical monitoring system for seal failure detection.

Motor shall be directly coupled to the pump shaft and shall be a hollow shaft motor with thrust bearings capable of taking thrust load developed by the pump and the dead weight of the shaft and impeller.

In addition to accessories which will listed by vendor in data sheet, any other accessories required for safe and efficient operation of pump shall be provided.

5 INDUCTION MOTOR FOR SUBMERSIBLE PUMPS

The submersible motor shall confirm to IS: 9283:2013.

6 PERFORMANCE AND CHARACTERISTICS

Motors shall be capable of giving rated output without reduction in the expected life span when operated continuously under varying voltage and frequency supply conditions.

Motor shall be of oil-filled or oil-lubricated or water-filled type. Pressure equalising diaphragm and sand guards with seals shall be provided to prevent the outside water and sand entering the motor

The starting current of motor shall not exceed 200% of rated full load current for star/delta starting and 600% of rated full load current for DOL starting, under any circumstances.

Motors shall be suitable for full voltage direct-on-line starting or star-delta starting.

Motors shall be capable of starting and accelerating the load with the applicable method of starting, without exceeding acceptable winding temperatures, when the supply voltage is in the range 85% of the rated motor voltage to maximum permissible voltage.

The locked rotor current of the motor shall not exceed 600% of full load current (subject to tolerance as per the applicable standard).

Motors shall be designed to withstand 120% of rated speed for two minutes without any mechanical damage, in either direction of rotation.

The motor vibrations shall be within the limits specified in applicable standard unless otherwise specified for the driven equipment.

Except as mentioned herein, the guaranteed performances of the motor shall be met with tolerances specified in applicable standard (IS: 9283:2013).

The stator winding shall be made from high conductivity annealed copper conductor; PVC insulated winding wires conforming to IS 8783 for wet type motors. The stator winding shall be of high conductivity annealed copper enamelled insulated wires confirming to IS 4800 for dry type motors.

7 SUBMERSIBLE CABLE

The cable shall be PVC insulated and PVC sheathed, flexible, 3 core flat type. The size of the conductor shall be adequate for continuous use under water service. The submersible cable shall conform to IS 9283. The cable gland shall be properly sealed to prevent entry of pumped liquid into the motor. Suitable cable guards and supporting clamps for cable shall be provided.

The cable shall be terminated above ground level in a local terminal box with facility for terminating cable. The local terminal box with outlets for incoming and outgoing cables shall be in pump vendor’s scope.

The size of the conductor and length of cable should be suitably selected so that the voltage drop at motor terminals does not exceed 3 percent of the rated voltage.

8 EARTHING

Earthing of the motor shall be done in accordance with the relevant provisions of IS: 3043:1987. For fixed installation, earthing connection may be made to discharge pipe clamp.

9 INSULATION

Any joints in the motor insulation such as at coil connections or between slot and end winding sections shall have strength equivalent to that of the slot sections of the coil.
The insulation shall be given tropical and fungicidal treatment for successful operation of the motor in hot, humid and tropical climate. The tropical sing treatment shall be as per the applicable standard.

10 TEMPERATURE RISE

The temperature-rise test of the motor shall be taken with the motor coupled to the suitable pump to give the full load output of the motor. When the various temperatures are stabilized, the set is stopped and the temperature-rise of the stator winding by the resistance method shall not exceed 35°C at rated voltage and 45°C at 85% of the rated voltage. During the test, the temperature of the cooling water may not exceed 45°C. As the cable resistance will also be substantial, it is necessary that while calculating the temperature rise by resistance method, due care is taken to account for the correct hot and cold resistance of windings.

11 CONSTRUCTION FEATURES OF MOTOR

The motor shall be suitable for continuous use in fully or partially submerged condition. A built-in cooling system if required shall be provided to allow the motor to operate continuously at its rated output regardless of whether the electric motor is submerged or not by providing either external or internal cooling arrangement.

12 TESTS AND INSPECTION

Hydro-test pressure on casing shall be 1.5 times maximum discharge head or twice differential head whichever is higher. Maximum discharge head is defined as the sum of the shut-off head and maximum suction head. Unless otherwise stated, the hydrostatic tests on the casing shall be conducted for a minimum duration of 30 minutes.

The pumps shall be tested in accordance with HIS, ISO 9906 and IS 5120, at rated speed at manufacturer's works to measure capacity, total head, efficiency and power. The negative tolerance on efficiency shall be limited to 2.5% and not 5% as indicated in IS 5120. These tests shall form the basis for acceptance of pumps except for vibration and noise. The pumps shall be tested over the range covering from shut-off head to the maximum flow. The duration of the test shall be minimum one (1) hour. Minimum five (5) readings approximately equidistant shall be taken for plotting the performance curves.

After installation, the pumps shall be subjected to testing at site also. If the site performance is found not to meet the requirements regarding vibration and noise as specified. The equipment shall be rectified or replaced by the vendor, at no extra cost to the purchaser.

13 PERFORMANCE GUARANTEE

Performance parameters to be guaranteed by the vendor. Pump or any portion thereof is liable for rejection, if it fails to give any of the guaranteed performance parameters.

14 PENALTY:

If guaranteed efficiencies are not achieved during the test, client shall have the right to reject the pump or right to accept the equipment with lower efficiencies & shall have right to charge penalty for that.

15 DRAWINGS

The following drawings shall be submitted by the BIDDER along with their proposal.

1. Preliminary outline dimensional drawing showing details of pump set, installation details, civil foundation, clearances, minimum submergence, etc.

2. Performance curves for capacity vs total head, efficiency, and input to motor. The capacity range shall be zero flow to run out flow.

3. Typical cross sectional drawing showing constructional details.

16 MATERIALS OF CONSTRUCTION

Unless otherwise specified in Data Sheet, the Material of Construction for the pumps shall be as follows:

Sr. No	Component	Material of construction
1.	Casing	Cast Iron IS:210 Gr. FG 220
2.	Impeller	SS ASTM A351 CF8M
3.	Shaft	SS ASTM A276 TYPE 410
4.	Shaft sleeve	Bronze
5.	Motor body	Cast Iron
6.	Sealing	Mechanical seal

ITEM NO 04: GI PIPE & FITTINGS

All pipes inside the buildings and where specified, outside the building shall be M.S. galvanized steel tubes conforming to IS: 1239 of Class specified. When Class is not specified they shall be Heavy Class. All embedded / concealed pipes shall be of heavy duty.

Fittings shall be of malleable cast iron galvanized, of approved make. Each fitting shall have manufacturer's trade mark stamped on it. Fittings for GI pipes shall include couplings, bends, tees, reducers, nipples, unions, bushes etc. Fittings etc. shall conform to IS: 1879. Pipes and fittings shall be jointed with screwed joints using Teflon tape suitable for water pipes. Care shall be taken to remove burr from the end of the pipe after cutting by a round file. All pipes shall be fixed in accordance with layout and alignment shown on the drawings. Care shall be taken to avoid air pockets. Necessary vents and drains shall be provided at all high and low points respectively. GI pipes inside toilets shall be fixed in wall chases well above the floor. No pipes shall be run inside a sunken floor as far as possible. Pipes may be run under the ceiling or floors and other areas as shown on drawings. All pipe joints after testing of the line shall be seal welded and the weld plus the adjoining portion shall be given two coats of zinc rich primer.

I. Bib cocks and stop cocks

All bib cocks and stop cocks shall be of C.P. brass conforming to IS: 781 of tested quality and approved make and design, of diameter as specified in schedule of quantities.

II. Clamps

GI pipes in shafts and other locations shall be supported by GI clamps of design approved by the Engineer-in-charge. Pipes in wall chases shall be anchored by iron hooks. Pipes in shafts shall be supported on slotted angles/ channels as specified/ as directed.

III. Unions

Contractor shall provide adequate number of unions on all pipes to enable easy dismantling later when required. Unions shall be provided near each gunmetal valve, stop cock or check valve and on straight runs as necessary at appropriate locations as required for easy dismantling and/ or as directed by the Engineer-in-charge.

IV. Flanges

Flanged connections shall be provided on pipes as required for maintenance/ ease in dismantling or where shown on the drawings, all equipment connections as necessary and required or as directed by the Engineer-in-charge. Connections shall be made by the correct number and size of the GI nuts/ bolts as per relevant IS Standards and made with 3mm thick insertion rubber washer/gasket. Where hot water or steam connections are made insertion gasket shall be of suitable high temperature grade and quality approved by the Engineer-in-charge. Bolt hole dia for flanges shall conform to match the specification for CI sluice valve as per IS: 780. Gaskets shall conform to IS: 11149.

V. Trenches

All GI pipes below ground shall be laid in trenches with a minimum cover of 600mm. The width and depth of the trenches shall be as follows except at places where welding/ jointing etc. needs larger width of trench. Additional width/ depth shall be provided as necessary for welding/ jointing etc. at no additional cost:

Diameter of pipe	Width of trench	Depth of trench
15mm to 50mm	300mm	750mm
65mm to 100mm	450mm	1000mm

VI. Sand filling

GI pipes in trenches shall be protected with fine sand 150mm all around before filling in the trenches.

VII. Painting

All pipes above ground shall be painted with one coat of red lead and two coats of synthetic enamel paint of approved shade and quality to give an even shade, or as specified by the Engineer-in-charge.

VIII. Pipe protection

Where specified, pipes below floor or below ground shall be protected against corrosion by the application of two or more coats of solvent based rubberised asphaltic primer to give a uniform coat covered with 'Pipe coat Hiper', a puncture resistant non woven polyester mat. The application of pipe coat primer and "Hiper" membrane shall be as specified by the manufacturer.

ITEM NO 05: SLUICE / GATES VALVES

Sluice valve shall generally confirm to IS 14846.

Sluice valves shall be of non-rising spindle type. The valve shall be furnished with a bushing arrangement for replacement of packing without leakage.

The sluice valves shall bear I.S.I. mark on them. The pressure drop across valve shall be limited to 0.05 mwc. All valve flanges shall be designed to withstand the stresses to which they will be subjected under hydraulic tests.

The valves shall be designed so as to minimize erosion, cavitations and vibration in all positions and to minimize head loss in fully open position. Valve bodies or bonnets shall enable the wedge to be withdrawn well clear of the stream.

The dimensions of all the components of valves shall be conforming to IS: 14846. The type and make of all bearings shall be indicated on the drawings and necessary arrangements for lubrication shall be provided. Valves shall have two position marked at the shut end of the scale, first one corresponding to the position of the gate tangential to the bore of the seating and the second position below the first, corresponding to the position of the gate as it sits on the seating after moving a further distance equal to the depth of the seating.

All valves, spindles and hand wheels shall be positioned to give good access for operational personnel. All the hand wheels shall be arranged to turn in a clockwise direction to close the valve. The direction of rotation for opening and closing of the valve shall be indicated on the hand wheels. All Sluice valves shall be open end tested.

Each valve shall bear on their bodies as cast indications in raised letters showing

1. Size of Valve
2. Year of Manufacture
3. Manufacturer's Name
4. Pressure rating
5. Heat Number
6. Valve Operating & Closing direction on hand wheel.
7. The serial number of valves shall be punched on the flanges distinctly and legibly on both side flanges of valve.

One spare spindle and nut shall be supplied. Spares supplied shall be new, unused and interchangeable with the corresponding components they are intended to replace.

The material of construction of valve shall be as follows :

Item	PN 16 Valves

Body, Door, Dome, stuffing box, gland, handwheel, gear box cover and casing.	Cast Iron IS 210 Grade FG260
Wedge	Cast Iron IS 210 Grade FG260 Rubber lined with EPDM
Seat, Face ring	IS :318 Gr.LTB 2
Spindle / Stem	SS: IS 6603 04 Cr17 Ni 12 M0 2 / AISI 316
Bonnet Gasket	EPDM
Internal Fasteners	Stainless steel SS316
Nuts, bolts & washers for pipe flanges	High tensile steel Hot dip galvanized
Spur gear	IS: 1865 Grade 600/2
Pinion with shaft.	BS 970 EN-19
Wedge nut, channel and shoe sections.	High tensile brass IS: 320 Alloy-2

ITEM NO 06: LIGHTS

LED Light Bodies (12V, 21W for RGB)

Waterproof luminaries with array of high output of LEDs housed in compact enclosure (IP 68) of stainless steel body. Toughened glass with elastomer seal. Special plastic cable gland compact socket head fasteners and mounting bracket are all of stainless steel.

Material of construction for light bodies

Light body and cover ring : Stainless Steel

Fasteners : ANSI 304 Standard Stainless Steel

Gasket	:	Elastomer – silicone rubber
Cable Gland	:	Polymide
Mounting bracket	:	Stainless Steel

DATA SHEETS

SUBMERSIBLE MONOBLOC PUMPSET

Sr. No	Item	Unit	Bidder to indicate
1.	Designation	-	
2.	Number offered	-	
3.	Tag numbers	-	
4.	Pump make and model number	-	
5.	Type of pump	-	
6.	Design capacity	m3/hr	
7.	Total head	MLC	
8.	Shut- off head	MLC	
9.	Hydrostatic test pressure	Kg/cm2(g)	

10.	Efficiency at duty point	%	
11.	NPSH required	MLC	
12.	Pump speed	RPM	
13.	Pump bkw	kW	
14.	Minimum continuous flow	m3/hr	
15.	Maximum allowable size of solids	mm	
16.	Installation	-	
17.	Method of lubrication	-	
18.	Type of impeller	-	
19.	Type of coupling	-	
20.	Type and make of seal	-	
21.	Type and make of bearing	-	
22.	Discharge pipe orientation	-	
23.	Suction nozzle size	-	
24.	Discharge nozzle size	-	
25.	Power input to motor at duty point	kW	
26.	Motor make and model number	-	
27.	Motor type	-	

28.	Motor rating	kW	
29.	Motor speed	RPM	
30.	Motor efficiency	%	
31.	Class of insulation	-	
32.	Starting current	A	
33.	Degree of protection		
34.	Cable size	C x mm2	
35.	Weight of pump, driver and cables	Kg	
36.	Accessories	-	
37.	Performance guarantee		
37.1	Capacity	m3/hr	
37.2	Differential head	MLC	
37.3	Power consumption	kW	

SLUICE / GATE VALVES

Sr. No.	Particulars	Unit	Bidders Data
1.0	**General**		
1.1	Make	-	
1.2	Type	-	
1.3	Model	-	

Sr. No.	Particulars	Unit	Bidders Data
1.4	Rating of Valve	-	
1.5	Manufacturing Standard	-	
1.6	Sizes	mm	
1.7	Quantity	Nos	
2.0	**Material of Construction**		
2.1	Body	-	
2.2	Door	-	
2.3	Dome	-	
2.4	Stuffing box	-	
2.5	Gland	-	
2.6	Handwheel	-	
2.7	Wedge	-	
2.8	Seat, Face ring	-	
2.9	Spindle / Stem	-	
2.10	Bonnet Gasket	-	
2.11	Internal Fasteners	-	
2.12	Nuts, bolts & washers	-	
2.13	Spur gear	-	
2.14	Pinion with shaft	-	
2.15	Wedge nut, channel and shoe sections.	-	
3.0	**Testing**		

Sr. No.	Particulars	Unit	Bidders Data
3.1	Body test pressure	Kg/cm2	
3.2	Seat test pressure	Kg/cm2	

PREFERRED VENDOR LIST

SL NO	Equipment	Manufacturer
1.	Submersible monobloc pumps	Kirloskar
		Crompton
		Laxmi
2.	Sluice Valves	Leader valves Ltd
		Hawa valves
		Durga Engineering Company
3	Fountain	Premierworld
		IFL India
		Deep & Deep Industries

PART – C

TECHNICAL SPECIFICATION

FOR

CIVIL WORKS

TECHNICAL SPECIFICATION FOR CIVIL WORKS

IMPROVEMENT OF THREE PONDS

NEAR MODERN CLUB AND MBB COLLEGE GATE AT SHIVNAGAR

Improvement of Three Ponds by providing peripheral metal railing, pathways, pedestrian bridge, seating arrangements, landscaping, fountains, decorative illumination, area lighting & allied works at Shivnagar (near Modern Club and MBB College Gate) and post completion operation & maintenance for 05 (five) years including Defects Liability period of 01 (one) year.

GENERAL

The Technical Specification is based on IS standards. However, in case there is a conflict in between this specification and IS Standards, the recommendation of IS standard shall prevail.

In case this specification remain silent on any specific case, the IS Standard / Tripura PWD specification may be followed. However, in both the cases the issue shall be brought to the notice of the Engineer-in-charge.

1.0 TECHNICAL SPECIFICATIONS

1.1 EARTHWORK

1.1.1 SCOPE OF WORK

The work covered by this section of the specifications consists of furnishing all plant, labor, equipment, appliances and materials and in performing all operations in connection with earthworks of all underground supplies and services and for all structural units, of specifications and applicable drawings, and subject to terms and conditions of the contract. The scope of this section of specifications is also covered with detailed specifications as laid down herein.

1.1.2 GENERAL

The Contractor shall acquaint himself with the nature of the ground, existing structures, foundations and subsoil which might be encountered during excavation of earthworks. The Employer does not guarantee or warrant in any way that the material to be found in the excavation will be similar in nature to that of any samples which may have been exhibited or indicated in the report, drawings or in any other contract documents or to material obtained from boring or trail holes. The contractor shall be deemed to have made local and independent inquiries and shall take the whole risk of the nature of the ground subsoil or material to be excavated or penetrated and the Contractor shall not be entitled to receive any extra or additional payment nor to be relieved from any of his obligations by reasons of the nature of such ground subsoil or material.

All excavations, cutting, and fills shall be constructed to the lines, levels and gradients specified with any necessary allowance for consolidation, settlement and drainage so that at the end of the period of maintenance the ground shall be at the required lines, levels and gradients.

During the course of the Contract and during the period of maintenance any damage or defects in cuttings and fills, structures and other works, caused by slips, falls or basins or any other ground movement due to the Contractor's negligence shall be made good by the Contractor at this own cost.

1.1.3 SITE PREPARATION

1.1.3.1 The Contractor shall construct and maintain accurate bench marks so that the lines and levels can be easily checked by the Project Engineer. The Contractor shall Construct and maintain such ditches, in addition to those shown on the plans, as will adequately drain areas under construction.

1.1.3.2 The Contractor shall perform a joint survey with the Project Engineer's representative of the area where earthwork is required, plot the ground levels on the drawings and obtain approval from him before starting the earthwork.

1.1.3.3 The Contractor shall Construct and maintain such ditches, in addition to those shown on the plans, as will adequately drain areas under construction.

1.1.3.4 The Contractor shall perform a joint survey with the Project Engineer's representative of the area where earthwork is required, plot the ground levels on the drawings and obtain approval from him before starting the earthwork.

1.1.4 EXCAVATIONS

Excavation shall include the removal of all material of every name and nature. Excavations shall be carried out in accordance with excavation plans and sections shown on the Drawings and as directed by the Project Engineer.

The major portion of excavations shall be carried out by mechanical excavators and excavated materials disposed off to stock on spoil as per drawings or as directed by the Project Engineer. The excavation which cannot be done by mechanical means including

leveling, trimming and finishing to the required levels and dimensions shall be done manually. The material suitable for fill and back fill shall be stock piled within the free haulage limit of the 200m of the works.

1.1.4.1 The Contractor shall give reasonable notice that he intends to commence any excavation and he shall submit to the Project Engineer full details of his proposals. The Project Engineer may require modifications to be made if he considers the Contractor's proposals to be unsatisfactory and the Contractor shall give effect to such modifications but shall not be relieved of his responsibility with respect to such work.

1.1.4.2 For major excavations, the Contractor shall submit for the prior approval of the Project Engineer full details and drawings showing the proposed method of supporting and strutting etc. The design, provisions construction, maintenance, and removal of such works shall be the responsibility of the Contractor and all cost in these respects shall be included in the unit rates for the permanent work.

1.1.4.3 The Contractor's attention is drawn particularly to his obligations under the general conditions in respect of those works which are in close proximity to existing buildings.

1.1.4.4 The Contractor shall preserve the complete excavation from damage from slips and earth movements, ingress of water from any source what so ever and deterioration by exposure to the sun and the effects of the weather.

