REQUEST FOR PROPOSAL

FOR

INNOVATIVE USE OF WATER BODY AT RANIR PUKUR POND BY PROVIDING DECORATIVE BOUNDARY COLUMNS, PERIPHERAL LANDSCAPING, PATHWAY, DECORATIVE ILLUMINATION & AREA LIGHTING AND ALLIED WORKS 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: **Innovative Use of Water Body at Ranir Pukur Pond by providing decorative boundary columns, peripheral landscaping, pathway, decorative illumination & area lighting and allied works 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 09th October 2018** **Time 10.00 Hours**
3.	Period of downloading of biding documents at	:	**From Date 09th October 2018** **https://tripuratenders.gov.in** **To Date 10th November 2018**
4.	Period of seeking clarifications	:	**From Date 09th October 2018** **To Date 25th October 2018**
5.	Time and date of Pre-bid Conference	:	**Date 30th October 2018** **Time 11.30 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 02nd November 2018**
8.	Deadline for online Bidding	:	**Date 10th November 2018** **Time 15.00 Hours**
9.	Date & Time of opening Bid/Bids	:	**Date 14th November 2018** **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 13th May 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***

CONTENTS

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 PWD/TTAADC/MES/CPWD/Railway/P&T/Other State PWD Central & State Sector undertaking experienced and also from the registered firm / company experienced in similar nature of 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.	Innovative Use of Water Body at Ranir Pukur Pond by providing decorative boundary columns, peripheral landscaping, pathway, decorative illumination & area lighting and allied works and Post Completion Operation & Maintenance for 05 (five) years including Defects Liability Period of 01 (one) year. **(3rd Call)** **NIe-T No. ASCL/RFP/07/10**	**Rs. 1,60,51,032.72**	**Rs. 1,60,510.00**	**12 (Twelve) Months**	**Up to 15.00 Hrs on *10-11-2018***	**O/o the Chief Executive Officer, Agartala Smart City Limited, 5th Floor, Paradise Chowmuhani, Agartala – 799 001 at 11.30 Hrs on *14-11-2018***	**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 ***09-10-2018*** to ***10-11-2018.***

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 ***09-10-2018*** to ***25-10-2018***.

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 ***30-10-2018*** at 11.30 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 ***02-11-2018***.

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.

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 ***14-11-2018.*** 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 ***12-11-2018.*** 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.

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.

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

TABLE OF CONTENTS

A. GENERAL

1. Name of Work:

Innovative Use of Water Body at Ranir Pukur Pond by providing decorative boundary columns, peripheral landscaping, pathway, decorative illumination & area lighting and allied works 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 ***12-11-2018*****.**

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 PWD/TTAADC of Tripura/ MES /CPWD/Railway/P&T/Other State PWD/Central & State Sector undertaking. In case of tenderer as Registered Firm / Company, documentary evidence regarding Registration of the Firm / Company supported with relevant deed / article of association etc.

ii) Details of experiences of the tenderer as prime contractor in similar type of projects. 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.

iv) 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

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. 40.50 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 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 his/her "My Document", 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 PWD/TTAADC of Tripura/ MES /CPWD/Railway/P&T/Other State PWD/Central & State Government undertaking. In case of the tenderer as registered Firm / Company, documentary evidence regarding registration of the Firm / Company supported with relevant deed / article of association etc.
		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 Similar type of work. 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.
4	**Machineries and equipment details**	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.40.50 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 **ii)** Any other relevant & applicable documents

During actual bidding, the bidder shall select / check these documents from his/ her 'My Document', 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 **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 'My Document' 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.	Documents in support of registration as approved Contractor / Firms / Agencies in appropriate class under PWD / TTAADC of Tripura / MES /CPWD/ Railway /P&T/Other State PWD/Central & State Sector undertaking. In case of bidder as registered firm / company, documentary evidence regarding registration of the firm / company supported with relevant deed / article of association etc.	Yes / No
2.	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
3.	Downloaded DNIe-T.	Yes / No
4.	Details of experiences of the tenderer as prime contractor in similar type of works duly issued by the concerned consignee(s).	Yes / No
5.	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.	Yes / No
6.	Possess Portable Concrete Mixture Machine, Welding Set, Grinding Machine, Portable Diesel Generator and Portable dewatering pump.	Yes / No
7.	Availability of key & critical construction equipment (**as per Annexure-B**)	Yes / No
8.	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. 40.50 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
9.	Form of Performance Guarantee (**as per Annexure - H**)	Yes / No
10.	Valid PAN Card of the bidder	Yes / No

Sl. No.	Description	Submitted
11.	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
12.	Availability of technical staff & key personnel for execution & site management the work as per format prescribed in the bid document (**as per Annexure - C**)	Yes / No
13.	Declaration of the Bidder (**as per Annexure - D**)	Yes / No
14.	Undertakings of the Bidder (**as per Annexure - E**)	Yes / No
15.	Schedule – A of BOQ **(as per Annexure - F)**	Yes / No
16.	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
17.	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
18.	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. **"**Innovative Use of Water Body at Ranir Pukur Pond by providing decorative boundary columns, peripheral landscaping, pathway, decorative illumination & area lighting and allied works 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

CONTRACTOR **CHIEF EXECUTIVE OFFICER**

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.