1.1.4.5 All excavation of every description, in whatever material encountered shall be performed to the elevations and dimensions shown on the drawings in such a manner as to avoid interruption to work in other parts of the site. The Contractor shall be responsible for injury to the permanent works caused by excavation on other parts of the works.

1.1.4.6 Excavation shall extend to sufficient distance from walls and footing to allow for placing and removal of forms, installations of services and for inspection, except where the concrete for walls and footings is authorized to be deposited directly against excavated surfaces.

1.1.4.7 All excavations in foundations shall be taken to 150mm and shall be trimmed carefully to a smooth and level surface, immediately after trimming to the final elevation a layer of building concrete shall be placed to the thickness shown on the drawings. All excavations

for foundations which have been trimmed and disturbed shall be compacted and covered by concrete by the end of the day. It is specifically brought to the notice of the Contractor that any excavation taken down to the trimmed elevation which is left overnight or for any length of time thereafter, uncovered by the blinding concrete, shall be required to be trimmed to such lower elevation as directed by the Project Engineer and any extra work or any consequent increase in the quantities caused thereby shall not be paid to the Contractor.

1.1.4.8 No excavation shall be refilled nor any permanent work commenced until the foundation has been inspected by the Project Engineer and his permission to proceed given. If excavation for sub-structures are carried below the required level, as shown in the drawings or as directed by the Project Engineer, the surplus depth shall be filled in with concrete of same grade as of blinding concrete at the sole cost of the Contractor.

1.1.4.9 All excavation shall be performed in the dry. The placing of blinding concrete, placing of reinforcement and casting of the permanent works in the excavation shall be carried out in the dry and the Contractor shall have sufficient equipment for this purpose. Adequate precautions shall be taken to prevent any corrosion due to undercutting from underneath the previously constructed adjoining foundations.

1.1.4.10 Existing utility lines to be retained, as well as utility lines constructed during excavation and backfilling, and if damaged, shall be required to be repaired by the Contractor at his expense. Any existing utility lines which are not known to the Contractor in sufficient time to avoid damage, if inadvertently damaged during excavation, shall be repaired by the Contractor and adjustment in payment will be made as approved by the Project Engineer. When utility lines which are to be removed, are encountered within the area of operations the Contractor shall notify the Project Engineer in ample time for necessary measures to be taken to prevent interruption of the service.

1.1.4.11 Excavated material suitable for use as filling material shall be stock piled within the free haulage limit 200m of works as directed by the Project Engineer. This stock piled material shall be transported back to places requiring fill or backfill. Surplus or material unsuitable for use as filling shall be disposed of by the Contractor at locations approved by the Project Engineer within specified free haulage limit.

1.1.4.12 The Contractor shall make independent enquiries and perform and make independent observations to ascertain the water table in the areas of excavations during the period when the construction works are in progress. The Contractor shall take whole risk of any nature for fluctuation of the water table from his own findings. The Employer is not bound in any way and shall not be responsible for any information given by him or any information, observations or values obtained from his reports, drawings and documents.

1.1.4.13 Excavation for Recharge pits, Recharge trenches shall be taken out to the levels and dimensions as the Project Engineer may direct.

1.1.4.14 Before starting the excavations, the Contractor shall ensure the correct alignment of the recharge trenches and location of recharge pits on the ground, the depth and width of excavation of the trench and pits, all in accordance with the drawings and instructions of the Project Engineer.

1.1.4.15 The Contractor at his cost shall provide to the satisfaction of the Project Engineer all timbering, approved supports and shores and bracings to the sides of the excavated trench and foundations in such a manner to secure the sides of the trench and excavations from falling or adverse movement. All responsibility connected with such shoring shall rest with the Contractor. Adequate clearance / working space on both sides of the structure/pipe line shall be provided for which no payment shall be made.

1.1.4.16 Without the written permission of the Project Engineer no more than 50.0m the trench shall be opened in advance of the completed pipe line. The bottom of all excavations shall be carefully leveled. Any pockets of soft or loose material in the bottom of the pits and trenches shall be removed and the cavities so formed filled with lean concrete at the Contractor's expense.

1.1.4.17 The Project Engineer may require the Contractor to excavate below the elevations shown on the drawings or he may order him to step above the elevations shown depending upon the suitable foundation material encountered.

1.1.4.18 If for any reasons, the levels grades or profiles of the excavations are changed adversely, the Contractor shall at his own cost be liable to bring the excavations to the required levels and profiles as shown on the drawings or as directed by the Project Engineer.

1.1.5 EXCAVATION TOLERANCES

Excavation shall be performed within the tolerances for excavation limits indicated on the drawings. Where no tolerance limits are indicated excavation shall be performed to tolerances established by the Project Engineer as accepted for the design and type of work involved.

1.1.6 MEASUREMENT

Except otherwise specified herein or elsewhere in the Contract documents, no measurement and payment will be made for the under mentioned specified works related to the relevant items of the bill of quantities. The cost thereof shall be deemed to have been included in the quoted unit rate of the respective items of the bill of quantities.

Quantities of excavation shall be calculated / measured from the pre-work levels of natural ground taken jointly by the Contractor and the Project Engineer before Commencement of the work. The quantities set out for excavation and its subsequent disposal shall be deemed to be the bulk before excavating and no allowance shall be made for any subsequent variations in bulk or for any extra excavation unless otherwise shown on the drawings quantities of excavation shall be measured on the basis of vertical excavations required for the nominal concrete dimensions of the structural members of foundations. Lean concrete shall not be construed as structural concrete.

Quantities of excavation for service line trenches shall be measured for payment on the basis of vertical excavation faces for the specified width as shown on the drawings. Measurement for acceptably completed excavation works shall be made on the basis of number of cubic meter of material excavated for foundation and service trenches as shown on the drawings or as directed by the Consultant's Project Engineer.

1.1.7 PAYMENT

Payment will be made for acceptable measured quantity of excavation on the basis of unit rate per cum, quoted in the bill of quantities and shall constitute full compensation for all the works related to the item.

1.2 BACK FILLING

After completion of foundation footing, foundation, walls, and other construction below the elevation of the final grades and prior to backfilling, forms shall be removed and the excavation shall be cleaned of trash and debris.

The backfilling shall include filling around the foundations, trenches.

Filling shall be approved selected material from excavation or other predominantly granular material and free from slurry, mud, organic or other unsuitable matter and capable for compaction by ordinary means.

The excavated material if found suitable shall be stock piled within the free haulage limit of the site of the works. This material shall be used for backfilling if approved by the project engineer and shall be transported by the contractor any where required for the purpose of backfilling work in this contract.

The contractor shall provide the approved quality fill and backfilling material as required to complete the fill/backfilling work. Filling in trenches and foundation shall be placed in 200 mm layers and compacted at optimum moisture content by mechanical means or other means as approved by the project engineer.

Fill in around trenches and pits shall be carefully placed with fine material to cover the completely before the normal infilling is done.

Material for back filling shall be as approved by the project engineer and shall be placed in layers of 150 mm measured as compacted material and saturated with sufficient water and compacted to produce in-situ density not less than 95% of the maximum density at optimum moisture content, achieved in test no.15 of IS 1377:1975 or similar clause of relevant is code.

All filled areas shall be left neat, smooth and well compacted with the top surface consisting of the normal site surface soil unless otherwise directed.

Depending on the depth of fill the project engineer may instruct increased thickness of successive layer to be placed.

Fill shall not be placed against foundation walls prior to approval by the project engineer. Fill shall be brought up evenly on each side of the walls as far as practicable. Heavy equipment for spreading and compacting the fill shall not be operated closer to the wall than a distance equal to the height of the fill above the top of footing.

Depending on the depth of fill the project engineer may instruct increased thickness of successive layer to be placed.

Fill shall not be placed against foundation walls prior to approval by the project engineer. Fill shall be brought up evenly on each side of the walls as far as practicable. Heavy equipment for spreading and compacting the fill shall not be operated closer to the wall than a distance equal to the height of the fill above the top of footing.

In case the contractor is instructed to arrange for the fill material the quality of the fill material will be subject to the approval of the project engineer. The project engineer shall require the contractor to carry out various tests of the fill material. All such tests shall be made at an approved laboratory at the cost of the contractor. Once a material from a specific source has been approved, the material for the same quality and from that source only shall be used. Any fill material from borrow pits which has not been approved or the quality of which differs from the approved material shall be rejected out rightly. The project engineer reserves the right to order removal of any such materials brought to the site of works at his discretion at contractor's expense. In order to ensure satisfactory compaction, it will be necessary to carry out, depending upon the type of material, particle size distribution tests, determination of organic content tests, maximum and minimum density tests and determination of optimum moisture content for the filling material.

The method of compaction, namely type of compactor, type of roller, weight of roller and number of passes proposed by the contractor for any particular fill material shall be subject to the approval of the project engineer after completion of satisfactory field tests, subsequent to the laboratory analyses, using the materials and equipment proposed to be used for the earth work in conditions similar to those likely to be encountered during construction.

The final selection of the soil moisture content, the thickness of layers, the type of compaction equipment and the number of passes shall be decided after these tests, which shall be conducted at contractor's expense.

Having established the method of compaction to be used, no departure from this approved method shall be permitted without the prior approval of the project engineer. Adequate control of the fill and compacting operations shall be ensured by in-situ density tests and in order to obtain significant results, not less than two measurements shall be carried out per one hundred square meters of area compacted. The frequency of tests shall be determined on site and may be varied at the discretion of the project engineer. Compaction shall not be less than 95% in-situ density with respect to the maximum density, at optimum moisture content.

The exact thickness of layers and the method of placing and compacting the fill shall be determined by the field tests, as stated above, but not withstanding the results of these trails, fill shall not be placed in layers exceeding 200mm in thickness. In order to maintain control of the thickness of layers, timber profiles shall be used wherever feasible. The travelers of such profiles for each layer of fill shall be checked by the supervisory staff of the project engineer. The contractor shall provide adequate supply of water and sufficient capacity of mechanical water carriers to ensure uniform and uninterrupted operation of compaction. The project engineer may forbid the contractor to proceed with placing and/or compaction of fill and/or order removal and re-compaction of such fill when he finds that the contractor has insufficient or defective equipment or that the fill has been improperly laid and/or compacted.

If it is found necessary to alter the moisture content of the fill material in any way, then very strict control shall be exercised over the wetting and/or the drying process and frequent moisture content tests.

The fill material should be well graded non-cohesive and nearly silt-free (silt content between 5 to 10 percent) salt free and free of organic materials (less than 2%). It should also be free of stones larger than 100 mm. Maximum dimension. It should be of such nature and characteristics that it can be compacted to the specified densities in reasonable length of time. It shall be free of plastic clays, of all materials subject to decay,

decomposition or dissolution and or cinder or other material which corrode piping and other metals.

1.2.1 TOLERANCES

The stabilization of compacted backfill/fill surfaces shall be smooth and even and shall not vary more than 100mm in 3 meters from true profile and shall not be more than 12.5mm from true elevation.

1.2.2 DISPOSAL OF SURPLUS MATERIAL

The rejected unsuitable material and surplus excavated material shall be disposed of within 200 m free haulage limit measured from boundary of the works to places or as directed by the Project Engineer.

The disposal of surplus excavated material shall include loading, unloading, transporting, stacking, spreading as directed by the Project Engineer.

1.2.3 MEASUREMENT

Measurement for acceptable completed backfill/ fill works shall be made on the basis of number of cubic meter of compacted backfill/ fill in position, or as shown on the drawings or as directed by the Project Engineer.

1.2.4 PAYMENT

Payment will be made for acceptable measured quantity of backfill/ fill on the basis of unit rate per cubic meter quoted in the bill of quantities and shall constitute full compensation for all the works related to the item.

1.3 PLAIN AND REINFORCED CEMENT CONCRETE

The work covered by this section of the Specifications consists of furnishing all plant, labor, equipment, appliances and materials, and in performing all operations in connection with the supply and installation of plain and reinforced concrete work, complete in strict accordance with this section of the Specifications and relevant documents, subject to the Conditions of the Contract.

1.3.1 GENERAL

Full co-operation shall be given to other trades to install embedded items and/or any associated services.

Embedded items shall have been inspected, and tests for concrete and other material or for mechanical operations shall have been completed and approved, before concrete is placed.

Formwork shop drawings shall be designed and prepared by the Contractor at his own cost. Approval of shop drawings as well as those of mock-ups /actual samples of finished concrete shall be obtained before Work is commenced.

Contractor shall prepare bar bending schedules, and get the same approved by the Project Engineer, prior to commencement of work.

1.3.2 RELATED SPECIFICATIONS

The codes and standards generally applicable to the work of this section are listed herein after.

IS 269 : Ordinary and low heat Portland Cement
IS 8041 : Rapid Hardening Portland Cement
IS 455 : Portland slag cement
IS 1489 : Portland Pozzolana Cement
IS 8112 : High Strength Ordinary Portland Cement
IS 383 : Coarse and fine aggregates from natural sources for concrete
IS 456 : Code of practice for plain and reinforced concrete
IS 516 : Method of sampling and analysis of concrete
IS 1199 : Method of sampling and analysis of concrete
IS 1139 : Hot rolled deformed bars
IS 23896 : Methods of testing of aggregates for concrete (Part I to III)
IS 2751 : Recommended Practice for welding for reinforcement bars
IS 9103 : Admixtures for concrete
IS 10262 : Recommended guide lines for concrete mixed design
IS 800 : Code of Practice for General Construction in Steel
IS: 816 : Code of Practice for Use of metal arc welding for general construction in mild steel.

1.3.3 MATERIALS

1.3.3.1 CEMENT

a. Cement shall conform to standards listed in section 2 of IS:456, latest edition.

b. Only one brand of each type of cement shall be used for concrete in any individual member of the structure. Cement shall be used in the sequence of receipt of shipment, unless otherwise directed.

c. There shall be sufficient cement at site to ensure that each section of Work is completed without interruption.

d. Cement reclaimed from cleaning of bags or from leaky containers shall not be used.

e. Contractor shall provide and erect, at his own cost, in a suitable place, dry, well ventilated, and water proof shed of sufficient capacity to store the cement.

f. The cement shall be used as soon as possible after delivery, and cement which the Project Engineer considers has become stale or unsuitable through absorption of moisture from the atmosphere or otherwise shall be rejected and removed immediately from the site at Contractor's expense.

g. The mixing together of different types of cement shall not be permitted.

1.3.3.2 AGGREGATES

a. The sources of supply of all fine and coarse aggregates shall be subject to the approval of Project Engineer.

b. All fine and coarse aggregates shall be clean and free from clay, loam, silt, and other deleterious matter. If required, Project Engineer reserves the right to have them washed by the Contractor at no additional expenses. Coarse and fine aggregates shall be delivered and stored separately at Site. Aggregates shall not be stored on muddy ground or where they are likely to become dirty or contaminated.

c. Fine aggregate shall be hard coarse sand, crushed stone or gravel screenings and shall conform to requirements of IS: 383 latest edition.

d. Coarse aggregate shall be gravel or broken stone or hard, durable material free from laminated structure and conforming to IS: 383 latest edition. The aggregates shall be graded as follows for use in mass concrete as in foundations:

TOTAL PASSING	PERCENT BY WEIGHT
2" B.S. Sieve (50.00 mm)	100
1-1/2" Sieve (38.10 mm)	95-100
3/4" Sieve (19.00 mm)	35- 70
3/8" Sieve (9.50 mm)	10- 30
No. 4 Sieve (4.75 mm)	0- 5

Coarse aggregate for all cast-in-place concrete other than mass concrete as for foundations shall be graded with the following limits:-

TOTAL PASSING	PERCENT BY WEIGHT
1" Sieve (25.00 mm)	100
3/4" Sieve (19.00 mm)	90-100
3/8" Sieve (9.50 mm)	20- 55
No. 4 Sieve (4.75 mm)	0- 10

1.3.3.3 Water:

Only clean potable water from the city supply, tube well installed at the Site or from other sources approved by Project Engineer shall be used. Contractor shall supply sufficient water for all purposes, including mixing the concrete, curing and cleaning plant and tools. Where doubts exist as to the suitability of the water, it shall be tested in accordance with IS: 3025. Where water can be shown to contain any sugar or an excess of acid, alkali or salt, Project Engineer may refuse to permit use. As a guide, the following concentrations represent the maximum permissible values:

a. To neutralize 200 ml sample it should not require more than 2 ml of 0.1 normal NaOH.
b. To neutralize 200 ml sample it should not require more than 10 ml of 0.1 normal HCL.
c. Percentage of solids should not exceed the following:

	PERCENT
Organic	0.02
Inorganic	0.30
Sulphates	0.05

Alkali Chlorides 0.10

In case of doubt, Project Engineer may require that concrete mixed with water proposed to be used should not have a compressive strength lower than 90 percent of the strength of concrete mixed with distilled water.

1.3.3.4 Reinforcement

a. Reinforcement for concrete shall conform to the respective IS or other standards as specified in the drawings and Contract Documents or as may be specified by Project Engineer.

b. Unless otherwise specified, all plain reinforcing bars shall comply with the requirements of IS: 432, and shall have a minimum yield stress of 248 N/sq mm.

c. Unless otherwise specified, all deformed reinforcing bars shall comply with the requirements of IS: 1786 for deformed cold worked steel bars and shall have minimum characteristic stress of 415 N/sq mm.

d. Reinforcement shall be obtained only from manufacturer's approved by Project Engineer. If and when required Contractor shall provide all necessary facilities to Project Engineer for the selection of test pieces and shall cause these to be prepared and submitted where directed for tests at Contractor's cost.

e. If the reinforcement is to be supplied by Employer, Contractor shall inform Project Engineer of his requirements much before its use in construction.

f. Reinforcement of all types is to be stored at Site in an approved manner so as to avoid damage.

g. Contractor shall report immediately on receipt of any consignment, having any deviation in the standard weights of the reinforcing bars beyond those allowed in respective standards mentioned in clause (3.3.3.4.b) and (3.3.4.4.c) herein before.

1.4 CONCRETE MIX PROPORTIONS

1.4.1 GENERAL:

The proportions of ingredients shall be such as to produce a mixture which will work readily into the corners and angles of the forms and around reinforcement by the methods of placing and consolidation employed on the Work, but without permitting the materials to segregate or excessive free water to collect on the surface. Specific approval of the Project Engineer is required to waive limitations on mixture proportions.

The proportions of ingredients shall be selected in accordance with Section 5.7 to produce the proper placebility, durability, strength and other required properties.

1.4.2 STRENGTH

The Specified compressive strength of the concrete cube, shall be 15 N/sq mm. or 20 N/sq mm.. Samples from fresh concrete shall be taken as per IS: 1199 and cubes shall be made, cured and tested at 28 days in accordance with IS: 516.

1.4.3 DURABILITY

Requirements of Clause 7 of IS: 456-1978 shall be followed.

1.4.4 SLUMP

Unless otherwise permitted or specified, the concrete shall be proportioned and produced to have a slump of 100 mm or less. A tolerance of up to 25 mm above the indicated maximum shall be allowed for individual batches provided the average for all batches or the most recent 10 batches tested, whichever is fewer, does not exceed the maximum limit.

Concrete of lower than usual slump may be used provided it is properly placed and consolidated.

Note: If S.R. Cement is used, permissible water-cement ratio may be increased by 0.05.

Slump shall be determined by the "Test for slump for Portland Cement Concrete" as per relevant IS code.

1.4.5 MAXIMUM SIZE OF COARSE AGGREGATE:

The nominal maximum size of the aggregate shall be 20.mm for all portions of the structure except footings which may be 38 mm. These limitations may be waived if, in the judgment of the Project Engineer, workability and methods of consolidation are such that the concrete can be placed without honeycomb or voids.

1.4.6 ADMIXTURES:

If required or permitted, admixtures used shall be in accordance with the manufacturer's instructions except as otherwise specified herein.

1.4.7 METHODS OF OBTAINING MIX DESIGN:

For concrete of normal weight, mix proportions to provide the desired characteristics shall be developed using the methods/procedure covered by the Recommended Practice for Selecting Proportions for Normal Weight Concrete ACI-211.1-77/ IS:456- 1978.

Trial mixtures having proportions and consistencies suitable for the Work shall be made based on above codes, using at least three different water-cement ratios which will produce a range of strengths encompassing those required for the Work. Trial mixes shall be designed to produce the specified slump. The temperature of concrete used in trial batches shall be reported.

For each water-cement ratio, compression test of cube shall be made, cured, and tested in accordance with IS:1199 and IS:516. From the results of these tests a curve shall be plotted showing the relationship between the water-cement ratio and compressive strength. From this curve, the water-cement ratio to be used in the concrete shall be selected to produce the required design strength. The cement content and mixture proportions to be used shall be such that this water- cement ratio is not exceeded when slump is the maximum permitted. Control in the field shall be based upon maintenance of proper cement content and slump.

1.5 READY MIX CONCRETE

1.5.1 GRADES AND STRENGTH REQUIREMENTS OF CONCRETE

General

Ready mix Concrete shall consist of the material described under site batched concrete sections, using separate coarse and fine aggregate in an appropriate combination determined in the course of the of mix design . The overall grading shall be such as to produce a concrete of the specified quality which will work readily in to position without segregation. The ready mix concrete shall conform to IS: 4926 and shall be delivered in agitating trucks. The RMC may contain fly ash as per the acceptable norms.

Slump

The water shall be added to the cement and aggregate during mixing to produce concrete having a sufficient workability to enable it to be well consolidated, to be worked in to the corners of the shuttering and around the reinforcement to give the specified surface finish, and to have the specified strength. Water cement ratio shall be maintained as per IS456-1978 when a suitable amount of water has been determined, the resulting consistency

shall be maintained throughout the corresponding parts of the work and tests shall be conducted to ensure the maintenance of this consistency. The max slump at the point of the discharge should not exceed 110mm max.

Concrete Grades

Grade of concrete used in the works shall be shown on the drawings or as directed by the Architect/Project Manager. The minimum cement used for M-20 shall be 300 Kg. Per Cum, 350 Kgs for M-25 and 400Kgs for M-30.

1.5.2 TRANSPORTING CONCRETE

Concrete shall be transported in agitating trucks without contamination, loss of ingredients or segregation. In no case shall a period of more than 4 hours have elapse between the wetting of mix and discharge of the concrete at site.

1.5.3 CONCRETE PLACEMENT

1.5.3.1 Concrete, when deposited, shall have a temperature of not less than 5^{o}C (41^{o}F) and not more than 32^{o}C(90^{o}F).

1.5.3.2 The concrete shall be placed in the positions and sequences indicated on the drawings, in this specification and/or as directed by the Architect/Project Manager.

1.5.3.3 Contractor shall give adequate notice to the Architect/Project Manager of his intention to concrete any section of the works.

1.5.3.4 Except where otherwise directed, concrete shall not be placed unless the representative of the Architect/Project Manager is present and has previously examined and approved the positioning, fixing and condition of the reinforcement or any other items to be embedded and the cleanliness, positioning and suitability of the concreting surface.

1.5.3.5 The concrete shall be deposited as nearly as possible in its final position. It shall be placed in such a manner as to avoid segregation of the concrete and displacement of the reinforcement, other embedded items, or formwork. It shall be brought up in horizontal layers not exceeding 450 mm in compacted thickness unless otherwise authorized or directed by Architect/Project Manager. Concrete shall not be placed simultaneously on each side of large horizontal specified or approved construction joints.

1.5.3.6 Shutters for walls or thin sections of considerable height shall be provided with openings or other devices that will facilitate the cleaning of the accumulation of hardened concrete on the shutters or on the metal reinforcement above the level of the concrete and the removal of concrete in the case of segregations.

1.5.4 QUALITY CONTROL

1.5.4.1 In order to ensure that the quality of materials and the mix proportions are suitable for the particular grade of concrete required are so maintained, sampling and testing shall be carried out regularly during the course or the works.

1.5.4.2 Workability testing shall be carried out in accordance with IS:456. The results shall lie within the range upon which the accepted mix design is based. Testing shall be carried out at such a frequency that the required workability is consistently achieved.

1.5.4.3 Samples of concrete shall be taken at random in accordance with IS: 516 at the time and place of deposition of the concrete at a frequency of sampling for each grade of concrete and from each concrete mixing plant at six cubes of 150 mm nominal size per 50 cubic meters of concrete placed in the works or twice per week.

1.5.4.4 Notwithstanding the foregoing, additional samples shall be taken by the contractor when directed by the Architect/Project Manager. The test cube procedure shall be in accordance with IS: 516 throughout.

1.5.4.5 Compliance with the specified characteristic strength shall be assumed if:

a. Each of the six cubes in a group has a test strength not less than the characteristic strength or,
b. Not more than one cube has a test strength less than the specified characteristic strength but not less than 85% of the specified characteristic strength and the average strength of the group of four test results is not less than the specified characteristic strength plus the standard deviation of the group.

1.5.5 SEVEN DAY CUBE TESTS

Acceptance of concrete is based on the 28th day results. However, the contractor shall establish a relationship between 7 days and 28 days strengths by carrying out 7 days tests at the time of performing the laboratory testing and from subsequent quality control testing.

This relationship shall be used in interpreting any further test results to predict the probable value of the corresponding 28 days cube strengths. The contractor shall without delay advise the Architect/Project Manager of any sample that appears likely to fail to meet the specification and the contractor shall take any necessary action to minimize the effect of such failure.

1.5.6 ACCEPTANCE CRITERIA

The general Acceptance Criteria of any and all of the concrete work shall be as per the relevant Clauses of IS. 456. If any of the works tests are not up to the standard, the Architect/Project Manager shall have the power to stop the work until the reason is investigated and steps taken to prevent further low results. The contractor shall not be entitled to any claims on account of such delays. Any concrete carried out from the batch that is afterwards found to be faulty, will be liable for rejection and if so directed, the contractor shall at his own expenses dismantle and replace the defective work and any work built thereon or shall take such other measures as may be deemed necessary by the Architect/Project Manager. At the discretion of the Architect/Project Manager, the contractor may be allowed to prove by means of a load test to be carried out at his own expense, that the concrete is capable of safely withstanding the loads as specified in the test.

1.5.7 QUALITY OF WATER

- Water used for both mixing and curing shall conform to IS: 456. Potable water is generally satisfactory. Water containing any excess of acid, alkali, sugar or salt shall not be used.
- The pH value of water shall not be less than 6.
- Seawater shall not be used for concrete mixing and curing.
- The proposed admixtures shall comply with requirements of specification part 11- Water sealing materials.

1.6 STEEL REINFORCEMENT

1.6.1 SCOPE OF WORK

The work to be done under this section consists of furnishing, cutting, fabricating, bending, placing and tying steel reinforcement in concrete structures or elsewhere as shown on the drawings or directed by the Project Engineer. The scope of this section of this section of specifications as laid down herein.

1.6.2 MATERIAL AND SIZE OF BARS

1.6.2.1 Reinforcement for concrete shall conform to the respective Indian or other standards as specified in the drawings and in the contract documents or as may be specified by the Project Engineer.

1.6.2.2 Unless otherwise specified, all plain mild steel reinforcing bars shall comply with the requirements of IS: 432 (Part- I) and shall have a minimum yield stress of 250 N/mm.sq.

1.6.2.3 Unless otherwise specified, all deformed reinforcing bars shall comply with the reinforcements of IS: 1786 for deformed cold twisted steel bars and shall have a minimum characteristic strength of 415 N/mm.

1.6.2.4 Reinforcement shall be obtained only from manufacturers approved by the Consultant/Project Engineer. Each consignment of reinforcement steel shall be accompanied by a manufacturer's certificate or shall refer to a previous certificate, if the consignment is from the same batch, showing that the reinforcement steel complies with the following requirement

1.6.2.5 If such certificate is not made available or if the Consultant / Project Engineer considers that the manufacturer's tests are inadequate, samples shall be taken for acceptance test from different consignments as the Project Engineer may direct and shall be tested at the Contractor's cost should the result of such that any sample does not meet with the specifications, the whole consignment shall be rejected and removed from the site at the Contractor's cost.

1.6.2.6 Reinforcement of all types is to be stored on site in approved manner so as to avoid damage.

1.6.2.7 Reinforcement shall be free from all loose or flaky rust and mill scale or coating, including ice, and other substance that would reduce or destroy the bond. Reduced section steel reinforcement shall not be used.

1.6.2.8 If such certificate is not made available or if the Consultant / Project Engineer considers that the manufacturer's tests are inadequate, samples shall be taken for acceptance test from different consignments as the Project Engineer may direct and shall be tested at the Contractor's cost should the result of such that any sample does not meet with the specifications, the whole consignment shall be rejected and removed from the site at the Contractor's cost.

1.6.2.9 If such certificate is not made available or if the Consultant / Project Engineer considers that the manufacturer's tests are inadequate, samples shall be taken for acceptance test from different consignments as the Project Engineer may direct and shall be tested at the Contractor's cost should the result of such that any sample does not meet with the specifications, the whole consignment shall be rejected and removed from the site at the Contractor's cost.

1.6.2.10 Reinforcement of all types is to be stored on site in approved manner so as to avoid damage.

1.6.2.11 Reinforcement shall be free from all loose or flaky rust and mill scale or coating, including ice, and other substance that would reduce or destroy the bond. Reduced section steel reinforcement shall not be used.

1.6.2.12 Steel wire mesh reinforcement shall conform to requirement of relevant Indian codes or those of ASTM: A 185-64 or BS. 4483, 1969: Standard Specifications for welded steel wire fabric for concrete reinforcement. It shall be used where shown on the drawings.

1.6.2.13 Applicable standards

Latest editions of Indian Standards as per 4.3 or other International Standards

1.6.2.14 DELIVERY & STORAGE

Delivery

Steel reinforcement bars shall be delivered in bundles firmly secured and tagged. Each bars or bundle of bars shall be identified by marks stamped on hot or cold or painted on or by any other means. The identifying marks shall contain the following information:

a. Name of the producer or his trade.

b. Standard to which the bars have been manufactured.

c. The clause, type and strength respectively.

d. The diameter.

e. The number of the test certificate (if available).

Storage

The method of storage shall be approved by the Project Engineer. Reinforcing bars shall be stored in racks or platforms above the surface of ground and shall be protected free from scaling, rusting, oiling, coatings, damage, contamination and structural defects prior to placement in works. Bars of different diameters and grades of steel reinforcement shall be kept separate.

1.6.2.15 BAR BENDING SCHEDULES

The Contractor shall prepare bar bending schedule of all the reinforcing steel bars and these bar bending schedules will be supplied to the Consultants/Project Engineer in duplicate on the basis of which the work shall be carried out. However, the Contractor shall be responsible to satisfy himself as to the correctness and accuracy of the bar bending schedule. Any discrepancy shall immediately be notified to the Consultant / Project Engineer before commencing work.

1.6.2.16 MEASUREMENT & PAYMENT

Except otherwise specified herein or elsewhere in the Contract documents, no measurement and payment will be made for the under mentioned specified works related to the relevant items of the Bill of Quantities. The cost thereof shall be deemed to have been included in the quoted unit rate of the respective items of the Bill of Quantities. Providing and installing chairs, supports, hooks, spacers, binding wires, and laps not shown on drawings including wastage and rolling margin.

Measurement

Measurement for acceptably completed works of reinforcement shall be made by weight according to bar bending schedules approved by the Consultant / Project Engineer.

Payment

Payment will be made for acceptable measured quantity of reinforcement on the basis of unit rate per ton or kg quoted in the bill of quantities and shall constitute full compensation for all the works related to the item.

1.7 BRICK MASONRY

1.7.1 GENERAL

Brick Masonry shall consist of all work required in connection with constructing brick masonry at locations shown on drawings including, but not limited to, furnishing brick, Portland cement and sand for mortar and all other materials, and mixing, placing brick masonry as per bill of quantities.

1.7.2 MATERIALS

All Portland cement for mortar shall be furnished by the Contractor and shall conform to the applicable requirements specified in the section "Plain and Reinforced Concrete". All sand for mortar shall be furnished by the Contractor and shall conform to the applicable requirements for sand specified in the section "Plain and Reinforced Concrete".

All water used in the manufacture of bricks and in the preparation of mortar shall be free from objectionable quantities of silt, organic matter, alkali, salts and other impurities, and will be tested and approved by the Project Engineer as per the guidelines of IS: 456.

1.7.3 MORTAR

a. MIX: Mortar for all brick masonry, expect where otherwise directed by the Project Engineer, shall consist of one part cement to six parts of damp loose mortar sand by volume for brickwork 230mm and above. For brick piers, half brick walls, honeycombed brickwork and hollow (cavity) walls, the mortar mix shall consist of one part cement and four parts of sand. Quantity of water shall be just sufficient enough to produce proper consistency for the intended use. Where directed and approved by the Project Engineer, hydrated lime putty, shall be added to the mortar for increased workability. The putty shall, however, not exceed 25% by volume of the dry cement.

b. Methods and equipment used for mixing mortar be such as will accurately determine and control the amount of each separate ingredient entering into the mortar and shall be subject to the approval of the Project Engineer. Mortar shall be mixed only in sufficient quantities for immediate use and all mortar not used within 30 minutes after addition of the

water to the mix shall be wasted. Re-tempering of mortar will not be allowed. The mixers shall be thoroughly cleaned and washed at the end of each day's work.

1.7.4 BRICK

a. All bricks shall be of first class quality made from good brick earth, free from saline deposits and shall be sand moulded. They shall be thoroughly burnt without being vitrified, shall be regular, uniform in shape and size with sharp and square edges parallel faces and of deep red or copper colour. First class bricks shall be homogeneous in texture and emit a clear ringing sound when struck, and shall be free from flaws, cracks, chips, stones and nodules of lime. First class brick in an oven dried condition shall not absorb more than 1/5 of its weight of water when immersed for one hour in water at 21 to 27 degrees centigrade and shall show no signs of efflorescence on subsequent drying. The average compressive strength of five representative first class bricks shall be 15N/mm. sq. and shall no result shall fall below 10 N/mm sq. The bricks in general shall conform to the requirements of IS: 1077.

b. All bricks shall be manufactured by the Trench Kiln method or other standard methods approved by the Project Engineer. The earth used in manufacturing bricks shall be carefully selected and shall be free from objectionable quantities of lime, gravel coarse sand, roots, or other organic matter salts shall not exceed 0.3% and calcium carbonate shall not exceed 2.0%.

c. The moulds used in the manufacture of bricks shall be thoroughly sanded before each use and shall be sufficiently larger than the size of the bricks being manufactured to allow for shrinkage in drying and burning. The size ready for use shall be 9" by 4 3/8" by 2 3/4" (229X 112X 70mm) and shall weigh between 3.2 to 4.2 Kilograms. All bricks shall have a "Frog" 1/4" deep on one face.

1.7.4.1 PLACING

a. The methods and equipment used for transporting the bricks and mortar shall be such as will not damage the brick nor delay the use of mixed mortar. Brick shall not be placed during rains sufficiently heavy or prolonged to wash the mortar from the brick. Mortar which becomes diluted by rain shall be removed and replaced before continuing with the work. All bricks to be used in brick masonry shall be moistened with water for three to four hours before they are used. The chosen method of wetting shall ensure that all bricks are

thoroughly and uniformly wetted. All bricks shall be free from water adhering to their surface when they are placed in the brick masonry.

b. Bricks shall be laid "Frog" upward with mortar joints and in English bond as directed by the Project Engineer. Both bed and vertical joints shall be 6mm in thickness completely filled with cement mortar as specified herein, and each brick shall be bedded by firmly tapping with the handle of the trowel. All horizontal joints shall be parallel and all vertical joints in alternate courses shall be directly over one another. Excess mortar at the outer edges shall be removed and joints drawn straight with the edge of a trowel and a straight edge. All anchors and similar work required to be embedded in the brick masonry shall be installed as the work progresses. At the completion of the work all holes or defective mortar joints shall be cut out and repointed.

c. The exterior faces of the walls shall be finished by striking the joints as the work proceeds. The joints shall be struck by raking the green mortar after the brick work has been laid and finishing the joint with a pointing tool. Horizontal joints shall be struck to form weathered joints and vertical joints shall be struck with a V notch. Care shall be taken that the striking tools do not develop a cutting edge as the object of striking the joint is to compress the mortar into the joints.

1.7.5 CURING AND REPAIR

a. All brick masonry shall be water cured and shall be kept wet for least seven days by an approved method which will keep all surfaces continuously wet. Water used for curing shall meet the requirements of these specifications for water used in the manufacture of bricks.

b. If, after the completion of any brick masonry work, the brick are not in alignment or level or does not conform to the lines and grades shown on the drawings, or shows a defective surface, it shall be removed and replaced by the Contractor at his expense unless the Project Engineer grants permission, in writing to patch or replace the defective area.

1.7.6 TOLERANCES

The brickwork shall be erected plumb and true to line at level with the maximum variation in any storey height of any length of wall being one meter. The maximum tolerance in the length, height or width of any single masonry unit shall be +/- 3mm.

1.7.7 MEASUREMENT AND PAYMENT

1.7.7.1 GENERAL

Except otherwise specified herein or elsewhere in the contract documents, the measurement and payment will be made for the under mentioned specified works related to the relevant items of the bill of quantities.

1.7.7.2 MEASUREMENT

Measurement of acceptable completed works of brick masonry will be made on the basis of cubic meters provided and installed in position as shown on the drawing or as directed by the Project Engineer.

1.7.7.3 PAYMENT

Payment will be made for acceptable measured quantity of brick masonry on the basis of unit rate per cum quoted in the bill of quantities and shall constitute full compensation for all the works related to the items.

1.8 FINISHING

1.8.1 GENERAL

1.8.1.1 All plaster work shall be of the best workmanship and in strict accordance with the dimensions of the drawings. All plastering shall be finished to true levels including plumbs, without imperfections, and square with adjoining work. It shall form proper foundations for finishing materials such as paint etc. Masonry and concrete surface to which plaster is to be applied shall be clean, free from efflorescence, sufficiently rough and keyed to ensure proper bond.

1.8.1.2 All chasing, installation of conduits, boxes, etc. shall be completed before any plastering is commenced on a surface. Chasing or cutting of plaster will not be permitted. Broken corners shall be cut back less than 150 mm on both sides and patched with plaster of Paris as directed. All corners shall be rounded to a radius. Contractor shall get samples of each type of plaster work approved by the Architect/Project Manager.

1.8.1.3 All chasing, installation of conduits, boxes, etc. shall be completed before any plastering is commenced on a surface. Chasing or cutting of plaster will not be permitted. Broken corners shall be cut back less than 150 mm on both sides and patched with plaster of

Paris as directed. All corners shall be rounded to a radius. Contractor shall get samples of each type of plaster work approved by the Architect/Project Manager.

1.8.1.4 The materials used for plastering shall be proportioned by volume by means of gauge boxes. Alternatively it may be required to proportion the materials by weight.

1.8.2 PLASTER WORK

1.8.2.1 The joints in the brick work, concrete blocks, shall be raked to a depth of 15 mm while the masonry is green. Concrete surfaces to receive plaster shall be suitably roughened. All walls shall be washed with water and kept damp for 10 hours before plastering.

1.8.2.2 The plaster unless specified otherwise shall be average of 12 mm thick on walls. The finished texture shall be as approved by the Architect/Project Manager. The mix for plaster unless otherwise specified, shall be one part cement and four parts sand, to walls and one part cement, 3 parts sand to ceiling.

1.8.2.3 The interior plaster shall be applied in one coat only. The surface shall be trowelled smooth to an approved surface. All plaster work shall be kept continuously wet for seven days

1.8.2.4 The external plaster shall be of two coats on an overall thickness of minimum 20 mm. Preparations of walls to receive plaster work shall be the same as in internal plaster. Backing coat shall be 12 to 15 mm thick with cement mortar 1:5 and finishing coat shall be with cement mortar 1:3.

Backing coats shall be combed on wet surface to form keys for finishing coat. All external plaster shall be waterproofed with approved water proofing powder added to cement in proportion of 1.5 Kg. to 50 Kg. of cement as per the manufacturers' instruction, for both the coats. Cost of waterproofing powder per Kg. shall be paid for separately.

1.8.2.5 For sand faced cement plaster, the finishing coat shall be in cement mortar 1:3, sand used shall be of selected color, properly graded and washed so as to give a grained texture. Finishing plaster coat shall be 8 mm thick, uniformly applied and surface finished with special rubbing by sponge pads and other tools and recommended by the Architect/Project Manager.