CONTRACTOR **CHIEF EXECUTIVE OFFICER**

(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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82.	General Obligations of Contractor		
83.	Security Measures		
84.	Fire Fighting Measures		
85.	Sanitation		

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: Innovative Use of Water Body at Ranir Pukur Pond by providing decorative boundary columns, peripheral landscaping, pathway, decorative illumination & area lighting and allied works 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: **INNOVATIVE USE OF WATER BODY AT RANIR PUKUR POND BY PROVIDING DECORATIVE BOUNDARY COLUMNS, PERIPHERAL LANDSCAPING, PATHWAY, DECORATIVE ILLUMINATION & AREA LIGHTING AND ALLIED WORKS 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	SOFT SCAPE WORK	11,66,502.00
II	HARDSCAPE WORK	12,76,205.50
III	CIVIL WORK	81,70,318.23
IV	ELECTRICAL WORK	34,95,578.99
V	OPERATION AND MAINTENANCE FOR FIVE YEARS	19,42,428.00
	TOTAL COST (I + II + III + IV + V)	**1,60,51,032.72**

Validate Print Help

Tender Inviting Authority: Agartala Smart City Limited

Name of Work: INNOVATIVE USE OF WATER BODY AT RANIR PUKUR POND BY PROVIDING DECORATIVE BOUNDARY COLUMNS, PERIPHERAL LANDSCAPING, PATHWAY, DECORATIVE ILLUMINATION & AREA LIGHTING AND ALLIED WORKS AND POST COMPLETION OPERATION & MAINTENANCE FOR 05 (FIVE) YEARS INCLUDING DEFECTS LIABILITY PERIOD OF 01 (ONE) YEAR

Contract No: Nle-T No. ASCL/RFP/07/10

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	SOFTSCAPE					
1.01	**Good earth**					
1.02	Trenching in ordinary soil up to a depth of 60 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.	840.000	Cum	115.60	**97104.00**	INR Ninety Seven Thousand One Hundred & Four 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.	840.000	Cum	235.00	**197400.00**	INR One Lakh Ninety Seven Thousand Four Hundred 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.	84.000	Cum	189.90	**15951.60**	INR Fifteen Thousand Nine Hundred & Fifty One and Paise Sixty 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.	84.000	Cum	162.60	**13658.40**	INR Thirteen Thousand Six Hundred & Fifty Eight and Paise Forty 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.	1400.000	Sqm	1.00	**1400.00**	INR One Thousand Four Hundred 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.	1400.000	Sqm	2.80	**3920.00**	INR Three Thousand Nine Hundred & Twenty Only
1.1	**Trees and Palms - 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 holes1.2 m dia x1.2 m 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.	63.000	Each	274.00	**17262.00**	INR Seventeen Thousand Two Hundred & Sixty Two Only
1.12	Alstonia scholaris (height-165 cm) in bag	12.000	Each	60.00	**720.00**	INR Seven Hundred & Twenty Only
1.13	Delonix regia (Gulmohar) (height- 165 cm) in big polybag	12.000	Each	60.00	**720.00**	INR Seven Hundred & Twenty Only
1.14	Plumeria alba (height-135 cm) in bag	8.000	Each	120.00	**960.00**	INR Nine Hundred & Sixty Only
1.15	Bottle palm (height- 300 cm) in big HDPE bag	27.000	Each	550.00	**14850.00**	INR Fourteen Thousand Eight Hundred & Fifty Only
1.16	Ficus religiosa (Peepal) (height-165 cm) in big polybag	4.000	Each	60.00	**240.00**	INR Two Hundred & Forty Only
1.2	**Shrubs and Climbers - The rate of the following items include for supply and plantation of plants as specified, transportation to site, excavation of pits as follows:**					
1.21	Digging holes 0.6m dia x 0.6m 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:	1058.000	Each	36.50	**38617.00**	INR Thirty Eight Thousand Six Hundred & Seventeen Only
1.22	Ficus nuda (height - 150 cm- 165 cm) in big HDPE bag	480.000	Each	190.00	**91200.00**	INR Ninety One Thousand Two Hundred Only
1.23	Hamelia patens (height - 40 cm) in polybag	140.000	Each	20.00	**2800.00**	INR Two Thousand Eight Hundred Only