1.9 UPVC –SWR PIPING WORK

1.9.1 GENERAL

The item includes supplying of UPVC soil, waste and rainwater (SWR) and ventilation pipes with fittings of specified diameter including laying, fixing, cutting, joining, painting if required etc.

1.9.2 MATERIAL

The pipes shall conforming to IS 13592, UPVC – SWR and fittings conforming to IS 13591 shall be able to withstand a pressure as mentioned in the schedule of work. Rubber sealing rings conforming to IS 5382 with the lubricant for sliding socket joints as mentioned in the schedule of work.

1.9.3 EXAMINING

Before laying the pipe line, it shall be first examined for damages and cracks, No cracked or damaged pipe and fittings shall be used in the work and they shall be removed from the site by the contractor at his own cost and charge.

1.9.4 CLEANING

All the pipes and fittings shall be thoroughly cleaned with brush and washed if necessary to remove any accumulated stone, soil or dirt inside and outside surfaces.

1.9.5 LAYING

The pipes shall be carefully laid straight to the correct alignment in gradients as indicated in the drawing. All the pipe shall be used in standard length as far as possible. Cut length may be used only where it is necessary to make up exact length.

The entire length of pipe shall be evenly supported on bed of the trench throughout. Care shall be taken to prevent any sad, earth or other materials from entering into the pipes during laying. At the end of the day's work the open end shall be suitably plugged.

1.9.6 FIXING

The pipe line shall be fixed in position in shown in the drawings or as directed by project engineer. The pipe shall be fixed with G.I clamps not less than 2.0mm thick of the suitable UPVC clamps/clips shall be fixed into the wall with G.I nails not less than 40 mm long and wooden gutties keeping the pipe about 15mm clear of the wall.

1.9.7 MAKING JOINT

The Joints of pipes and fittings generally shall be done with the approved make cement solvent including making surface rough or rubber sealing rings with the lubricant for sliding socket joints. The pipe shall be cut to desired length. Care shall be taken that the profile or cut surfaces shall not be changed and the fibrous material shall be removed with the scraper or knife.

1.9.8 PAINTING

In case of underground piping, the pipe line shall be painted with the two coats of approved oil paint of matching colour over a coat of primer.

1.9.9 THE RATE INCLUDES:

a. Supplying of UPVC - SWR pipes and fittings of specified diameter.
b. Laying and cutting the pipe wherever necessary and wastage.
c. Fixing the pipe line with G.I clamps not less than 2mm thick and G.I/M.S nails length not less than 40mm or with UPVC clamps, screws, wooden gutties etc
d. Making the solution joint and painting if mentioned in schedule of work the pipe line.
e. All necessary materials, labour and use of tools.

1.9.10 MODE OF MEASUREMENT

The measurement shall be for unit running meter length of pipe line laid of fixed. The measurement shall be taken along the center line of pipe. No measurement shall be recorded separately for fittings, making joint, painting if mentioned in schedule of work and testing.

1.9.11 MODE OF PAYMENT

The contract shall be for unit running meter length of pipe line laid.

1.9.12 GENERAL REQUIREMENTS

a. The work shall be executed on Item rate basis. Details and drawings issued by the CLIENT shall be followed by the successful bidder. The bidder shall undertake confirmatory survey for accuracy and completeness of data. Scope of work mentioned is for indicative and exhaustive purpose. In addition the contractor shall be responsible for executing all items required for completing the tendered works as per direction of Engineer-in-charge.
b. Agency has to obtain labor license from Respective Department.

c. Fire safety norms shall be followed as per Standards.

d. Setting of testing laboratory at site, equipped with apparatus needed for testing during construction. All the required tests as instructed by Engineer-In-Charge shall be carried out.

e. Taking all precautionary measure to safeguard against any accident for the contractors employees, general public, supervisory staff of HDMC by providing necessary safety equipment, helmets and MS sheet barricading etc. at work site. The site has to be kept clean all the time of all debris, rubbish, dirt & surplus/waste material.

1.10 TESTING AND INSPECTION

a. Third Party inspection

b. The charges for third party inspection, if any, would initially be borne by the Contractor.

c. Site tests

d. After erection at site, all components, equipment as described shall be tested to prove satisfactory performance and /or fulfillment of functional requirements without showing any sign of defect as individual equipment and as well as a system.

1.11 WOOD WORK IN WALK WAY BRIDGE .

1.11.1 MATERIALS:

Timber to be used shall be of shall be of First Grade Shal wood as per IS:4021. Timber shall be of the best quality and well-seasoned by a suitable process before making plane to the required sizes. The maximum permissible moisture content shall be from 10 to 16 percent for timber 50mm and above in thickness and 8 to 14 percent of timber less than 50mm in thickness for different regions of the country as stipulated in IS:287. Timber shall be close grained, of uniform colour and free from decay, fungal growth, boxed heart, pitch pockets or streaks on the exposed edges, borer holes, splits and cracks.
The Timber should be well seasoned as per IS :1141, 1993.

1.11.2 WORKMANSHIP:

The workmanship and finish of wood work in wooden walk way Bridge shall be of a very high order. Contractor shall ensure that work is executed in a professional manner by skilled carpenters for good appearance, efficient and smooth operation of the wooden beams. Planks etc.

All works shall be executed as per the detailed drawings and/or as directed by the Engineer.

All members of the wooden walk way Bridge etc. shall be straight without any warp or bow and shall have smooth well plane faces. In case of curved wooden beam the degree of curvature shall be maintained as per approved drawing, the wooden member shall be connected to each other with Nut & bolt as per drawing. The walkway deck shall be prepared with sufficient thickness of planks as mentioned in drawings. The workmanship shall generally conform to the requirements specified in IS:4021.

Wood work shall not be provided with the finishes of painting/varnishing etc. unless it has been approved by the Engineer. The type of finish and the number of coats, type of laminate/veneer shall be as stipulated in the respective items of work.

Any carpentry work which shows defects due to inadequate seasoning of the timber or bad workmanship shall be removed and replaced by Contractor with work as per Specifications at no extra cost to the Employer.

1.11.3 MEASUREMENT:

Measurement for wood work shall be in generally be in Cum unless otherwise stated in the BOQ.

PART- D

TECHNICAL SPECIFICATION

FOR

ELECTRICAL WORKS

TECHNICAL SPECIFICATION FOR ELECTRICAL WORKS

IMPROVEMENT OF THREE PONDS

NEAR MODERN CLUB AND MBB COLLEGE GATE AT SHIVNAGAR

Improvement of Three Ponds by providing peripheral metal railing, pathways, pedestrian bridge, seating arrangements, landscaping, fountains, decorative illumination, area lighting & allied works at Shivnagar (near Modern Club and MBB College Gate) and post completion operation & maintenance for 05 (five) years including Defects Liability period of 01 (one) year.

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1.0 **SCOPE OF WORK:**

1.1 The scope of services covers manufacturing and testing at manufacturer's works; packing, forwarding and delivery from manufacturer's works to project site handling at site including unloading, shifting to storage site and from storage site to erection point; assembly, erection, testing & commissioning; performance demonstration and handing over to Agartala Smart City Limited (ASCL) along with all necessary accessories and spares of original ratings. Inland and overseas transit insurance, transport, testing at site shall be in CONTRACTOR's scope.

1.2 The scope of work broadly includes:

1.3 Providing Basic lighting that meets the requirements of Functional Illumination complemented by aesthetic and architectural lighting for the below mentioned elements at MBB College Pond

(a) Pathways / Walkways all around the ponds

(b) Tree Up-lighting

(c) Illumination of Bus Stand

1.4 Installation of power distribution equipment and other Misc. Supplementary works as mentioned below;

(a) Outdoor Main Incoming Panel, Outdoor Lighting Panel and Junction Box for power supply distribution for the above

(b) Cabling and Earthing system for all the above scope of works

(c) Providing one point supply for Fountain panels, Bio Toilet & Water ATM and other OEM package units as required

(d) Civil works including Foundation/ steel support for the panels, etc.

(e) Liaison with Govt. Authorities for making Power supply arrangement for the project areas and getting them approved for regular operation

1.5 Operation and maintenance of all the equipments ask for in the scope of works above.

1.6 General Instruction to Bidders

1.6.1 The CONTRACTOR shall prepare carry out the work based on parameters/ design criteria indicated in the specifications and standards.

1.6.2 Design and detailed engineering of the materials procured by CONTRACTOR is included in scope. CONTRACTOR shall submit each document/ calculations of system which is included in scope to Purchaser/ Consultant for final review/ approval.

1.6.3 Expert or manufacturer supervision for sub-CONTRACTOR supplied material shall be provided by CONTRACTOR and included in offer.

1.6.4 CONTRACTOR shall be solely responsible for any shortages or damages in transit for his supply scope, handling and/ or in storage of any materials and erection of the equipment, supply of erection tools at site. CONTRACTOR shall ensure that it will not affect any activity or project schedule. Any demurrage, wharfage and other such charges claimed by the transporters, railways etc. shall be to the account of the CONTRACTOR.

1.6.5 Nothing in this specification shall be construed to relieve the CONTRACTOR of his/ her responsibilities towards following best engineering practices established in the country.

1.6.6 Obtaining all the required approvals and permissions including load sanction/ release from Tripura State Electricity Corporation Limited (TSECL), No Objection Certificates from TSECL, Electrical Inspector, relevant government agencies, and statutory authority, as applicable is included in CONTRACTOR's scope.

1.6.7 All necessary legal fees required for various applications to TSECL/Electrical Inspector, relevant government agencies, statutory authorities shall be paid by the Purchaser. The TSECL deposit required to be paid for Load Release shall also be borne by the Purchaser.

1.6.8 The CONTRACTOR's scope shall also include measurement of soil resistivity at site by Wenner's four electrode method as per IS: 3043 – 1987 at minimum two locations at site. The earthing shall be designed for the actual mean soil resistivity value obtained.

1.6.9 Even if all components of a system included in this specification are not explicitly identified and/ or listed herein, these shall be supplied under this contract to ensure completeness of the system and facilitate proper operation and easy maintenance of the installations. Any and all other works not indicated above but necessary/ required to complete the job in all aspects, are included in the CONTRACTOR's scope.

1.6.10 The CONTRACTOR shall include start up spares, essential spares, recommended spares and a set of special tools necessary for operation, routine maintenance of equipment supplied for a period equivalent to the contract period.

1.6.11 Whether specifically called for or not, all accessories required for normal and satisfactory operation (as deemed by the Purchaser) of the equipment shall be considered to be a part of the CONTRACTOR's basic scope of supply and/ or work and no claims whatsoever, for extra payment on these grounds, will be accepted.

1.6.12 CONTRACTOR should visit site and get himself/ herself ascertained regarding the scope of work for the complete Electrical works before submission of quote/ offer.

1.6.13 CONTRACTOR's scope shall include design, manufacture, supply, testing, commissioning and handover of all electrical equipment/ systems as per tender specifications, BOQ and reference electrical SLD & other relevant details.

1.6.14 Tariff metering equipment & electric supply connection shall be provided by TSECL for which necessary liaison shall be done by CONTRACTOR.

1.6.15 Incoming point of supply till tariff meter is in the scope of TSECL. Further, the entire distribution is in the scope of CONTRACTOR.

1.6.16 All SAFETY considerations in design and manufacturing for safe operation & maintenance and safe practices during installation at site shall be in the scope of the CONTRACTOR. Cost towards accomplishing the same shall be included in the BID price and no extra claim shall be entertained later.

1.6.17 Equipment furnished/ supplied under this scope of works shall be complete in every respect with all mountings, fittings, fixtures, and standard accessories normally provided with such equipment and / or needed for erection, completion and safe operation of the equipment as required by applicable codes though they may not have been specifically detailed in the Technical Specification unless included in the list of exclusions. Materials and component not specifically stated in the specification but which are necessary for commissioning and satisfactory operation unless specifically excluded shall be deemed to be included in the scope of specification and shall be supplied without any extra cost. All similar standard components/ parts of similar standard equipment provided shall be inter-changeable with one another.

1.6.18 The CONTRACTOR shall be responsible for the selection and design of appropriate equipment to provide the best co-ordinated performance of the entire system. The design of various components, sub-assemblies and assemblies shall be so done that it facilitates easy field assembly and maintenance.

1.6.19 The material supplied by the CONTRACTOR shall be subject to approval of the designated Authorities of ASCL. Samples of the Supply material under the scope of works shall be inspected by ASCL or their representatives either at site or at Manufacturer's works and approve them for supply and execution. Notwithstanding any approval/ instruction given otherwise, if the ASCL, during random check-up, finds any non-conformance with the quality of material supplied by the CONTRACTOR with respect to the technical specifications, ASCL shall have the Authority to reject the entire lot/ batch of that particular material and ask to replace without any cost impact to ASCL.

1.6.20 During the construction at site, it shall be the CONTRACTOR's responsibility to take care of the safety and security of its person and material at site. The CONTRACTOR shall be self-reliant with all the requirements including tools and tackles for digging, filling, erecting, lifting, etc. and consumables required for construction like electricity and water at his own cost.

1.6.21 The CONTRACTOR shall carryout the installations in a safe and responsible manner without any inconvenience or danger to public. The CONTRACTOR shall take care not to damage any public/ private property by mistake or by intention during the course of work with its actions and shall be well insured to compensate the owner in case any such incidence happens.

1.6.22 CONTRACTOR shall plan and carry out all supply, installation, testing and commissioning of the lighting system conforming to the approved drawing, technical specification and good engineering practices.

1.6.23 Even if all components of a system included in this specification are not explicitly identified and/ or listed herein, these shall be supplied under this contract to ensure completeness of the system and facilitate proper operation and easy maintenance of the plant. Any and all other works not indicated above but necessary/ required to complete the job in all aspects, are included in the CONTRACTOR's scope. ASCL reserves the right to issue addendum to the technical specification to indicate modification/ changes in the requirements, if so required at a later date.

2.0 DESIGN CONCEPT

2.1 The design concept of electrical system as a whole is based on providing safe, reliable & stable power and efficient performance of electrical system.

2.2 The design standards described herein are generally in compliance with the Central Electricity Authority Regulations 2010, latest Indian Standards, State Electricity board standards and code of practices already established in the country.

2.3 The design ambient temperature for all electrical equipment shall be 50°C.

3.0 PROJECT INFORMATION

(a) SITE/ ENVIRONMENTAL CONDITIONS:

i. Ambient temperature : 50ºC.(site specific)

ii. Relative Humidity : 60-80%

(b) Seismic Data : As per IS 1893 latest issue

(c) NOMINAL SYSTEM VOLTAGE:

i. Incoming supply: 415V, 3 ph, 4 wire, 50 Hz AC

ii. General lighting & space heating: 240V, 1 ph, 2 wire, 50Hz, AC

iii. Voltage variation: 415 V supply: ± 10%

iv. Frequency variation: ± 5%

v. Combined voltage and frequency variation: ±10%

(d) SYSTEM EARTHING:

i. 415 V, 3 ph, AC system: Neutral solidly earthed

ii. 240 V, 1 ph, AC system: Neutral solidly earthed

4.0 POWER DISTRIBUTION ARRANGEMENT

4.1 The power supply to the Pond area shall be tapped from the nearest LT point of supply of TSECL through underground buried cable/Overhead conductor and terminated at Consumer's Main DB through a LT tariff meter.

4.2 The power supply to the Pond area shall be arranged by TSECL. LT tariff metering shall be provided for Pond area. The LT tariff metering shall be as per the guidelines of TSECL/TERC.

4.3 The above works up to the LT Tariff metering shall be in the scope of TSECL. The battery limit of the Contractor shall starts from outgoing of the LT Tariff metering.

4.4 The Main Outdoor DB shall have the configuration like incoming from Grid. The number of outgoings shall be as per enclosed Single line diagram.

4.5 The outdoor lighting DB shall distribute power to the landscape lighting fixtures proposed around the Pond.

4.6 Railings with embedded light post shall be provided along the periphery of the Pond as shown in the tender drawings.

4.7 Tree uplighting shall be provided for the Tree in the planters provided around the Pond. These areas shall have seating benches as well.

4.8 Two fountains are proposed in two of the ponds as shown in the plan drawing. Each fountain shall have it's composite panel from wherein the fountain pumps, underwater lighting, etc shall be catered.

4.9 Refer Single Line Drawing (SLD) - TCE.10198A-EL-4000-AU-40020.

GENERAL TECHNICAL & PARTICULAR REQUIREMENTS FOR ELECTRICAL, EQUIPMENT/ SYSTEMS:

5.0 **OUTDOOR & WEATHERPROOF PANELS**

5.1 GENERAL:

5.1.1 The scope of this specification includes design, engineering, manufacture/ assembly, installation, testing, commissioning and performance demonstration of the LV Panel boards for various sizes and ratings to be provided for the distribution of the power supply.

5.1.2 The panels shall include

(a) Floor mounted panels –

(i) Outdoor Main Incoming Panel for receiving Grid power and distribution to the pond area.

(ii) Outdoor Lighting Panel (OLP) fed from the MDB

(iii) Outdoor Power Distribution Panel for Fountain located near the respective ponds.

5.1.3 Applicable Standards: The design, manufacture and performance of equipment shall conform to the latest standards

5.2 The Outdoor Main Incoming Panel shall be metal enclosed, Non Compartmentalised, Double Door Construction, free standing on raised structural supports, single front, fabricated with 2mm CRCA sheet steel for all doors, partitions and covers (and 2.5mm CRCA sheet steel for load bearing sections including all ACB feeders, if any).

5.2.1 The Outdoor Lighting Panels and Outdoor Power Distribution Panel shall be Similar in construction as Outdoor Main Incoming Panel.

5.2.2 The front Door shall be provided with Toughened Glass to see through the equipment mounted on the internal Door.

5.2.3 All outdoor panels shall be mounted on raised steel structures of minimum height 400 mm from FGL with proper foundation. The SITC of outdoor panels shall be

inclusive of all design, engineering, supply (Steel and Civil building material), installation & commissioning of civil & structural works required for preparing such pedestal including excavation and backfilling. All mounting accessories like base channels, cross angles if required, nuts, bolts etc. shall be supplied by the vendor.

5.2.4 The panels shall be Weather proof conforming to IP55. The height of the panel shall not exceed 2000mm and the operating height shall not exceed 1800mm on top and 500mm at the bottom of the panel from FGL.

5.2.5 Adequate rain & sun protections shall be provided for the outdoor panels by way of raised hoods cum sheds above the panel extended such that the direct blasts of rain or sun rays are avoided. The rain hood cum shed shall be bolted and detachable to fix the Lifting lugs. Alternately an independent shed can be provided to safe guard the panel from sun and rain in all the seasons.

5.2.6 The gasket shall be suitable to withstand all weathers for long tenure of service. Suitable type test reports for the same shall be submitted for approval before procurement. All hardware shall be HD Galvanized.

5.2.7 All doors shall be hinged type with panel locks. All such doors shall open min 105 deg. All doors shall be with concealed type hinges and captive screws. Rear doors of panels, in case requiring rear access, shall be provided with removable hinged doors. Side covers of panels shall be with removable panels.

5.2.8 All doors shall be provided with durable and easy fitting locks with special keys to ensure opening by Authorised personnel. Suitable Rubber grommets shall be provided at the cable entry. All the panel boards shall have cable entry from bottom.

5.2.9 All the live bus bars shall be adequately shrouded against accidental contact by a shroud (and not by sleeve) to protect the workmen working on the switchgear. The protection shall be minimum IP20 inside the entire panel.

5.2.10 All fabrication work like cutting, drilling, punching, shearing & welding etc. related to switch board shall be complete before proceeding to 7 tank process. All interiors and exteriors of switchgear enclosure shall be finished and painted to prevent rusting and corrosion.

5.2.11 Sheet metal components shall be pre-treated using the seven tank phosphating process consisting of de-greasing, acid pickling, de-rusting, phosphating and passivation including repeated rinsing in between each process. On completion of passivation of the components they shall be preheated and then epoxy powder coated with Siemens grey RAL 7035 shade for exterior as well as interior and Glossy White shade for the gland plates (Inside the panel) and component mounting plate. Thickness of all painting shall be minimum 80 - 100 microns DFT.

5.2.12 Bus-bar rating of all panels shall be suitable for Continuous current rating at site conditions.

5.2.13 All bus-bars rated below and upto 63A shall be tinned copper whereas bus-bars rated greater than 63A shall be electrolytic grade Aluminium.

5.2.14 BIDDER shall ensure that incoming feeder shall be suitably designed for terminating the required no. of runs of 1.1kV grade XLPE insulated armoured cables with 20% spare capacity. BIDDER shall consider the necessary arrangement (dummy panel, adapter panel, rear extension etc.) if required, for terminating the cables within the limits specified above.

5.2.15 The bus-bars shall be designed considering the design criteria mentioned below;

(a) Maximum Current density of 1.5 A/ sq mm for copper and 1 A/ sq mm for Aluminum bus bars.

(b) Sleeves made of insulating material on all bus bars.

(c) Bus bars carrying rated current continuously at Design Ambient Temperature shall be considered as 50ºC and temperature rise shall be considered as per latest relevant standard.

(d) Configuration of bus bars and Proximity effect

(e) Bus bars shall withstand the short time rating of the panel.

(f) Bus bar supports shall only be SMC irrespective of bus bar size. The size of Neutral bus-bars shall be 100% of Phase bus-bars.

(g) All bus-bar shall be treated with anti-oxide paste wherever bi-metallic contact is required.

5.2.16 All the Terminals shall be Polyamide type. Sliding link type CT shorting terminals shall be provided for CT connections & screw / stud type terminals shall be provided for PT connections & other control circuit wiring.

5.2.17 20% extra terminals shall be provided for power as well as control for PURCHASER's use in each terminal strip/feeder.

5.2.18 All panels shall have Terminal block suitable for connecting minimum 6sq.mm. Conductor unless otherwise stated. There shall be no. joints or tapping between two terminals. More than two connections are not allowed from one terminal.

5.2.19 All power wiring for rating upto and including 63A shall be carried out with 1.1kV grade coloured FR PVC insulated, for phase identification, multi stranded copper wires duly crimped with ring type lugs.

5.2.20 Power connections for rating above 63A shall be done with bus bars (machine bend for proper profile) insulated with black heat shrinkable sleeves with phase identification coloured tapes duly supported on SMC insulators and placed with required minimum clearance of 25mm between phases and between phase to ground/ neutral. Such bus when brought out of the feeder for cable connections shall be sufficient enough and profiled suitable for termination of the required number of cables.

5.2.21 All panel Control wiring shall be done by 1.1kV grade HFFR/FR PVC insulated multi-stranded copper wire. CT circuit wiring shall be done with minimum 2.5 Sq.mm size wire of above specification. Control and Potential circuits shall be wired with minimum 1.5 sq. mm size wires of above specifications. Wires shall be gray coloured with suitable crimp able copper lugs. CT's & PT's wiring shall be colour coded for multi-phase identifications (R-Y-B-N).

5.2.22 It shall be VENDOR's responsibility to maintain uniformity across various items/panels being procured.

5.2.23 Panel wiring & cabling shall be cross-ferruled. Ferrules shall be etched & painted type.

5.2.24 The panels shall be provided with engraved Aluminum name plate & caution Board with danger sign for the required voltage class to meet safety regulation as per CEA Guidelines.

5.2.25 Adequately rated anti-condensation space heaters shall be provided for each panel. Space heater shall be of the industrial strip continuous duty type, rated for operation on a 240 V, 1 phase, 50 Hz, AC system

5.2.26 Each space heater shall be provided with a Double pole MCB with overload and short circuit release, and a control thermostat to cut off the heaters at 35 °C.

5.2.27 An Aluminum / GI Earth bus shall be run at the bottom of the Feeder Pillar which shall be connected to the earth leads at the two extreme ends for connecting the GI earthing strip from the electrode.

5.2.28 Two nos. GI Pipe earthing electrode shall be provided for each panel and connected with 25X3 mm GI earth strip. The pipe electrode shall be as per the latest version of IS 3043

5.2.29 All Panels shall be mounted on prefabricated Galvanised Steel Support structure duly fastened with a concrete foundation with grade M20

5.2.30 All doors and detachable components shall be earthed with flexible green coloured (with Yellow coloured band) PVC sheathed 2.5/ 4.0 sq mm. multistranded Copper cable.

5.2.31 The equipment shall be given tropical and fungicidal treatment.

5.2.32 Each compartment & component shall be provided with name plates (with black letters on white background) at front, inside & rear side.

5.2.33 Equipment nameplates shall be fixed by screws/ rivets and shall not be pasted.

5.2.34 Outdoor Main Incoming Panel

(a) Refer SLD for reference configuration with an incoming from the Grid.

(b) All panel mounted equipment shall be mounted on the internal door. The equipment shall be removable and replaced from the front only.

(c) 415V, 3 Ph, Four (4) pole, MCCB (Ics=Icu=100%) shall be provided for the Incomer of the MDB with microprocessor based Overload, Short circuit and Earth fault protections.

(d) All outgoings shall be four (4) pole MCCBs for 63A and above feeders and 4 pole MCBs for lesser rating outgoing feeders.

(e) R,Y,B indications shall be provided at the incoming MCCB; ON, OFF and TRIP indications shall be provided for all the MCCBs. Indicating lamps shall be of the Multi chip LED type with low watt consumption.

(f) One no. digital Multi-Function Meter (MFM) shall be provided on incomer bus. The Meter shall display essential electrical parameters like (but not limited to) current, voltage, kW, kVA, KVAr, kWH, MD, PF, Hz, etc. and shall have provision for remote communication with SCADA. Preferred Make and Model – L&T Make Quasar meter or equivalent.

(g) All instrument transformers shall be cast resin type and shall have insulation of class B or better.

(h) It shall be entirely the responsibility of the BIDDER to ensure that characteristics of CTs, VTs and all other devices offered by him are such as to be suitable for the purpose for which they are intended.

(i) The switchgear shall be complete with all equipment such as CT, VT, switches etc. duly wired up to terminal blocks. Terminal blocks shall be located at suitable place for easy access. CT shorting, isolating terminals, & earthing terminals shall be provided for CTs and isolating terminals shall be provided for VT connections. Twenty (20) percent spare terminals shall be provided in each cubicle. Ring type lugs suitable for termination of 2.5 sq mm copper wires shall be used.

5.2.35 Outdoor Lighting Distribution Panel

(a) 415V, 50 Hz, 3 Ph, four (4) Pole RCBO shall be provided as incomer for the OLDBs.

(b) All Outgoings shall be four (4) / Two (2) Pole MCBs.

(c) Operating height of the panel shall vary from 500mm to 1800mm. The panel should be mounted on suitable foundation such that it is atleast 400mm above FGL.

(d) The panel shall be made of CRCA sheet of atleast 2mm thickness. Proper neoprene rubber gaskets shall be provided at all doors and openings.

(e) The panel shall be for outdoor application provided with rain hood and IP55 protection.

(f) The panel shall have a toughened glass view panel at the operating side enabling reading the metering instruments.

(g) Astronomical Time Switch shall be provided in each OLDB for Auto Operation. The time switch shall be suitable for the following;

(i) Supply Volt – 110-240VAC, 50 Hz,

(ii) Programmable and Remote communicating

(iii) Precise time programming for Daily / Weekly / Pulse switching

(iv) 25 ON/OFF programs

(v) Weekend exclusion (FRI SAT or SAT SUN) and Weekly OFF programming

(vi) LED indication of Relay status

(vii) 12 / 24 hr. display formats

(viii) 6 years battery reserve

(ix) Simple Reset & Manual override

(x) Settable DST & Keypad Lock Feature

(xi) Min Switching Time 1 Minute, Clock Accuracy – +/-2s/day

(xii) No. of Operating Modes – 3 to 5

(xiii) Contact Rating – 16 A

(xiv) Mounting – DIN Rail

5.2.36 Indoor Wall mounted Distribution Boards (L+PDB) – For Bus stop / Bio tiolet

(a) Distribution Board shall be of industrial type, totally sheet steel enclosed of 2mm thick, double door construction, fully dust and vermin proof, wall/column mounting type with a degree of protection of IP – 52. The boards shall have welded back and sides and hinged door with gasket at the front with door handle and suitable locking device. Detachable cover plates shall be provided at the top and bottom for cable/conduit entry and suitable knock out shall be provided for this purpose. The DB after fabrication shall be subject to rust removal treatment and provided with epoxy powder coating followed by baking. The board shall have 2 No. earthing terminals suitable for 25mm X 6mm GI flat and mounting arrangement for wall/column mounting.

(b) Protective cover plates shall be provided inside the board to shroud all the live parts with only the operating knobs of MCBs protruding outside the cover plate. Adequate space shall be provided within the board to facilitate termination of incoming and outgoing flexible cable/conductor. The board shall be factory assembled and wired with HFFR/ FR/ FRLS insulated stranded copper wires. The MCB phase feeders shall be suitable for mounting on the DIN rail provided in the board. Tinned copper bus bar shall be used in the board.

(c) 20% spare outgoing circuits shall be considered per phase in each LP as spare.

(d) For all Distribution Boards and panels, RCCB sensitivity shall be 30mA.

(e) The power to the lighting and receptacle for the bus stop, bio-toilets shall be provided through the L+PDB (lighting and power distribution board). And L+PDB shall be supplied through MDB.

5.2.37 Junction Box

(a) Junction Boxes shall be suitable for 4CX16 Sqm Al PVC Insulated Armoured cable as incomer and 3 nos. 4CX4 sqmm PVC Insulated Armoured cable as outgoings shall be provided mounted at least 500mm above FGL on suitable steel supports for looping the power.

(b) The JBs shall be made of noncorrosive sustainable rugged material, with locking arrangements, conforming to IP 67 protection if mounted above ground and IP 68 protection if mounted recessed in ground.

(c) The terminal shall be suitable for termination of above cables comfortably. 20% spare terminals shall be provided in each JB.

(d) For ease of maintenance all the wiring shall be accessible from the front, cables will be neatly bunched in sides and adequate space should be there inside the box. For earthing two nos Bolted type earth terminals suitable to connect GI / Cu strip for earthing should be provided as per CEA regulations.

5.2.38 Outdoor Fountain Panel

(a) 415V, 50 Hz, 3 Ph, four (4) Pole MCCB shall be provided as incomer with short circuit, earth fault and over-current protections. The incomer should have Multi-function meter along with current transformer and potential transformer. Preferred Make and Model – L&T Make Quasar meter or equivalent. The incomer should have RYB phase indication and On / Off indication using cluster type LED lamps.

(b) Outgoings shall be MPCB for motor feeders with DOL Starter provision, MCB for lighting feeders. The breaker for the motor feeders shall be selected as per type 2 coordination requirement.

(c) Operating height of the panel shall vary from 500mm to 1800mm. The panel should be mounted on suitable foundation such that it is atleast 400mm above FGL.

(d) The panel shall be made of CRCA sheet of atleast 2mm thickness. Proper neoprene rubber gaskets shall be provided at all doors and openings.

(e) The panel shall be for outdoor application provided with rain hood and IP55 protection.

(f) The panel shall have a toughened glass view panel at the operating side enabling reading the metering instruments.

(g) All instrument transformers shall be cast resin type and shall have insulation of class B or better.

(h) It shall be entirely the responsibility of the BIDDER to ensure that characteristics of CTs, VTs and all other devices offered by him are such as to be suitable for the purpose for which they are intended.

(i) The switchgear shall be complete with all equipment such as CT, VT, switches etc. duly wired up to terminal blocks. Terminal blocks shall be located at suitable place for easy access. CT shorting, isolating terminals, & earthing terminals shall be provided for CTs and isolating terminals shall be provided for VT connections. Twenty (20) percent spare terminals shall be provided in each cubicle. Ring type lugs suitable for termination of 2.5 sq mm copper wires shall be used.

5.2.39 Prior to fabrication of the switchgear, the CONTRACTOR shall submit following for Purchaser Representative's approval - the dimensional drawing and design calculations indicating bus bar size, short circuit rating of all the electrical component used, internal wiring, components mounting details etc. The CONTRACTOR shall submit manufacturers catalogues of the electrical components installed in the switchgear. Documents to be submitted for approval after award of contract

(a) General Arrangement and sections of the Panel with dimension

(b) Control and Power wiring diagram

(c) Mounting arrangement drawing of steel structure for the Panels

(d) Type test certificate from Accredited laboratory for IP protection

(e) Foundation Details if any

(f) Cable schedule

5.2.40 Inspection

At all reasonable times during production and prior to dispatch of the switchgear to site, the CONTRACTOR shall arrange and provide all the facilities at their plant for inspection & testing of switchgear.

5.2.41 Cable Entry:

(a) The panel shall have provisions of cable entry from bottom. The removable cable gland plate shall be provided to make entry dust and vermin proof.

(b) The panel shall have provisions for fixing the multi-core cable glands.

(c) The cable glands support plates shall be 3 mm thick.

(d) Cable entries to the panel shall be from the bottom unless otherwise specified. Cable gland shall be double compression screwed type and made of brass.

5.2.42 Entire LV system shall be fuse less type.

5.2.43 Inspection

(a) At all reasonable times during production and prior to dispatch of the switchgear to site, the CONTRACTOR shall arrange and provide all the facilities at their plant for inspection & testing of switchgear.

(b) Routine and Acceptance Tests to be conducted by the manufacturer at their own risk and cost in presence of Purchaser/ Purchaser's representative during inspection & testing at manufacturer's works:

6.0 **CABLING SYSTEM:**

6.1 Cables Laid in Double Wall Corrugated (DWC) HDPE pipes –

(a) Buried cable up to 1.1 kV shall be laid in a Double Walled Corrugated (DWC) HDPE pipes at a minimum depth of 750 mm measured from FGL to the top of the highest pipe within the Pond area.

6.2 Armoured cables shall be laid upto the load point and further distribution can be carried out with Flexible cables laid in PVC/ HDPE flexible conduits laid buried. Four way Junction boxes shall be provided to loop the cables.

6.3 All armoured cables shall be 4C or 3.5C or both cables while the flexible cables shall be 3 Core cables.

6.4 Cable Glands

(a) Glands shall generally be of the double compression double seal weather proof hexagonal type brass glands. Earth continuity of brass glands shall be assured.

(b) Cable glands shall be brass casting, machine finished and Nickel-plated to avoid corrosion and oxidation. Rubber components used in cable gland shall be of neoprene. Cable glands shall be with metric threads.

(c) Gland shrouds shall be used and entry shall be sealed.

6.5 Point wiring in the Toilet block & Bus stop shall be done as per the following points,

(a) Point wiring work shall include the, PVC conduit, joints, connectors, conduit accessories, FRLS PVC insulated stranded copper conductor wires and earthing wires, pull boxes, ceiling rose, clamps, cleats, hardware, accessories, anchor fasteners, modular switch boards with cover plates, switches, sockets, box, blank plates, receptacles and all other necessary accessories as per specifications etc.

(b) Wiring shall be done in wire colour codes. Colour code of wire for Phases, Neutral and Earth shall be separate.

(c) Lighting fixtures shall be grouped on the single circuit wherever required. However, separate circuits shall be used for receptacles wiring. Wires of the different phases shall not be laid in the same conduit. Switchboard shall be recessed mounted.

(d) Point Wiring for the luminaries from the DB to the switchboard and from the switchboard to the luminaries shall be done with 750V grade min 2.5

Sq.mm (2Nos.-Ph+N) & 1.5 Sq.mm (for earthing of luminaire) PVC insulated, multistranded Cu conductor flexible wires running through 25mm inner dia., PVC conduit running concealed/exposed in false ceiling and concealed on brick wall.

(e) Point Wiring for the 6A Raw power socket from the DB shall be done with 750V grade 2.5 Sq.mm (2Nos.-Ph.+N) & 1.5 Sq.mm (for earthing of luminaire) FRLS PVC insulated, multistranded Cu conductor flexible wires running through 25mm inner dia., PVC conduit running concealed/exposed in false ceiling and concealed on brick wall.

7.0 EARTHING AND LIGHTNING PROTECTION SYSTEM

7.1 Earthing system shall be provided to ensure equipment safety, personnel safety and facilitate designed operation of protective switching during earth fault conditions in the associated system.

7.2 Applicable Standard: The general design shall be on the basis of following codes and standards (their latest amendments) in line with design criteria & specification requirements.

(a) IS 3043-1987 – Re-affirmed in 2006: Code of practice for Safety Earthing

(b) Central Electricity Authority (CEA) Regulations – 2010

(c) National Building Code 2016

7.3 The maximum values of earth fault current for the design of the earthing system shall be calculated as per the soil test report and IS 3043 standard.

7.4 CONTRACTOR has to carry out soil resistivity test at, at least 2 locations in each project area for which locations shall be provided by PURCHASER'S representative. Testing to be done at each site.

7.5 Soil resistivity shall be carried out by Wenner four electrode method as described in IS 3043. CONTRACTOR has to carry out the test in presence of Purchaser's representative & test shall be carried out keeping electrode spacing as 1, 2, 4, 6, 8, 10, 15, 25 M (each, along all 8 directions) as per normal practice and report has to be submitted. Polar curves shall be used for measurement of mean soil resistivity, which shall be used in finding earthing resistance at a particular location. Mean soil resistivity values shall be approved by Purchaser's representative.

7.6 The CONTRACTOR shall base his earthing calculations on actual measurement carried out by him in the presence of Purchaser/ Purchaser's Representative.

7.7 GI Pipe earthing electrodes shall be provided for all the equipment and systems. All the earth electrodes shall comply with the requirements specified in IS 3043 or as specified by CEIG/ TSECL.

7.8 The minimum spacing between two adjacent earthing pits shall not be less than 3000mm and shall be kept 1500 mm away from footings of the structure.

7.9 Earthing chamber shall be of RCC/ brick chamber of 600 mm x 600 mm, with Hinged cast Iron chequered cover plates. The covers shall have holes for handling. Earthing pits (chambers) shall be painted Green and the earth-pit number shall be marked on it.

7.10 Earth electrode provisions shall be made as follows;

(a) Outdoor Panels – 2 Nos. each

(b) Post top light, tree uplighters – 2 Nos for each pond area

7.11 GI/ Cu Earth flats, as applicable, of adequate size shall be provided for connecting the electrodes to the equipment

7.12 Minimum 8 SWG GI wire shall be carried along with the cable in the DWC/ HDPE pipe laid for distributing power to the landscape area.

7.13 Wherever earthing conductor passes through HDPE pipe, sleeves shall be provided. Both ends of the sleeve shall be sealed to prevent the passage of water through the sleeves.

7.14 For equipment earthing, two earthing leads will be used if rated voltage of the equipment is 250 volts & above and one earthing lead will be provided for equipment rated below 250 volts.

7.15 The earthing conductors in outdoor areas shall be installed at a minimum depth of 600 mm below FGL.

7.16 Lightning Protection:

The lightning protection system need will be established by calculating the risk factor value of each building/structure, structure etc. as per procedure given in IS/IEC 62305-2010/ NBC 2016 and if found necessary, the same shall be provided by the BIDDER.

7.17 Drawings/ Documents Required:

(a) The BIDDER shall submit the Earth resistivity measurement Report duly attested.

(b) Earthing calculations based on the above earth resistivity and the calculated or estimated fault level.

(c) Layout drawings showing the location of earthing grid, electrodes, interconnection grids and earthing leads to various equipment, isolating links etc.

8.0 LANDSCAPE LIGHTING LUMINARIES

8.1 Environmental Conditions

The average atmospheric condition during the year is mentioned below. The equipment shall be designed to work in such environmental conditions:

(a) Maximum ambient air temperature: 50° C

(b) Minimum ambient air temperature: 5° C

(c) Max. Relative humidity: 90%

(d) Atmosphere: Dusty and Humid

The equipment shall be suitable to sustain and work in the humid and dusty atmosphere of Agartala.

8.2 Luminary/Fixture Description

8.2.1 All Luminaires shall be UL/CE certified, robust & sturdy, manufactured out of Quality raw material/ inputs with proper Quality checks at each step designated to last long in the kind of application they are selected to work.

8.2.2 All selected Luminaires shall be minimum IP65 protected and certified for IK 07. Underwater luminaires shall be IP68 protected. The recess mounted luminaires shall be IP68 protected.