CONTRACTOR **CHIEF EXECUTIVE OFFICER**

1.24	Tecoma stans (height - 60 cm) in polybag	250.000	Each	40.00	**10000.00**	INR Ten Thousand Only
1.25	Jasminum grandiflorum (chameli) (height - 45 cm) in polybag	188.000	Each	20.00	**3760.00**	INR Three Thousand Seven Hundred & Sixty Only
1.3	**Climbers: Supply and plantation**					
1.31	Bougainvillea sp. (height - 45 cm) in earthen / plastic pot	50.000	Each	35.00	**1750.00**	INR One Thousand Seven Hundred & Fifty Only
1.4	**Ground Covers: Supply and plantation**					
1.41	Alternenthera species plant (height - 15 cm to 20cm) in polybag	2000.000	Each	16.00	**32000.00**	INR Thirty Two Thousand Only
1.42	Chlorophytum (Green) plant in polybag	2500.000	Each	15.00	**37500.00**	INR Thirty Seven Thousand Five Hundred Only
1.43	Duranta Golden plant (height - 15 cm to 20cm) in polybag	3000.000	Each	15.00	**45000.00**	INR Forty Five Thousand Only
1.44	Iresine herbstii plant (height - 20 cm to 30 cm) in polybag	1000.000	Each	11.00	**11000.00**	INR Eleven Thousand Only
1.45	Ophiopogon plant, (Green / Black) in polybag	3000.000	Each	15.00	**45000.00**	INR Forty Five Thousand Only
1.5	**Lawn (Grassing)**					
1.51	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.	1300.000	Sqm	40.10	**52130.00**	INR Fifty Two Thousand One Hundred & Thirty Only
1.52	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.	1300.000	Sqm	5.90	**7670.00**	INR Seven Thousand Six Hundred & Seventy Only
1.6	**Irrigation System**					
1.61	Supply, erection and commissioning of electrical motor driven submersible pump of capacity 7.2 m3/hr at 15 MWC with all accessories incl. suction strainer, flow meter etc. all as per drawings : (Approved Make Kirloskar / KBL / Equivalent as approved by Engineer-in-Charge)	1.000	Set	19373.00	**19373.00**	INR Nineteen Thousand Three Hundred & Seventy Three Only
1.62	Providing and fixing 50 NB gun metal vertical non-return valve of approved quality (screwed end), all as per the drawings, specifications and as per the directions of Engineer-in-Charge	1.000	Each	1243.20	**1243.20**	INR One Thousand Two Hundred & Forty Three and Paise Twenty Only
1.63	Providing and fixing 50 NB gun metal gate valve with C.I. wheel of approved quality (screwed end): all as per the drawings, specifications and as per the directions of Engineer-in-Charge	1.000	Each	843.00	**843.00**	INR Eight Hundred & Forty Three Only
1.64	Providing and fixing Chlorinated Polyvinyl Chloride (CPVC) pipes of FINOLEX / Supreme / Ashirvad or approved equivalent make (SDR 11 : CLASS 1 : IS 15778 : 2007) having thermal stability for hot & cold water supply including all CPVC plain & brass threaded fittings This includes jointing of pipes & fittings with one step CPVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge.					
1.65	50 NB	300.000	RM	525.10	**157530.00**	INR One Lakh Fifty Seven Thousand Five Hundred & Thirty Only
1.66	15 NB	30.000	RM	138.00	**4140.00**	INR Four Thousand One Hundred & Forty Only
1.67	Providing and fixing C.P. brass bib cock of approved quality conforming to IS:8931 of 15 mm nominal bore all as per the drawings, specifications and instructions of the Engineering-in Charge.	8.000	Each	472.60	**3780.80**	INR Three Thousand Seven Hundred & Eighty and Paise Eighty Only
1.68	Supplying of 12 mm dia, 30 M long PVC Garden Hose pipe alongwith universal tap connectors of approved make all as per the drawings, specifications and instructions of the Engineer-in Charge.	3.000	Set	1577.00	**4731.00**	INR Four Thousand Seven Hundred & Thirty One Only
1.7	**Seaters / Bench**					
1.71	Supply and placement of Garden Bench having size 1500 mm length, height 400 mm from GL and weight 110 - 115 Kg approx. per set sides made of cast iron, seat and back made of stainless steel of suitable horizontal member of size 75 mm X 20 mm X 2 mm of appropriate rectangular section including necessary painting etc. as per direction of the Engineer-in-Charge.	6.000	Each	26196.00	**157176.00**	INR One Lakh Fifty Seven Thousand One Hundred & Seventy Six Only
1.8	**Garbage Bin**					
1.81	Movable Dustbins with capacity of 120 lt. of make Arihant PGGD37, Nilkamal or equivalent	12.000	Each	6256.00	**75072.00**	INR Seventy Five Thousand &Seventy Two Only