8.2.3 All luminaires shall be manufactured from well binned LEDs to provide and maintain same Colour consistency over long duration of operations.

8.2.4 The Luminaires shall offer Flicker free output for long duration.

8.2.5 All Luminaires shall be Suitable to operate at auto-switching input voltage for 100 – 240 VAC, 50 Hz power supply with the tolerances as mentioned in the data sheet.

8.2.6 The luminaire light output (lumen) shall be constant and shall be able to withstand allowable supply source voltage variations/ fluctuations, spikes.

8.2.7 The entire fixture shall consume rated wattage as per data sheet maximum at full output.

8.2.8 The LED luminaries shall be single, self-contained device with integral electronic control gear, without requiring on-site assembly for installation.

8.2.9 Fixture shall have lens options.

8.2.10 All the Luminaire shall be complete with necessary accessories & mounting arrangements.

8.2.11 The Luminaries shall have housing as mentioned in datasheet.

8.2.12 The Luminaries Housing shall be suitable for termination of 4C X 2.5 sqmm copper conductor PVC insulated flexible Cable with Double Compression Cable Glands

8.2.13 All the connecting wires inside the Luminaire shall be low smoke halogen free, fire retardant cable.

8.2.14 Luminaires should conform to the IS standards for Safety & Performance and test certificates as per IS 16107 should be provided by the manufacturer. In case of luminaires are imported, the BIDDER shall conform to test parameters as per equivalent standards.

8.2.15 The electrical component of the LED and LED driver must be suitably enclosed in sealed unit to function in environment conditions mentioned earlier.

8.2.16 Design of the thermal management shall be done in such a way that it shall not affect the properties of the diffuser.

8.2.17 All LED fixtures shall undergo a minimum 24-hour burn-in test during manufacturing.

8.2.18 The LED fixture shall be operated at constant and carefully regulated current levels. LEDs shall not be designed to be driven beyond their specified nominal voltage and current.

8.2.19 High-power LED fixtures shall be thermally protected using metal core board, gap pad, and/or internal monitoring firmware thermal management techniques.

8.2.20 LED fixture housing shall be designed to transfer heat from the LED board to the outside environment. Design of the thermal management shall be done in such a way that it shall not affect the properties of the diffuser.

8.2.21 The equipment should be compliant to IEC 60598-1, IEC 62031 and IEC/ PAS 62612 depending on the type of luminary.

8.2.22 All the material used in the luminaries shall not contain any toxic material/ metal like mercury; shall be halogen free and fire retardant confirming to relevant standards.

8.2.23 The control gear shall comply with the provisions of IEC 61347-2-13, IEC 62031 and IEC 62384 as appropriate.

8.2.24 LED luminaries, should conform to the various National / International standards for safety & performance. Manufacturer should provide test reports as per LM 79 & LM80. **The test report from NABL accredited laboratory shall be submitted along with the technical proposal/ Bid for LED as well as Luminaires.**

8.2.25 Outdoor LED fixtures shall comply with Random Vibration MIL-STD 810 Category 24, pass temperature range operational testing from –40° C to 50° C, pass high-temperature operating testing up to 50° C, meet lumen maintenance standards as per LM-80, pass water ingress testing, and pass general endurance testing.

8.2.26 All hardwired connections to LED fixture shall be reverse-polarity protected and shall provide high-voltage protection in the event that connections are reversed or shorted during installation.

8.2.27 Adequate protection against Overloading, Short Circuit, Over Voltage, Over temperature, Under Voltage, String Open shall be provided within the Luminaries.

8.2.28 In Agartala the switching surges are expected in the power supply system. Appropriate surge protection shall be provided by the CONTRACTOR for all the Luminaires offered by it. Such protections can either be provided centrally at the Feeder Pillar or at each individual luminaire level or a combination of both, as may be decided by the CONTRACTOR. No claim for failure of Luminaires, on account of voltage surges other than Lightning surges, will be considered.

8.2.29 The Luminaires shall be suitable for operation within the input supply voltage range specified. The driver of the light should be able to sense and cut-off power to the light in case of phase-to-phase/ 440 V fault. No claim in this regard shall be considered.

8.2.30 The lighting fixtures offered shall comply with the data sheet.

8.2.31 The luminaire shall have a warranty period of 5 years.

8.2.32 The bidder shall develop and submit as built drawings and operational manuals for all the fixtures installed to ASCL or its representative after the completion of work.

8.2.33 All Luminaries under installation CONTRACTOR’s supply scope shall be guaranteed against quality (including any component failure and deterioration/appearance of corrosion symptoms. This shall also cover any fading

(reduction)/ deterioration of reflector coating). In such case the defective luminaire shall be replaced without any cost. In case identical defects are observed on more than 5% of particular type of luminaire (installed quantity), then the complete lot of supplied/ installed luminaires of similar type shall be replaced free of charge).

8.2.34 Offers shall include comprehensive technical details of the luminaires being offered. The details must be sufficient to take in to consideration maximizing of energy efficiency and minimizing overall power consumption.

8.2.35 Year of Manufacture, Batch No., Serial Number or Identification No. Luminaries Manufacturer's Name / Logo, Wattage and Frequency should be embossed on the housing.

8.2.36 Maintenance Requirements:

Bidder shall supply maintenance tools including special tools, if required, for attending to the equipment supplied at no extra cost. As far as practicable, the equipment and accessories shall be so designed that no special tools are necessary for installation and maintenance of the equipment. However, if special tools are required, the Bidder shall include price of one complete set for each type of equipment

8.2.37 Storage At Site

(a) BIDDER shall indicate the specific requirements, if any for proper storage of the equipment supplied at site.

(b) In general, while shipping the equipment to site, Vendor shall ensure that each assembly or component shall be crated, boxed or otherwise suitably protected against damage or loss during shipment and to facilitate site storage. All openings shall be effectively sealed with temporary closures to prevent entry of dust, dirt, moisture and other foreign matter.

8.2.38 Documents to be submitted by BIDDER

(a) CONTRACTOR shall submit all following test reports for LED lighting fixtures before dispatching of material at site. All tests shall be carried as per IES/IEC/BIS approved methods defined in the respective standards (LM-82).

(i) LM-80 for measurement of lumen of LED source.

(ii) LM-79 for fixture-Electrical & Photometric measurement.

(iii) TM-21 test for LED life.

(iv) Thermal Characteristic- Test for Lumen output temperature dependency.

(v) Electrical Characteristic- Test for the calculation of efficacy.

(vi) Driver testing for Power factor, THD & Isolation.

(vii) IP Protection test against ingress of dust & solid objects for both indoor & outdoor LED fixtures.

(b) Data sheet of offered Luminaries along with GA dimensional drawings with all views of Luminary

(c) Operating/fixing manuals / technical leaflets giving all the details of Installation, operation and maintenance.

8.3 Data sheets for Luminaires -

8.3.1 **For Tree Uplighter Luminaries**

Table 1– Uplighter Light Data Sheet

Parameters	Requirement
Type	LED Luminaries complete with all accessories for Tree Lighting
Make of LED	Cree/Nichia/Osram/Lumileds
Body of fittings	Die Cast Aluminium
System Wattage at maximum output, steady state	9W
Luminaries capable for color changing	No
Beam Angle	36 deg beam
Lumens Output	Minimum 769 Lumens
Operating voltage	100-270 V AC
Lumen maintenance L70 B10 at 25degree	50000 Hours @L70 50 Degree C
Operating Temperature	0 to+ 45 Deg Centigrade
Ingress Protection	IP67
Mandatory Certification	Luminaire should be UL/cUL/FCC/Class A/CE/PSE certified.
Mandatory test reports	LM-79,LM80
Luminaire connectors	Weather proof IP rated connectors
Surge Protection	Minimum 5kV
Lens type	Tampered Glass

Model	Philips cat no - BGP161 LED2300/WW PSU 220-240V 7043 IN or equivalent

8.3.2 **For Post Top Lighting Luminaries-**

Table 2 – Post top Light Data Sheet

Parameters	Requirement
Type	LED Luminaries complete with all accessories for Tree Lighting
Make of LED	Cree/Nichia/Osram/Lumileds
Body of fittings	Die Cast Aluminium
System Wattage at maximum output, steady state	27W
Luminaries capable for color changing	No
Lumens Output	Minimum 2300 Lumens
Operating voltage	220-270 V AC
Lumen maintenance L70 B10 at 25degree	50000 Hours @L70 50 Degree C
Operating Temperature	0 to+ 45 Deg Centigrade
Ingress Protection	IP65
Mandatory Certification	Luminaire should be UL/cUL/FCC/Class A/CE/PSE certified.
Mandatory test reports	LM-79,LM80
Luminaire connectors	Weather proof IP rated connectors
Surge Protection	Minimum 5kV
Lens type	Tampered Glass
Model	Philips cat no BBP330 9xLED HP/WW 220-240V 12 1N- or equivalent

9.0 **MAKE LIST**

Table 3: Make List

Sr. No.	Material/ Equipment	Vendor
A	Outdoor Panels	Manufacturer with Type Tested Design at CPRI or equivalent labs for minimum Heat Run test, Short circuit test, and IP protection tests.

Sr. No.	Material/ Equipment	Vendor
1.	Switchgear	Siemens, ABB, Schneider Electric, L&T
2.	Potential & Control Transformer	Kappa, Pragati ,AE
3.	Current Transformer (Cast Resin Epoxy Coated)	Kappa, Pragati ,AE
4.	Load Manager/ MFM	Schneider, Siemens, L&T, Secure
5.	Change over switch (automatic/ manual)	HPL, Hager, Socomec, GE
6.	Indicating Lamps	Siemens, Schneider ,ABB ,L&T BCH, Tecknic
7.	Selector Switches	Kaycee, ABB, Siemens, Salzer
8.	Alarm Annunciator (solid state type with LED illumination) / Facia Annunciator	Minilec ,Yashmun
9.	Push Buttons	ABB, L&T, Schneider ,Siemens, BCH, Tecknic
10.	Capacitor (APP) / Series reactors / APFC relay	Schneider, EPCOS, ABB ,L & T
11.	Space heater	Girish or equivalent
12.	Terminal Blocks /connectors	Jainson , Elmex, Connect well Wago

Sr. No.	Material/ Equipment	Vendor
13.	Astronomical Timer	ABB, Siemens, GIC, L&T
B	Lighting system	
1.	LED Fixture	Wipro, Philips, Bajaj, Havels or equivalent
2.	LED	Cree, Nichia, Philips, Osram
3.	MS Black Stove Enamelled ERW Conduits/GI pipes(ISI Approved) & accessories	AKG , Zenith , SAIL , TATA Steel
4.	UPVC Conduit/JB/flexible conduit / tees/ Bevels, elbow & accessories	Precision , Polycab
5.	Copper Conductor PVC Insulated Wires/ Stranded Flexible Wires (FRLS) (including pzanel wiring)	Finolex, RR Kabel, KEI, Havel
C	Receptacle system	
1	Modular Switches, Socket Outlets And Wiring Accessories With Moulded Cover Plate.	Legrand , Crabtree , Clipsal , Anchor, MK
2	Metal Clad Plug & Socket (Industrial)	Legrand, Menekkes , Schneider , BCH
D	Cables	
1	HT Armoured Cable	As approved by TSECL
2	LT armoured Cable	Finolex, RPG, Polycab, Universal

Sr. No.	Material/ Equipment	Vendor
3	LT Flexible Cable	Finolex, RPG, Polycab, Universal
4	Cable Gland	Comet, Dowells, Braco
5	Cable Lugs	Comet, Braco, Dowells
6	Cable termination Kit	Raychem, 3M
7	Cable Jointing Kit	Raychem, 3M
F	Earthing Strip, and accessories	Shruti, Profab, Sadhana, Sterlite
E	Misc.	
1	Fire Sealant & Fire Retardant Paint	3 M India Ltd., HILTI, Promat, OBO

10.0 LIST OF DRAWING AND DOCUMENTS

10.1 Equipment Sizing calculations with assumptions made; General Arrangement; Equipment Data sheet indicating compliance to all the requirement as asked for in the specifications; Type test certificates as required for the key tests like SC test, Temperature rise tests, IP Protections tests; Foundation Drawings with calculations; Cable Schedules; Interconnection Schedule; and other construction drawings shall be provided.

10.2 The Following minimum Documents shall be submitted by the BIDDER to PURCHASER for the approval

10.2.1 LV Panels – Floor Mounted and Wall Mounted

(a) GA Drawing

(b) Door open view of Wall mounted Distribution boards

(c) Data sheet of major Equipment

(d) Data sheet of motor starter

(e) Wiring Diagram

(f) Type test Certificate for Short Circuit withstand capacity

(g) Type test certificate for IP protection

(h) Bill of Quantities

(i) Makes Of Components offered

(j) Bus bar sizing calculations

(k) Foundation drawings

10.2.2 Construction Drawings of the following for Toilet & Bus stop

(a) Lighting Layout

(b) Receptacle Layout

(c) Switch Board Schedule

(d) Point Wiring Drawing for Lighting and power

10.3 The BIDDER shall depute competent engineers to PURCHASER's / CONSULTANT's office for discussions and finalization of any outstanding issues when called upon by PURCHASER/CONSULTANT

10.4 Both hard and soft copies of all BIDDER drawings shall be furnished right from approval stage.

10.5 The BIDDER shall plan his manufacturing schedule so as to allow at least two weeks time for approval of the drawings after their receipt by the PURCHASER.

10.6 Upon completion of the installation, the BIDDER shall furnish the following:

(a) Three (3) Complete set of construction As Built drawings

(b) Soft copies of the construction As Built drawings in CDs.

(c) Four (4) Sets of All Instruction and Operation & Maintenance Manuals for each equipment

(d) Two (2) Sets of Test Certificates of equipment provided by the BIDDER along with that of the respective Components outsourced.

10.7 The PURCHASER shall reserve the right to comment on drawings and documents under information category and inform the BIDDER to treat these drawings and documents as approval category.

10.8 PRE COMMISSONING TESTS ON ELECTRICAL SYSTEM EQUIPMENT TO BE CARRIED OUT AFTER INSTALLATION:

10.8.1 PRE-COMMISSION TESTS: Pre-commissioning tests in addition to mentioned in the specification requirements for various equipments but not limited to following shall be carried out by CONTRACTOR in presence of Purchaser/ Purchaser's representative. Commissioning shall be carried out only after obtaining satisfactory results, acceptable to Purchaser/ Purchaser's representative.

(a) LT Metal Enclosed Switchgears:

(i) IR Values of power & control circuits.

(ii) Mechanical charging - closing - tripping of breaker.

(iii) Electrical charging - closing - tripping of breaker.

(iv) Trip circuit healthiness and tripping through relays.

(v) Remote closing / Tripping / Interlocks circuits

(vi) Indication / Annunciation / Panel space heater circuit / Spare contacts for customer use

(vii) Secondary injection testing of protective relays/ releases.

(viii) CT testing for polarity, ratio, IR values and magnetization for class PS characteristics

(ix) PT testing for ratio, IR values.

(x) IR Values of breaker.

(xi) Testing of modules for DOL/ Star-Delta/ ATS/ Soft Starter starting or any other starting method as per the schematic drawings applicable.

(b) Power and Control Cables:

(i) IR Values before Hipot

(ii) Hipot Test - Measurement of leakage current

(iii) IR Values after Hipot

(iv) Control Panels for Miscellaneous Equipment:

(v) IR Values of all power circuits

(vi) Operational test and scheme - wiring testing as per control schematics

(c) Lighting System:

(i) Visual inspection for operating problems

(ii) System activation -burning in the lamps for 100 Hrs

(iii) Measuring light level & reflectance.

(d) Earthing System:

(i) Earthing resistance of each electrode.

(ii) Earthing resistance of grid.

ELECTRICAL DATA SHEETS

TECHNICAL DATA SHEETS (ELECTRICAL WORKS)

TABLE OF CONTENTS

Sr. No.	Description
1.0	Power, Control, Instrumentation Cables
2.0	Light Fitting
Note:	
1.0	Technical Schedules cover only salient features of equipment offered by the Contractor. The Contractor shall certify that the specification requirements are fully complied with, except those specifically brought out in Schedule of Deviations from Technical Specification.
2.0	For (*) items, Bidder to provide Quantity/ Ratings based on Design Criteria & Specification requirements. Ratings & Configuration, wherever specified (in Technical specifications/ Data Sheets/ Price Schedule/ SLD) for equipments, shall be minimum requirements. Electrical Switchgears/ Distribution Board Configuration (components/ equipment/ protections/ metering/ instruments) shall be as per indicated in typical reference SLDs & in line with design criteria & specification requirements.
3.0	Bidder to provide completely filled data sheets for the below mentioned equipments. As applicable, separate data sheets needs to be filled for each equipment/ system covered under works.

1.0 POWER CABLES

Sr. No.	Description	Unit	To be filled By Bidder
1	11 kV (E), multi strand, Al, XLPE insulated, inner & outer extruded PVC sheathed, Round GI Strip armoured power cable (as required)		
a)	Make		
b)	Applicable Standards		
2	1.1 kV, multi strand Cu/ Al, XLPE insulated, inner & outer extruded PVC sheathed, GI armoured power/submersible cable (Cu conductor cable & GI round wire armoring for sizes upto 4 sq mm & below, for balance all, above 4 sq. mm conductor size- Al conductor & GI flat strip armouring) (Cu conductor, double PVC sheathed, water tight, flexible cable for submersible pump application)		
a)	Make		
b)	Applicable Standards		
3	1.1 kV, multi-strand Cu, XLPE insulated, inner & outer extruded PVC sheathed, GI armoured control cables		
a)	Make		
b)	Applicable Standards		
c)	GENERAL		
	Type of Cable Gland (Suitable for Cable Size as per requirement)		
	Type of Cable Lugs (Suitable for Cable Size & material or bimetallic - as per requirement)		
	All Cable accessories as per specification requirements to be provided.		