2	HARDSCAPE					
2.01	**Grass crete pavers at parking area**					
2.02	Providing and fixing 80 mm thick M-30 precast cement **concrete grass crete pavers at parking area** as per design, size and patterns laid over 50 mm thick layer of fine sand and soil mix including joints filling with fine sand mixed with soil complete laid to slope as directed. The rate shall include the cost of sand.	160.000	Sqm	754.00	**120640.00**	INR One Lakh Twenty Thousand Six Hundred & Forty Only
2.1	**Pathway**					
2.11	Providing and laying 60 mm thick factory made cement concrete interlocking paver block of M-30 garde by block making machine with strong vibratory compaction, of approved size, design & shape, laid in required colour and pattern over and including 50 mm thick compacted bed of sand, filling the joints with fine sand etc. all complete as per specification and approval/ direction of the Engineer-in-charge.	425.000	Sqm	929.40	**394995.00**	INR Three Lakh Ninety Four Thousand Nine Hundred & Ninety Five Only
2.2	**Flooring**					
2.21	Kota stone slabs 25 mm thick in risers of steps, skirting, dado and pillars laid on 12 mm (average) thick cement mortar 1 : 3 (1 cement : 3 fine sand) and joined with ordinary cement slurry mixed with pigment to match the shade of slabs, including rubbing and polishing complete.	135.000	Sqm	1358.30	**183370.50**	INR One Lakh Eighty Three Thousand Three Hundred & Seventy and Paise Fifty Only
2.3	**Cobble Stone at entrance**					
2.31	Providing and fixing Natural Finish Brown/Yellow Cobble stone of size 100 mm x 100 mm x 75 mm laid over P.C.C.bed with 25 mm thick cement mortar 1:4 (1 cement: 4 coarse sand) and making grooves of size 6 mm deep and 6 mm to 10 mm wide including jointed with grey cement slurry mixed with pigment to match the shade etc complete as per design and drawing.Sample should be approved by Landscape Architect before execution.	370.000	Sqm	1560.00	**577200.00**	INR Five Lakh Seventy Seven Thousand Two Hundred Only
3	CIVIL					
3.01	**Site Clearing and cleaning of pond**					
3.02	Pumping out water from the pond and discharging the same to nearest drain / nullah all as per the direction of the Engineer-in-Charge	5189.000	KL	52.99	**274965.11**	INR Two Lakh Seventy Four Thousand Nine Hundred & Sixty Five and Paise Eleven Only
3.03	Earth work in excavation in development of pond bed by mechanical means (Hydraulic excavator) / manual means over areas (exceeding 30cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead upto 50 m and lift upto 1.5 m, disposed earth to be levelled and neatly dressed all as per the direction of the Engineer-in-Charge.	1832.000	Cum	128.80	**235961.60**	INR Two Lakh Thirty Five Thousand Nine Hundred & Sixty One and Paise Sixty Only
3.04	Extra rates over item no. 3.12 for quantities of works, executed in or under water and/ or liquid mud, including lpumping out of water as required	1832.000	Cum	25.76	**47192.32**	INR Forty Seven Thousand One Hundred & Ninety Two and Paise Thirty Two Only
3.05	Supplying and filling in pond bed 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 all as per the direction of the Engineer-in-Charge	204.000	Cum	615.70	**125602.80**	INR One Lakh Twenty Five Thousand Six Hundred & Two and Paise Eighty Only
3.06	Site clearing in Pathway Area by Clearing grass and disposal of the rubbish upto a distance of 50 m outside the periphery of the area all as per the direction of the Engineer-in-Charge	400.000	Sqm	3.50	**1400.00**	INR One Thousand Four Hundred Only
3.1	**Excavation in foundations trenches etc.**					
3.11	Earth work in surface excavation in Pathway in all kinds of soil not exceeding 30 cm in depth but exceeding 1.5 m in width as well as 10 sqm on plan including disposal of excavated earth upto 50 m and lift upto 1.5 m. Disposed soil to be levelled and neatly dressed all as per the direction of the Engineer-in-Charge	400.000	Sqm	44.98	**17992.00**	INR Seventeen Thousand Nine Hundred & Ninety Two Only
3.12	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	1300.00	Cum	128.80	**167440.00**	INR One Lakh Sixty Seven Thousand Four Hundred & Forty Only
3.13	Close timbering in case of shafts, wells, cesspits, manholes and the like including strutting, shoring and packing cavities (wherever required) etc. complete. (Measurements to be taken of the face area timbered) all as per the drawing, specifications and direction of the Engineer-in-Charge					
3.14	Depth exceeding 3 m but not exceeding 4.5 m	495.000	Sqm	141.95	**70265.25**	INR Seventy Thousand Two Hundred & Sixty Five and Paise Twenty Five Only
3.2	**Backfilling**					
3.21	Filling with available excavated earth (excluding rock) in trenches, plinth, sides of foundations, slope of the pond 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. all as per the drawing, specifications and direction of the Engineer-in-Charge.	1181.000	Cum	116.40	**137468.40**	INR One Lakh Thirty Seven Thousand Four Hundred & Sixty Eight and Paise Forty 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	107.000	Cum	7567.60	**809733.20**	INR Eight Lakh Nine Thousand Seven Hundred & Thirty Three and Paise Twenty 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 the direction of the Engineer-in-Charge	259.000	Cum	5408.60	**1400827.40**	INR Fourteen Lakh Eight Hundred & Twenty Seven and Paise Forty 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	73.000	Cum	5930.80	**432948.40**	INR Four Lakh Thirty Two Thousand Nine Hundred & Forty Eight and Paise Forty 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	104.000	Cum	9896.50	**1029236.00**	INR Ten Lakh Twenty Nine Thousand Two Hundred & Thirty Six 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	20.000	Cum	10444.60	**208892.00**	INR Two Lakh Eight Thousand Eight Hundred & Ninety Two 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.	17240.000	Kg	59.70	**1029228.00**	INR Ten Lakh Twenty Nine Thousand Two Hundred & Twenty Eight 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	506.000	Sqm	327.70	**165816.20**	INR One Lakh Sixty Five Thousand Eight Hundred & Sixteen and Paise Twenty 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					
3.73	Bounday Columns foundations : Col above plinth	192.000	Sqm	491.40	**94348.80**	INR Ninety Four Thousand Three Hundred & Forty Eight and Paise Eighty Only
3.74	Pavilion : Columns above Plinth	12.000	Sqm	429.30	**5151.60**	INR Five Thousand One Hundred & Fifty One and Paise Sixty Only
3.75	Pavilion : beam at 3.0m Level	9.000	Sqm	327.70	**2949.30**	INR Two Thousand Nine Hundred & Forty Nine and Paise Thirty Only
3.76	Pavilion Roof : Slanting	30.000	Sqm	452.10	**13563.00**	INR Thirteen Thousand Five Hundred & Sixty Three Only
3.77	Pavilion Roof : Slanting side	4.000	Sqm	452.10	**1808.40**	INR One Thousand Eight Hundred & Eight and Paise Forty 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	576.000	Sqm	187.50	**108000.00**	INR One Lakh Eight Thousand Only
3.82	Providing and laying 12 mm cement plaster of mix : In cement mortar 1 : 4 (1 cement : 4 fine sand) all as per drawings, specifications and the direction of the Engineer-in-Charge	248.000	Sqm	150.50	**37324.00**	INR Thirty Seven Thousand Three Hundred & Twenty Four 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 direction of the Engineer-in-charge.	614.000	Sqm	155.10	**95231.40**	INR Ninety Five Thousand Two Hundred & Thirty One and Paise Forty Only

3.92	Applying priming coat: With ready mixed red oxide zinc chromate primer of approved brand and manufacture on steel, galvanised iron / steel work. [Payment shall be made after submission of Test Certificate issued by the Manufacturer]	500.000	Sqm	26.80	**13400.00**	INR Thirteen Thousand Four Hundred Only
3.93	Painting with 2 coats of synthetic enamel paint, having VOC (Volatile Organic Compound) content less than 150 grams/ litre, of approved brand and manufacture, including applying additional coats wherever required to achieve even shade and colour. [Payment shall be made after submission of Test Certificate issued by the Manufacturer]	500.000	Sqm	71.90	**35950.00**	INR Thirty Five Thousand Nine Hundred & Fifty Only
4	**STONE CLADDING WORK**					
4.01	Providing and fixing Granite cladding of 18mm thick gang saw cut of mirror polished, premoulded and prepolished, machine cut for 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. omplete at all levels all as per drawings, specifications and direction of the Engineer-in-charge.	181.000	Sqm	3402.70	**615888.70**	INR Six Lakh Fifteen Thousand Eight Hundred & Eighty Eight and Paise Seventy Only
4.02	Providing and fixing 25 mm thick pre-polished colored concrete designer tiles making by strong vibratory compaction technology using 50% white cement and 50% ordinary cement of size 300mm x 300mm, laid in pavilion roof on 20 mm thick bed of cement mortar 1 : 4 (1 cement : 4 fine sand) jointed with neat cement slurry mixed with pigment to match the shade of tiles including rubbing and cleaning etc. complete as per direction of the Engineer-in-charge.	59.000	Sqm	777.90	**45896.10**	INR Forty Five Thousand Eight Hundred & Ninety Six and Paise Ten Only
4.1	**MS GATES**					
4.11	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 direction of the Engineer-in-charge.	5500.000	Kg	88.70	**487850.00**	INR Four Lakh Eighty Seven Thousand Eight Hundred & Fifty Only
4.2	**RC PRECAST COVER OVER THE DRAIN**					
4.21	Providing and laying at or near ground level perforated precast cement slab of 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 all as per drawings, specifications and direction of the Engineer-in-charge. Reinforcement will be measured and paid as per relevant item.	34.000	Cum	10275.00	**349350.00**	INR Three Lakh Forty Nine Thousand Three Hundred & Fifty Only
4.3	**MISCELLANEOUS**					
4.31	Providing and laying 150mm dia non-pressure NP2 class (light duty) R.C.C. pipes with collars jointed with stiff mixture of cement mortar in the proportion of 1:2 (1 sand:cement: 2 fine) including testing of joints etc. complete all as per drawings, specifications and direction of the Engineer-in-charge.	60.000	RM	654.70	**39282.00**	INR Thirty Nine Thousand Two Hundred & Eighty Two Only
4.32	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 0.45 M X 0.3 M X 0.15 M 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.	6.750	Cum	10275.00	**69356.25**	INR Sixty Nine Thousand Three Hundred & Fifty Six and Paise Twenty Five Only
5	ELECTRICAL					
5.01	**SECTION I - POWER SUPPLY ARRANGEMENT**					
5.02	LT Three Phase Meter Demand Charges	1.000	Job	2756.00	**2756.00**	INR Two Thousand Seven Hundred & Fifty Six Only
5.1	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.					
5.11	4C x 16 sq mm A2XFY armoured Al Cable	55.000	RM	213.00	**11715.00**	INR Eleven Thousand Seven Hundred & Fifteen Only
5.2	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.					