2.0 LIGHT FITTING

Sr. No.	Description	Unit	To be filled by Bidder
1	**Uplighter**		
(a)	Type		
(b)	Make of LED		
(c)	Body of fittings		
(d)	System Wattage at maximum output, steady state		
(e)	Luminaries capable for color changing		
(f)	Beam Angle		
(g)	Lumens Output		
(h)	Operating voltage		
(i)	Lumen maintenance L70 B10 at 25degree		
(j)	Operating Temperature		
(k)	Ingress Protection		
(l)	Mandatory Certification		
(m)	Mandatory test reports	LM 79,LM 80	
(n)	Luminaire connectors		
(o)	Surge Protection	kV	
(p)	Lens type		
(q)	Model		
2	**Post Top**		
(a)	Type		

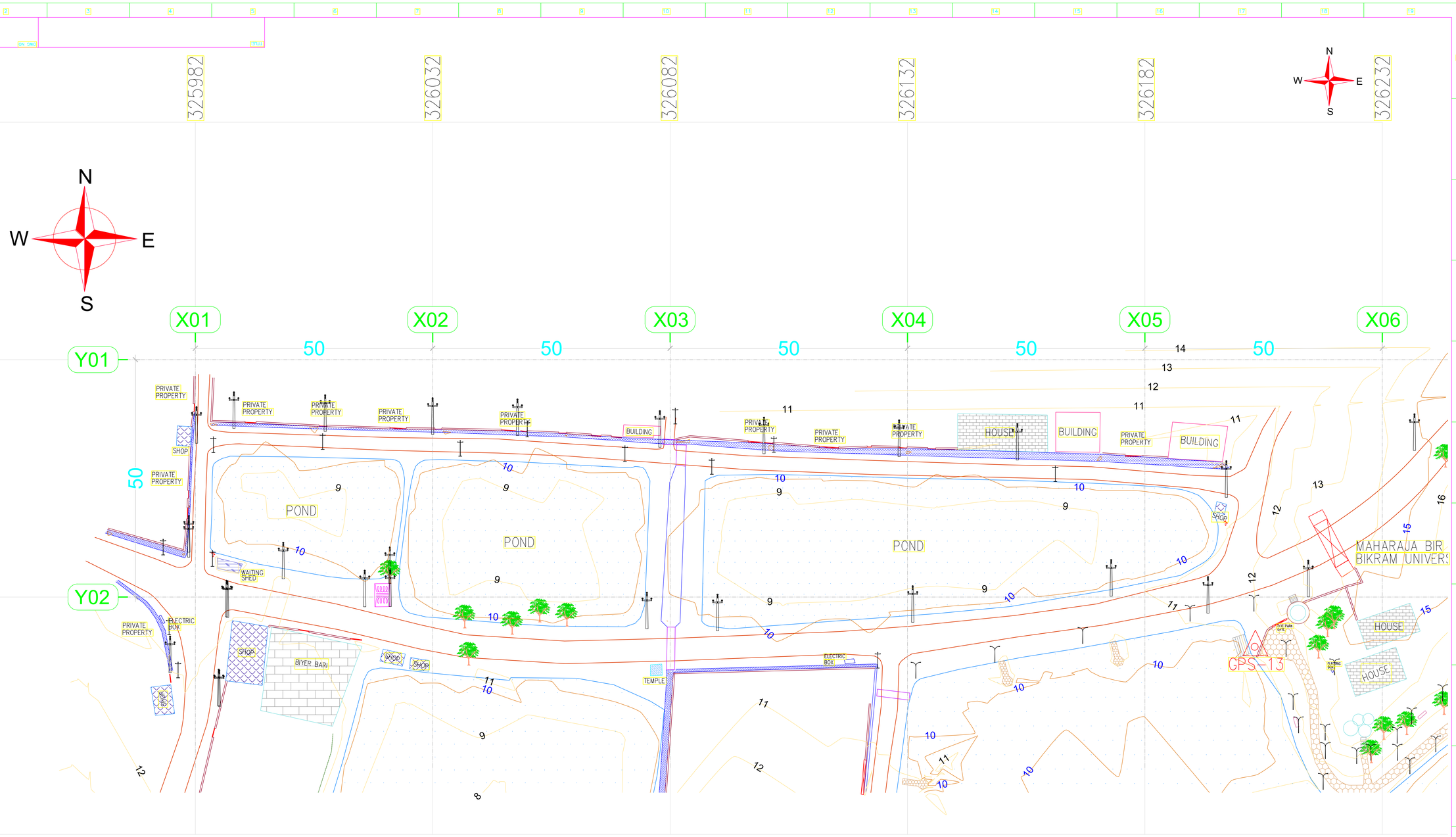
Sr. No.	Description	Unit	To be filled by Bidder
(b)	Make of LED		
(c)	Body of fittings		
(d)	System Wattage at maximum output, steady state		
(e)	Luminaries capable for color changing		
(f)	Lumens Output		
(g)	Operating voltage		
(h)	Lumen maintenance L70 B10 at 25degree		
(i)	Operating Temperature		
(j)	Ingress Protection		
(k)	Mandatory Certification		
(l)	Mandatory test reports	LM 79,LM 80	
(m)	Luminaire connectors		
(n)	Surge Protection	kV	
(o)	Lens type		
(p)	Model		

SECTION – VII

DRAWINGS

LIST OF DRAWINGS:

SL NO	DRAWING NUMBER	DESCRIPTION
	TOPOGRAPHICAL SURVEY	
1	TCE-10918A-AC-1018-LP-10301	Topographical Survey Plan
	LANDSCAPE	
2	TCE-10918A-AC-1018-LP-10302	Plan and Sections
3	TCE-10918A-AC-1018-LP-10302	3D Visualizations
	PLUMBING	
4	TCE.10918A-CV-3019-GA-30001	Tentative GA of Storm Water Drain between Lake-2 & Lake-3
	FOUNTAIN	
5	P-10768	Fountain Details
	ELECTRICAL	
6	TCE.10918A-EL-4000-AU-40020	Single Line Diagram



TOPOGRAPHICAL SURVEY PLAN

L E G E N D		
SL.NO.	DESCRIPTION	SYMBOL
1.	ROAD	
2.	WALL	
3.	IRON FANCHING	
4.	POND	
5.	HOUSE	
6.	BUILDING	
7.	DRAIN	
8.	BOX CULVERT	
9.	BENCH	
10.	GATE	
11.	PAVER BLOCK	

L E G E N D		
SL.NO.	DESCRIPTION	SYMBOL
12.	STEP	
13.	TEMPLE	
14.	MAJOR CONTOUR	
15.	MINOR CONTOUR	
16.	TREE	
17.	ELECTRIC POLE	
18.	TELEPHONE POLE	
19.	LIGHT POLE	
20.	TRANSFORMER	
21.	GPS POINTS	

	SIGN.	INITIALS	REVISIONS	DRN	DSN	CHD	CV	EL	IC	ME	PE/PM	APPD	DATE
ISSUE									CLEARED				
													29-08-2018

Purpose : FOR TENDER PURPOSE ONLY

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FILE NAME: F:\090-Rev-R0.dwg

AGARTALA SMART CITY LIMITED

AGARTALA, TRIPURA

IMPROVEMENT OF THREE PONDS AT SHIVNAGAR

TOPOGRAPHICAL SURVEY PLAN

TATA CONSULTING ENGINEERS LIMITED

MUMBAI

SCALE	1:1000	DWG. NO.	ISSUE
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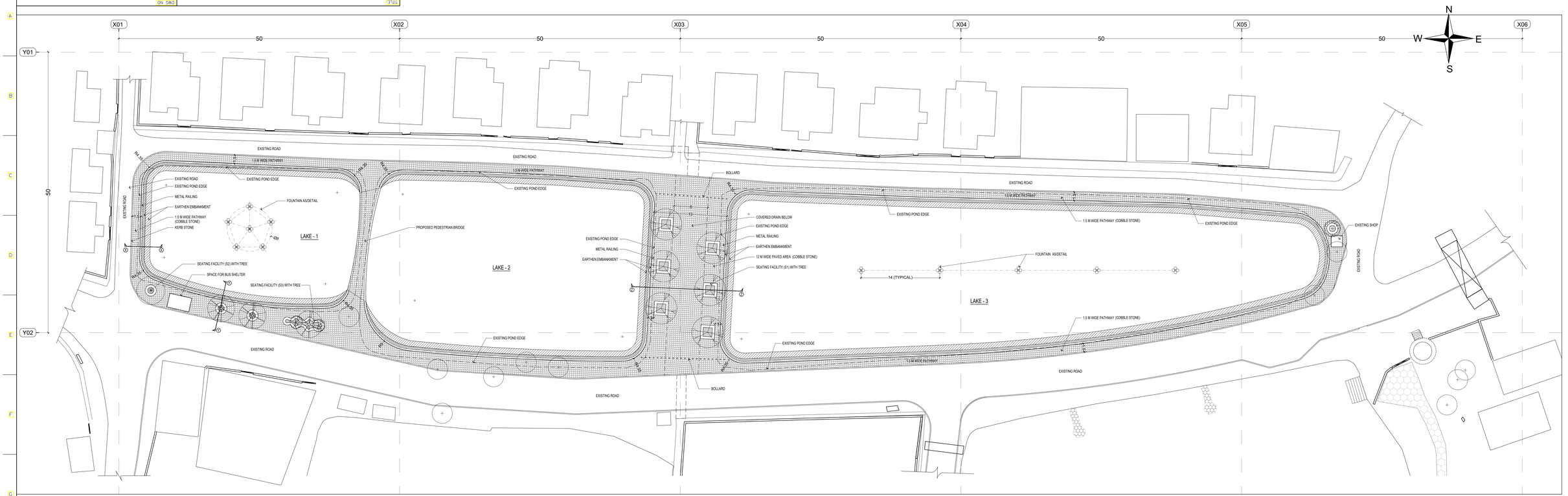
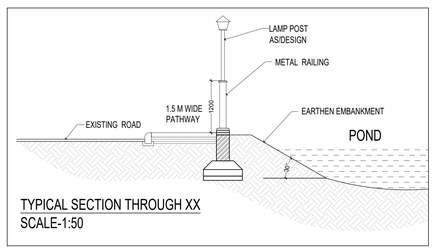
TCE FORM NO. 090 R0





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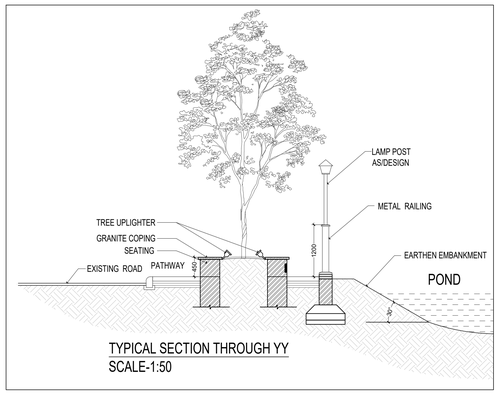

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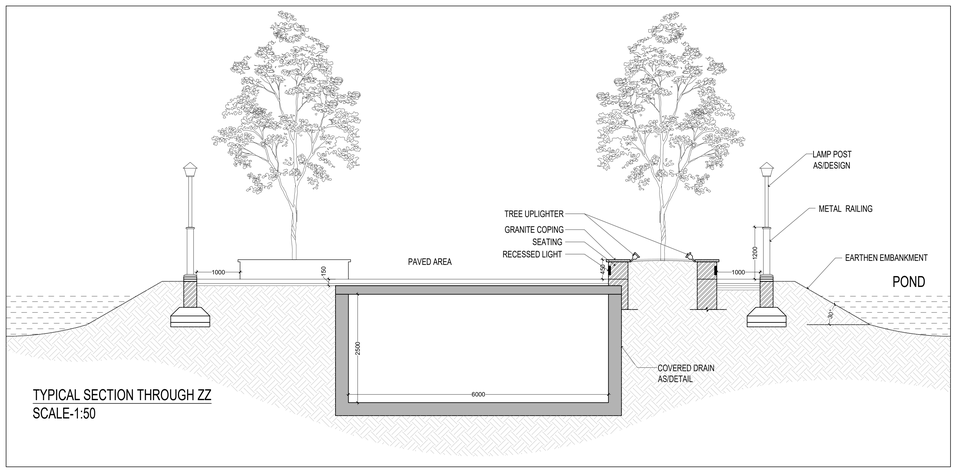

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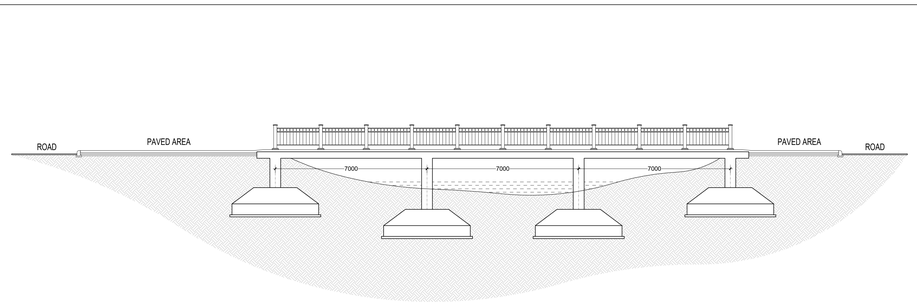

INDICATIVE ELEVATION OF PEDESTRIAN BRIDGE
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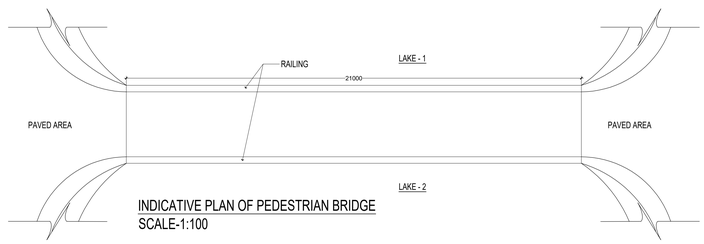

INDICATIVE PLAN OF PEDESTRIAN BRIDGE
SCALE-1:100

LEGEND:
- COBBLE STONE
- GRASS
- GREEN SHOULDER
- EARTHEN EMBANKMENT

LEGEND:
- EXISTING TREE
- GULMOHOR / *Delonix regia*
- RADHACHURA / COPPERPOD / *Peltophorum pterocarpum*
- AMALTAS / *Casia fistula*
- CHAMPA / *Plumeria alba*
- SHIRISH / *Albizzia lebbek*

ISSUE		DRN	DSN	CHD	CV	EL	IC	ME	PE/PM	APPD	DATE
SIGN. / INITIALS / REVISIONS											
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FILE NAME:

AGARTALA SMART CITY LIMITED

AGARTALA, TRIPURA

IMPROVEMENT OF THREE PONDS AT SHIVNAGAR
PLAN & SECTIONS

TATA CONSULTING ENGINEERS LIMITED

MUMBAI

SCALE : 1:250

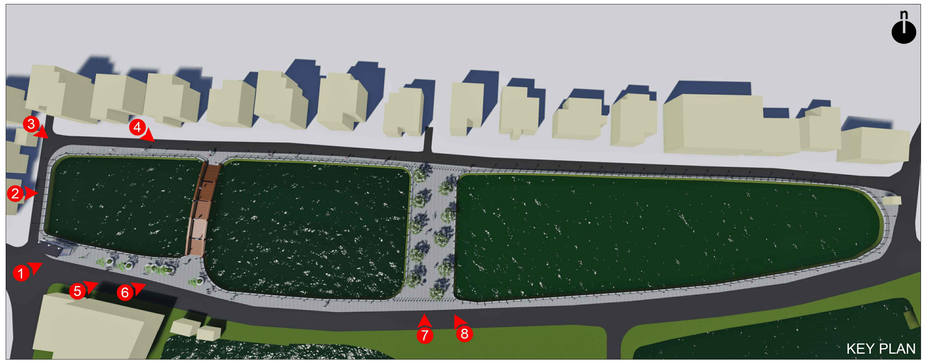
DC & DISC DC-MUM

Doc. No. TCE.10918A-AC-1018-LP-10302

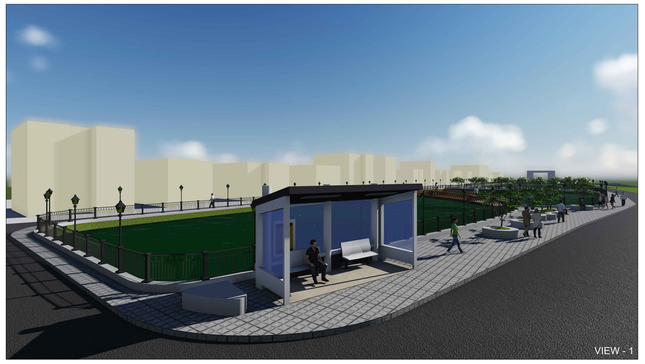
ISSUE P0

TCE FORM NO. 090 R5

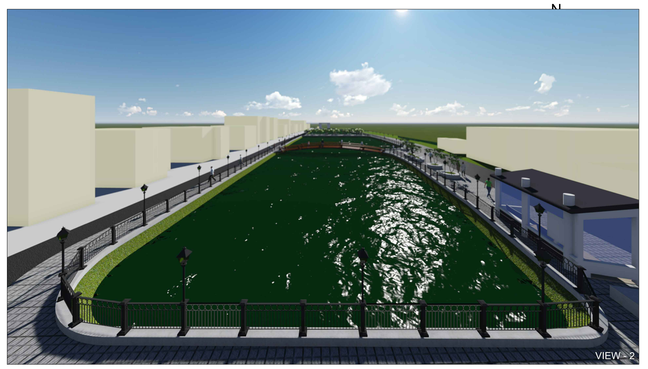
FILE NAME: F-090-Rev-R0.dwg



AERIAL VIEW



VIEW-1



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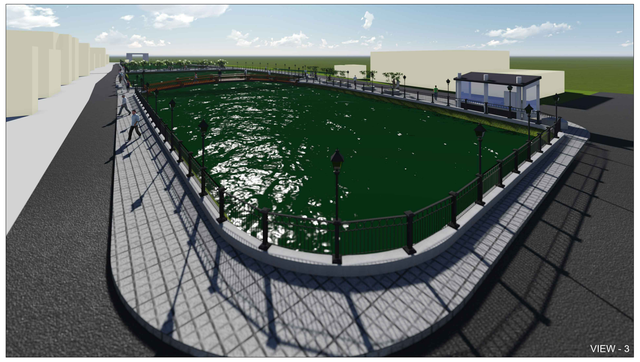
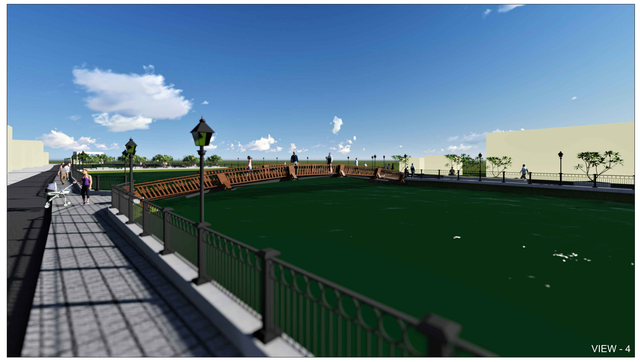


VIEW-3



VIEW-4

VIEW-5

VIEW-6

VIEW-7

VIEW-8

VIEW-9

FOUNTAINS AT LAKE-1

FOUNTAINS AT LAKE-3

PROCEEDING WITH ANY CONSTRUCTION / FABRICATION WORK RELATED TO 'HOLDS'.