5.21	4C x 16 sq mm A2XFY armoured Al Cable	2.000	Each	252.97	**505.94**	INR Five Hundred & Five and Paise Ninety Four Only
5.3	Supply, installation, testing and commissioning of earthing system. The complete installation and materials shall be complied to enclosed technical specifications.					
5.31	600 X 600 X 3.15 mm Tin plated Copper Plate & Tin plated copper lead, 3000mm dip earth pit as per IS 3043. The earth pit shall be provided with watering pipe (Class B) with wire meshed funnel, Cu lead shall be considered for connection of tinned Cu plate earth pit., disconnecting links with 600 x 600 mm (clear) precast R.C.C. 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. (Vendor has to ensure the all earthing shall be as per TSECL standards)	2.000	Each	13218.00	**26436.00**	INR Twenty Six Thousand Four Hundred & Thirty Six Only
5.4	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.	0.100	Ton	75800.00	**7580.00**	INR Seven Thousand Five Hundred & Eighty Only
5.5	**SECTION II - DIESEL GENERATOR**					
5.51	Supplying, installation, testing and commissioning of Air/Water Cooled Diesel Generator set coupled to suitable alternator of 220/415 V, AC, 1/3-Phase 0.8 p.f. 1) M.S. Fabricated base frame., 2) M.S. fuel tank of required capacity., 3) Residual Silencer. 4) Standard Control Panel. 5) Suitable batteries with lead., 6) First fill of lube oil. 7) Acoustic Enclosure complete with all accessories as specified and directed by the department conforming to IS comprising the Technical Specification as per manufacturer. Refer Specification for the details					
5.52	7.5 KVA with AMF panel	1.000	Each	274551.00	**274551.00**	INR Two Lakh Seventy Four Thousand Five Hundred & Fifty One Only
5.6	**SECTION III - LANDSCAPE LIGHTING**					
5.61	**16 WATT LED UPLITE** - Supply installation, testing Commissioning of 16 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/NW 220-240V 12 1N- or equivalent as approved by Engineer-in-Charge. (At Precast pole)	30.000	Each	15797.00	**473910.00**	INR Four Lakh Seventy Three Thousand Nine Hundred & Ten Only
5.62	**4 WATT STEP LIGHT**:- Supply installation, testing Commissioning of IP 67, 4 Watt Step lighting with integral driver & polycarbonate diffuser. The system lumen output shall be min. 40 lumens and minimum system efficacy shall be 10 lm/W. The luminaire shall have a rated system lifetime of 25,000 burning hours at L70. The luminaire should have a color temperature of 4000K and CRI > 75. The luminaire shall meet with THD < 20% and PF > 0.9. The total power consumption should not exceed 4W (including driver).(The cable from Lighting fixture to connection should be min 1.5 meter). Make Philips Cat no- "BWG150 LED4000/NW PSU 220-240V" or Equivalent as approved by Engineer-in-Charge (At planters).	30.000	Each	8743.50	**262305.00**	INR Two Lakh Sixty Two Thousand Three Hundred & Five Only
5.63	**16 WATT LED UPLITE** - Supply installation, testing Commissioning of 16 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) 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/NW 220-240V 12 1N- or equivalent as approved by Engineer-in-Charge. (At Entrance Column)	60.000	Each	15797.00	**947820.00**	INR Nine Lakh Forty Seven Thousand Eight Hundred & Twenty Only
5.64	**8 WATT LED BUSH LIGHT**-Supply, installation, testing and commissioning of IP 65 8W LED spot light with suitable mounting options as spike/clip.The product should be 1LED with 250lumen package. Color tempearture should be 3000K. Power consumption should be lesser than or equal to 8W. Beam angle option of 12D, 24D and 36D should be available (Beam Angle of the Fixture shall suitable for 4 to 5 meter Tree). (The cable from Lighting fixture to connection should be min 1.5 meter). Make - Philips Cat no-VAYA spot BGP310 or Equivalent as approved by Engineer-in-Charge. (At Shrubs and planters).	60.000	Each	8743.50	**524610.00**	INR Five Lakh Twenty Four Thousand Six Hundred & Ten Only

5.7	**SECTION IV - LV SWITCHGEAR**					
5.71	**SUPPLY, INSTALLATION, TESTING & COMMISSSIONING (SITC) OF 415V SWITCHGEAR PANEL**					
5.72	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.					
5.73	Main Outdoor Lighting DB- IP55					
5.74	Outdoor Type IP55 double door Main DB with 1. 25A FP MCB as incomer- 2 nos. 2. 25A FP Contractor (with Electrical & Mechanical interlocking)- 2 nos. 3. 10A FP MCB as outgoing- 2 nos. 4. 10A TP MCB as outgoing- 1 nos 5. 6A FP MCB as outgoings - 3 nos as spare. 6. 6A FP MCB- 6 nos & 6 nos of 6A FP Contactors with 1 no of 24 Hr Astronomical time switch for street lighting. 7. KWh Meter , RYB Indications etc. Refer SLD and specs for the construction and other details.	1.000	Each	144908.00	**144908.00**	INR One Lakh Forty Four Thousand Nine Hundred & Eight Only
5.75	1 HP Three Phase DOL Starter Panel- IP55.	1.000	Each	2451.00	**2451.00**	INR Two Thousand Four Hundred & Fifty One Only
5.8	**SECTION V - CABLING SYSTEM**					
5.81	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 R.C.C. trench, in provided DWC pipe, R.C.C. pipe hume pipe, on provided cable trays / ladders etc. as. required complete with clamps, hardware for fixing tagging, identification etc.					
5.82	4C x 16 sq mm A2XFY armoured Al Cable	35.000	RM	212.55	**7439.25**	INR Seven Thousand Four Hundred & Thirty Nine and Paise Twenty Five Only
5.83	4C x 4 Sq mm 2XFY armoured Cu Cable	650.000	RM	305.45	**198542.50**	INR One Lakh Ninety Eight Thousand Five Hundred & Forty Two and Paise Fifty Only
5.84	4C x 2.5 Sq.mm. 2XFY Cu Cable	530.000	RM	225.22	**119366.60**	INR One Lakh Nineteen Thousand Three Hundred & Sixty Six and Paise Sixty Only
5.85	3C x 2.5 Sq.mm. 2XFY Cu Cable	35.000	RM	180.00	**6300.00**	INR Six Thousand Three Hundred Only
5.86	3C x 2.5 Sq.mm. YY Cu Cable (Flexible)	380.000	RM	128.00	**48640.00**	INR Forty Eight Thousand Six Hundred & Forty Only
5.9	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.					
5.91	4C x 16 sq mm A2XFY armoured Al Cable	2.000	Each	256.50	**513.00**	INR Five Hundred & Thirteen Only
5.92	4C x 4 Sq mm 2XFY armoured Cu Cable	124.000	Each	256.50	**31806.00**	INR Thirty One Thousand Eight Hundred & Six Only
5.93	4C x 2.5 Sq.mm. 2XFY Cu Cable.	118.000	Each	131.77	**15548.86**	INR Fifteen Thousand Five Hundred & Forty Eight and Paise Eighty Six Only
5.94	3C x 2.5 Sq.mm. 2XFY Cu Cable.	2.000	Each	131.77	**263.54**	INR Two Hundred & Sixty Three and Paise Fifty Four Only
5.95	3C x 2.5 Sq.mm. YY Cu Cable (Flexible)	340.000	Each	131.77	**44801.80**	INR Forty Four Thousand Eight Hundred & One and Paise Eighty Only
6	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 Deptt.					
6.01	Junction Box Size with 100x100x75 mm for Cable size 4Cx2.5 sq.mm & 4Cx4 Sq.mm. YWY cable.	160.000	Each	561.48	**89836.80**	INR Eighty Nine Thousand Eight Hundred & Thirty Six and Paise Eighty Only
6.1	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.					
6.11	40 MM	290.000	RM	204.00	**59160.00**	INR Fifty Nine Thousand One Hundred & Sixty Only
6.12	100MM	310.000	RM	311.00	**96410.00**	INR Ninety Six Thousand Four Hundred & Ten Only

6.2	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 50 mm x 50 mm x 6mm, ISA 65 x 65 x 6, ISA 40x 40 x 3, MS plate 3 / 6 / 10mm or any other size as per requirement.	0.100	Ton	75800.00	**7580.00**	INR Seven Thousand Five Hundred & Eighty Only
6.3	**SECTION VI - EARTHING SYSTEM**					
6.31	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.					
6.32	25 x 3 mm GI Strip.(for Outdoor DB)	60.000	RM	158.00	**9480.00**	INR Nine Thousand Four Hundred & Eighty Only
6.33	8 SWG GI wire	220.000	RM	21.00	**4620.00**	INR Four Thousand Six Hundred & Twenty Only
6.34	25 X 3 mm Cu Strip for DG	14.380	RM	865.00	**12438.70**	INR Twelve Thousand Four Hundred & Thirty Eight and Paise Seventy Only
6.4	Supply, installation, testing and commissioning of earthing system. The complete installation and materials shall be complied to enclosed technical specifications.					
6.41	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. (Vendor has to ensure the all earthing shall be TSECL standards)	4.000	Each	5342.00	**21368.00**	INR Twenty One Thousand Three Hundred & Sixty Eight Only
6.42	600 X 600 X 3.15 mm Tin plated Copper Plate & Tin plated copper lead, 3000 mm dip earth pit as per IS 3043. The earth pit shall be provided with watering pipe (Class B) with wire meshed funnel, Cu lead shall be considered for connection of tinned Cu plate earth pit., disconnecting links with 600 x 600 mm (clear) precast R.C.C. 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. (Vendor has to ensure the all earthing shall be TSECL standards)	2.000	Each	13218.00	**26436.00**	INR Twenty Six Thousand Four Hundred & Thirty Six Only
6.5	**SECTION VII - MISCELLANEOUS**					
6.51	Excavation of cable trenches up to a depth of 750mm, refilling and reinstating the trenches etc. and all other work required to complete the task.					
6.52	Soft Soil	120.000	Cum	129.00	**15480.00**	INR Fifteen Thousand Four Hundred & Eighty Only
7	OPERATION & MAINTENANCE					
7.01	Operation & Maintenance for 1st Year	1.000	Year	302969.00	**302969.00**	INR Three Lakh Two Thousand Nine Hundred & Sixty Nine Only
7.02	Operation & Maintenance for 2nd Year	1.000	Year	333323.00	**333323.00**	INR Three Lakh Thirty Three Thousand Three Hundred & Twenty Three Only
7.03	Operation & Maintenance for 3rd Year	1.000	Year	408714.00	**408714.00**	INR Four Lakh Eight Thousand Seven Hundred & Fourteen Only
7.04	Operation & Maintenance for 4th Year	1.000	Year	400986.00	**400986.00**	INR Four Lakh Nine Hundred & Eighty Six Only
7.05	Operation & Maintenance for 5th Year	1.000	Year	496436.00	**496436.00**	INR Four Lakh Ninety Six Thousand Four Hundred & Thirty Six Only
Total in Figures					**16051032.72**	INR One Crore Sixty Lakh Fifty One Thousand &Thirty Two and Paise Seventy Two 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 LANDSCAPE WORK