FILE NAME: F-090-Rev-R0.dwg

ISSUE	DRN.	DSN.	CHD	CV	EL	IC	ME	PE/PM	APPD.	DATE
				CLEARED						

SIGN.
INITIALS
REVISIONS
29-08-2018

AGARTALA SMART CITY LIMITED
AGARTALA, TRIPURA

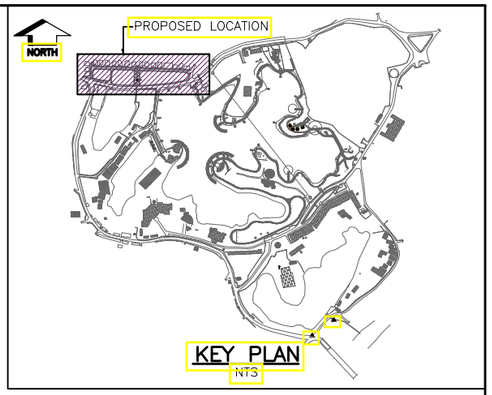
IMPROVEMENT OF THREE PONDS
AT SHIVNAGAR
3D VISUALIZATIONS

TATA CONSULTING ENGINEERS LIMITED
MUMBAI

SCALE: 1:250
DC & DISC: DC-MUM
Doc. No.: TCE.10918A-AC-1018-LP-10303
ISSUE: P0
TCE FORM NO. 090 R0

TENTATIVE GA OF STORM WATER DRAIN BETWEEN LAKES 2 & 3 IN MBB-3 LAKE DEVELOPMENT

1:100



KEY PLAN

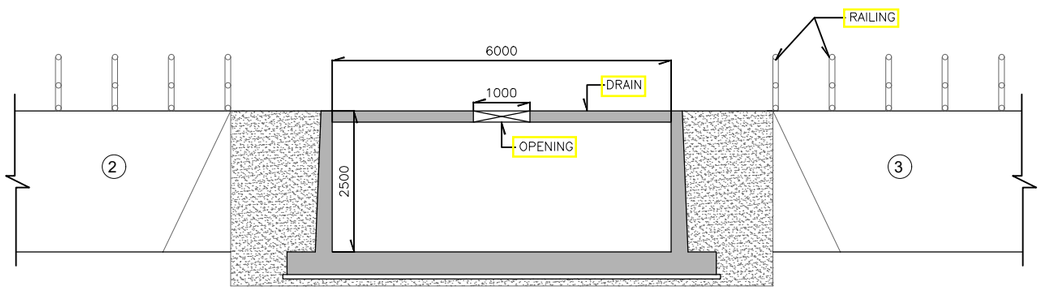
NTS

LEGEND

- RCC
- PCC
- OVERFLOW PIPE/ CHANNEL
- OPENING

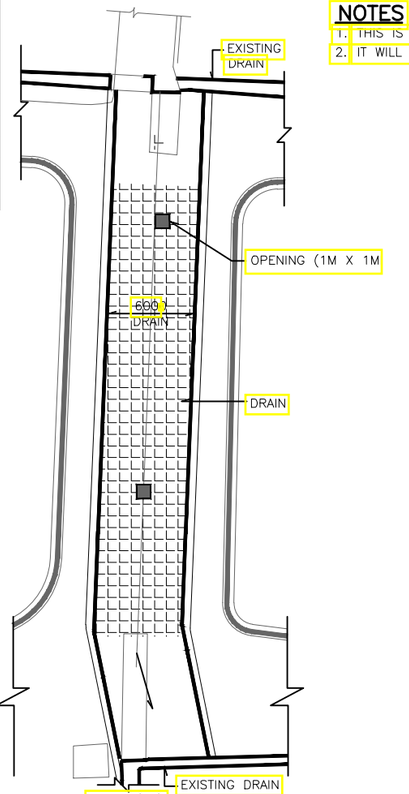
NOTES

1. THIS IS A TENTATIVE GA.
2. IT WILL BE DETAILED AFTER SURVEY LEVELS.



SECT. 1-1

1:1000



DET.'A'

1:250

FOR RO ISSUE ONLY			ISSUE	REVISIONS	DRN	CLEARED				APPD	DATE	FILE NAME :
CLEARED						CHEM	CIVIL	ELEC	I&C	MECH			
DEPT	SIGNATURE	DATE										
CHEM												
CIVIL												
ELEC												
I&C												
MECH												

FILE NAME: F043R4.DWG

TATA CONSULTING ENGINEERS LIMITED

MUMBAI

CLIENT : AGARTALA SMART CITY LIMITED

PROJECT : AGARTALA SMART CITY LIMITED

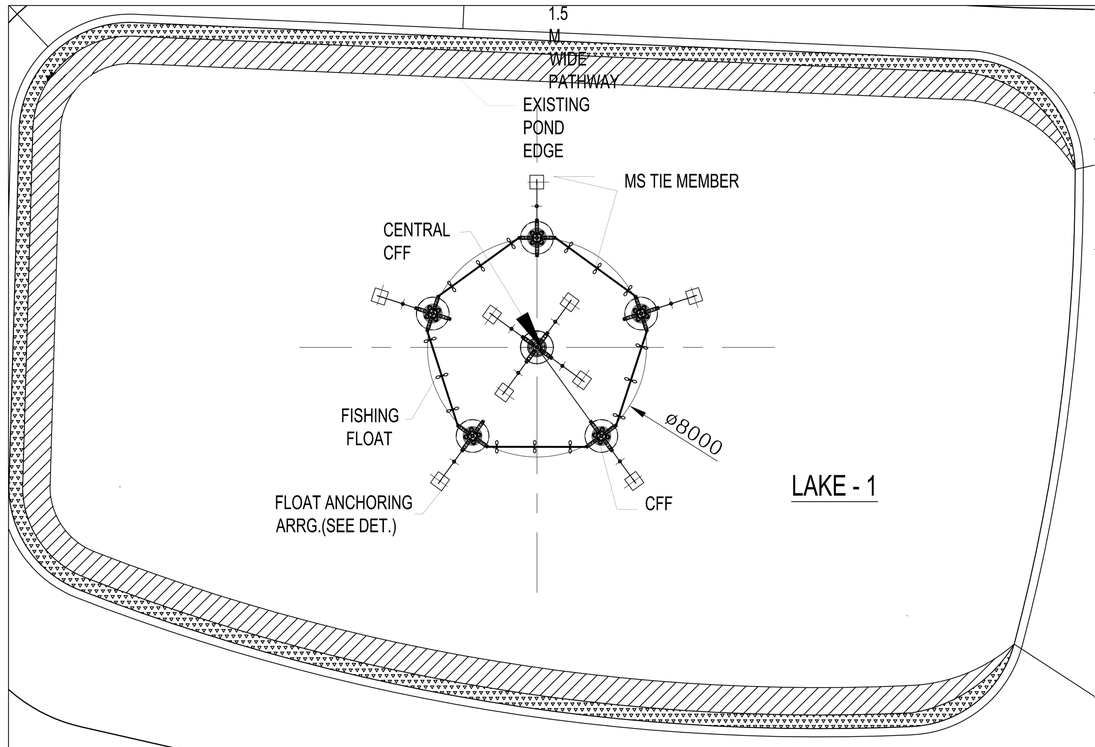
DO NOT SCALE

TENTATIVE GA OF STORM WATER DRAIN BETWEEN LAKES 2 & 3 IN IMPROVEMENT OF THREE PONDS

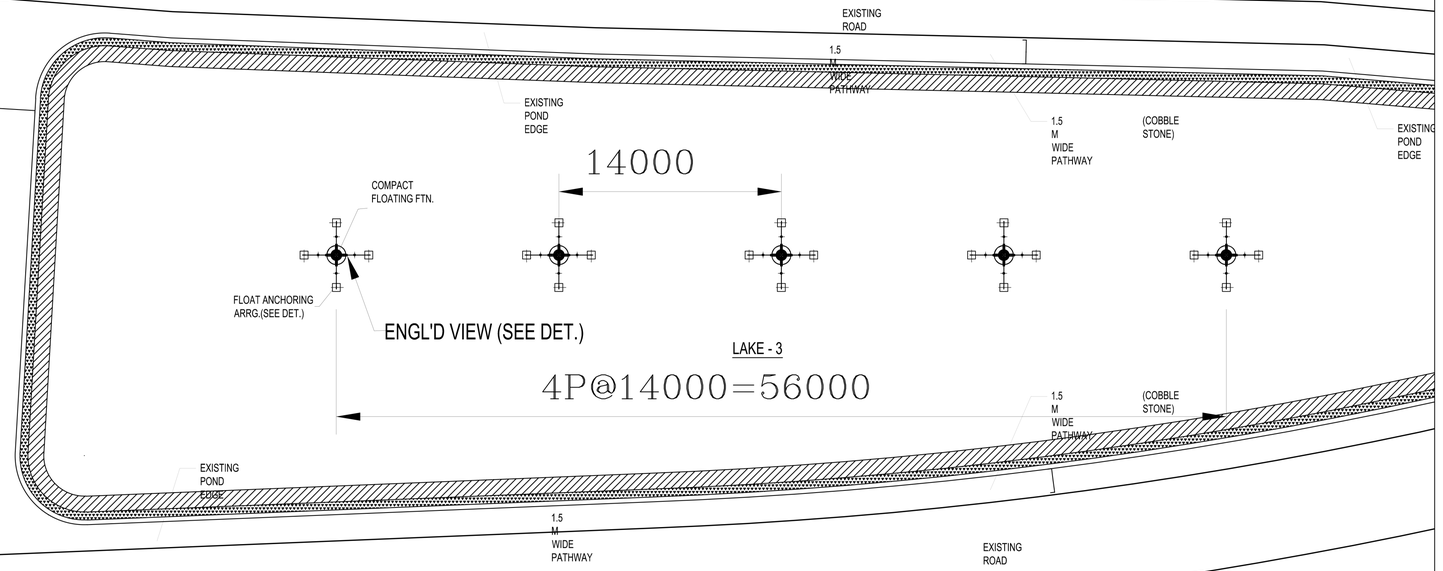
SCALE: NTS	APPROVED	DATE (RO ISSUE)	
OFFICE-DISC: PN-CV		DATE (CURRENT ISSUE)	18-09-2018
DRN: URB		DWG NO	TCE.10918A-CV-3019-GA-30001
CHD:		ISSUE	P0

SIZE-A3

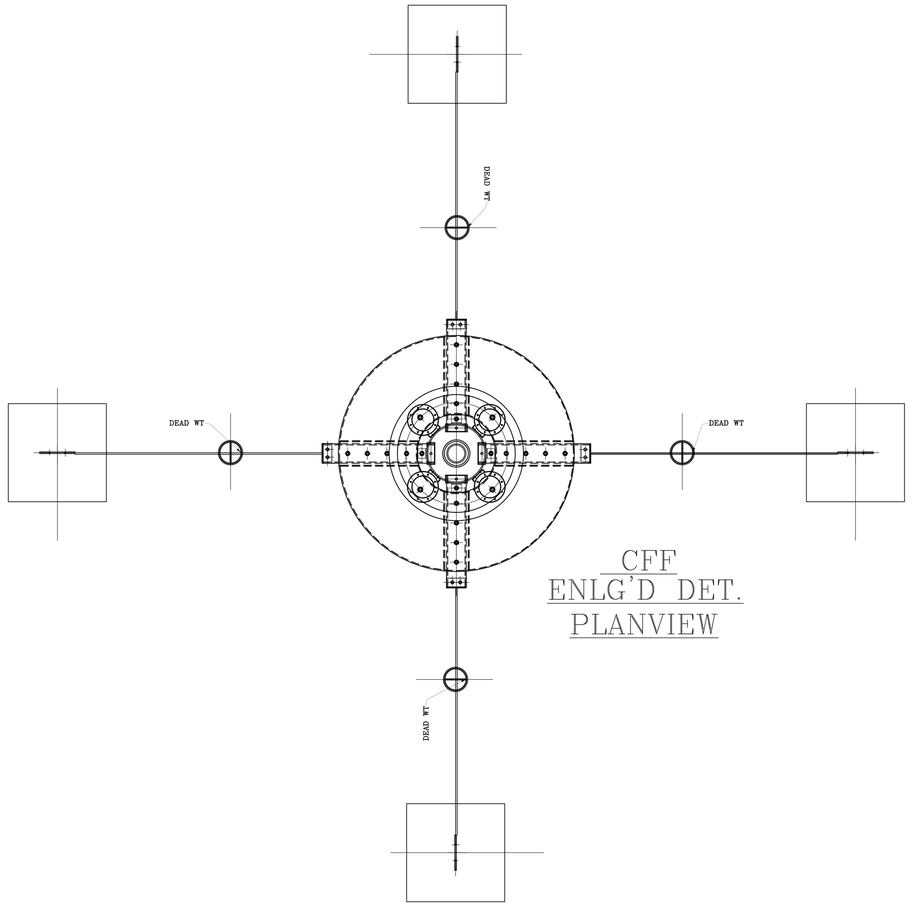
TCE FORM NO. 043 R4



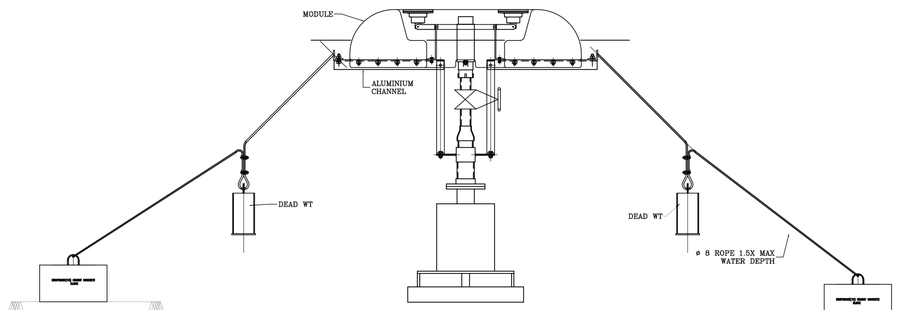
LAKE - 1



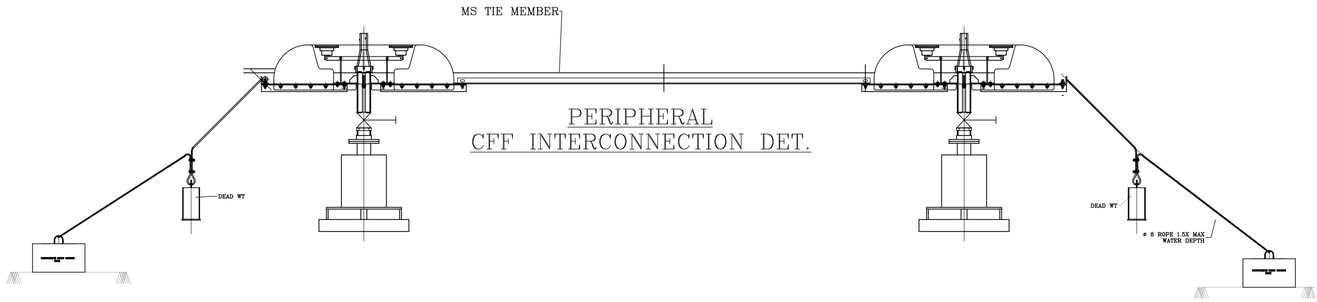
LAKE - 3



CFF
ENLG'D DET.
PLANVIEW



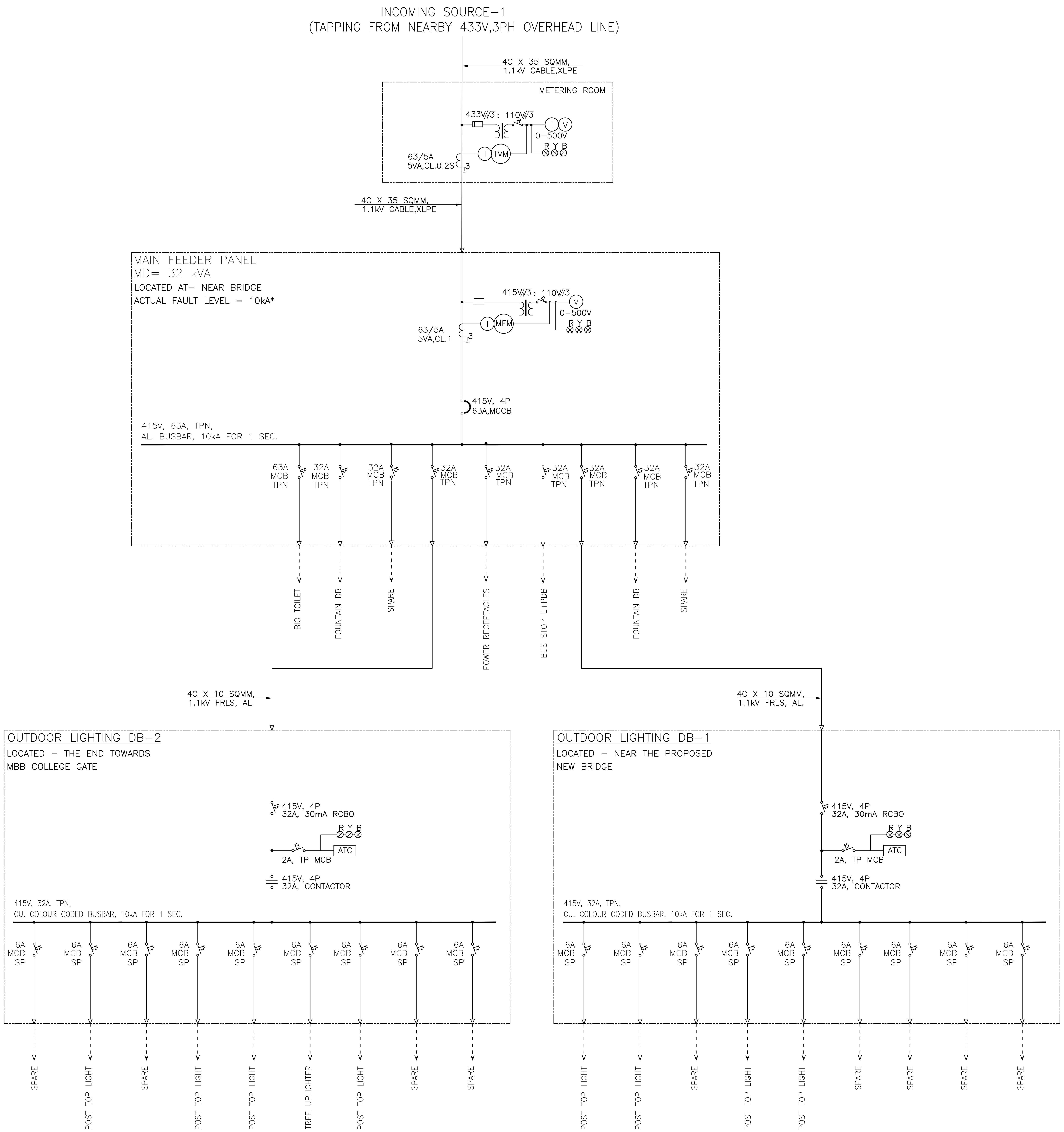
CENTRAL FTN. ARRG. DET.



PERIPHERAL
CFF INTERCONNECTION DET.

Date 24.09.2018	Material	Spec.	
Title PROPOSAL FOR COMPACT FLOATING FTN., MBB COLLEGE TRIPURA			Scale:
Drawing no. P10768		Sheet	Rev.

TITLE: SINGLE LINE DIAGRAM FOR REDEVELOPMENT OF PONDS NEAR MBB COLLEGE
DWG NO: TCE.10918A-EL-4000-AU-40020



LEGEND:

Symbol	Description
	MCCB
	MCB/RCBO
	RESIDUAL CURRENT CIRCUIT BREAKER WITH OVERLOAD PROTECTION
	HRC FUSE (LINK TYPE)
	CURRENT TRANSFORMER I-INSTRUMENTATION
	POTENTIAL TRANSFORMER
	CABLE GLAND
TVM	TRI-VECTOR METER
V	VOLTMETER
R Y B	INDICATING LAMPS
ATC	ASTRONOMICAL TIMER CONTROL

NOTES:

1. ALL 415V BUSES/SWGRS/EQUIP. ETC. ARE DESIGNED FOR SYMMETRICAL FAULT LEVEL OF 10kA* FOR 1SEC. (*)DATA IS TENTATIVE WILL BE DECIDED AFTER FINALISATION OF EQUIPMENT.
2. ALL THE EQUIPMENTS SHOULD BE AS PER RELEVANT IS/IEC STANDARD.
3. THE INDICATED RATINGS OF CT's AND PT's ARE TENTATIVE AND SAME SHALL BE CONSIDERED AS MINIMUM REQUIREMENT. THE VENDOR SHALL CHECK THE ADEQUACY AND CORRECTNESS OF THE SAME WITH RELAY / METER BURDEN.
4. MCCB SHALL HAVE Ics=Icu=100%. IT SHALL BE THERMAL MAGNETIC BASED.
5. MCB USED FOR STANDARD NETWORK SHALL HAVE 'C' CHARACTERISTIC CURVE.
6. ALL INDICATION LAMPS SHALL BE LED CLUSTER TYPE.
7. CONTROL CABLE TERMINATION CHAMBER SHOULD BE SEPARATE FROM POWER CABLE.
8. ALL PANEL WIRING SHALL BE WITH 1100 VOLTS GRADE FRLS PVC INSULATED, 1.5 SQ.MM. STRANDED COPPER WIRE FOR CONTROL WIRING & 2.5 SQ.MM FOR CT SECONDARY WIRING.
9. ALL CONTACTORS SHALL BE OF AC3 DUTY.
10. WIDTH OF FEEDER COLUMN SHALL BE MIN 500MM AND CABLE ALLEY SHALL BE 300MM MIN.
11. ALL ACB, MCCB, CONTACTORS, MOTOR STARTER & OLR SHALL BE OF TYPE-2 CO-ORDINATION.
12. THE LT PANEL SHOULD HAVE ATLEAST 20% SPARE FEEDER FOR EACH RATING.
13. ALL PANELS SHALL HAVE IP55 PROTECTION AND MOUNTED ATLEAST 500MM ABOVE GROUND ON STELL SUPPORT.
14. METER & CTS SHALL BE ENCLOSED IN IP55 PANEL.
15. ALL PANELS SHALL BE DOUBLE DOOR CONSTRUCTION

ISSUE		DRN	DSN	CHD	CV	EL	IC	ME		PE/PM	APPD	DATE
P0	SIGN. / INITIALS	TBR	KM	TSG	--		--	--		PD	VVB	10.09.2018

CLEARED

DPR PURPOSE ONLY

DO NOT SCALE

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AGARTALA SMART CITY

SINGLE LINE DIAGRAM FOR
REDEVELOPMENT OF PONDS NEAR MBB COLLEGE

TATA CONSULTING ENGINEERS LIMITED
MUMBAI

FILE NAME : 10918A-EL-40020-REV-P0.dwg
SCALE : NTS
DC & DISC: PUN-EL
DWG NO. TCE.10918A-EL-4000-AU-40020
ISSUE P0
SIZE-A1

FILE NAME: F-091-Rev-R0.dwg
TCE FORM NO. 091 R0