INNOVATIVE USE OF WATER BODIES AT RANIR PUKUR

Innovative Use of Water Body at Ranir Pukur Pond by providing decorative boundary columns, peripheral landscaping, pathway, decorative illumination & area lighting and allied works and Post Completion Operation & Maintenance for 05 (five) years including Defect Liability Period of 01 (one) year

1.0 SCOPE OF WORK

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

1.1 Broad Scope of Work.

The broad scope of work for Renovation of Ranir Pukur Pond 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 codal provisions and construction Drawings.

Contractor has to work as per the drawings issued by ASCL / Engineering-in Charge

Contractor shall have to take all the necessary approvals, if any, from respective authorities.

Contractor shall do all necessary co-ordination activities with client & ENGINEERING-IN-CHARGE for seamless implementation of the said works.

1.2 AREA OF WORKS

Landscape Development of Ranir Pukur pond Gardens Lawns, trees/plants, which shall specifically include the following areas:-

a) De-watering of pond and de-silting of pond bed
b) Construction of additional steps in gallery by the eastern and southern sides of the pond
c) Construction of a new pavilion similar to the existing
d) Enclosing the premises within a decorative fencing with foldable panels.
e) Installation of entry gates
f) Landscaping
g) 450mm high dwarf guard wall is proposed along the free edges of the pond
h) A walkway along with grass lawn, planter boxes are proposed all around the water body
i) Proper embankment of unprotected edges of the water body
j) Creating space for toilets, Water ATM etc.
k) Vehicle parking areas

l) Painting of all the structures

m) Removal of existing Electrical lights and wiring, if any

n) Illumination of entire area (Landscape lighting)

o) Provide required signage, benches, dustbin

p) Decorative lighting is proposed to keep the area illuminated during night

CONTENT

SPECIFICATIONS PART 6 SIGNAGES

SPECIFICATIONS PART 7 GARDEN FURNITURE & DUSTBINS

LIST OF APPROVED MAKE

1. SPECIFICATIONS PART 1: SITE DRESSING AND LAND MODULATION

1.1 SCOPE

1.1.1 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.

1.1.2 The drawings shall be read in conjunction with the specifications and matters referred to, shown or described in one are not necessarily repeated in the other.

1.1.3 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.

1.1.4 The work shall be carried out in accordance with the drawings and designs as would be issued to the Contractor by ASCL / Engineering-in-Charge duly signed and stamped by him.

1.1.5 The work shall be executed and measured as per metric dimensions given in the Schedule of Quantities, drawings etc.

1.2 GENERAL ITEMS

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

1.2.1 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.

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 labor in connection therewith. The Contractor shall submit to the client and the Engineering-in-Charge, margins and the verifications of layout within seven days from the date of getting site layout from Engineering-in-Charge / client.

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 / herself from safety point of view before starting of work.

The checking of any setting out or of any line or level by the Engineering-in-Charge and CLIENT's representative or their representative 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.

1.2.2 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 Engineering-in-Charge.

Grading and levelling of site as shown in drawing / specified on site by Engineering-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.

1.3 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 Engineering-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 Engineering-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 Engineering-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 Engineering-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 Engineering-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 Engineering-in-Charge suspend operations on that particular portion of the work until the Engineering-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.

1.3.1 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 Engineering-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.

1.3.2 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 Engineering-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 Engineering-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.

1.3.3 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 Landscape consultant 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 modeling 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.

1.4 DRAINAGE

There is existing storm water drain which shall be used for drain. The existing drain shall be covered and remodel as per requirement.

1.4.1 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 /Engineering-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 Engineering-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 Engineering-in-Charge for verification before any further work is undertaken, either pipe laying or backfilling.

2. SPECIFICATIONS PART 2: HORTICULTURE WORKS

2.1 SCOPE

The scope of services covers all horticultural operations and services including, labor, 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 One 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 Employer/ Employer's representative.

Contractor shall prepare and issue all required working drawings and get them approved by Employer/ Employer's representative with required number of revisions till the details provided do not satisfy the Employer/ Employer's representative.

2.2 SPECIAL CONDITION

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

a. The Contractor will supply and install 2.0 metres 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 Employer/ Employer's Representative.

b. The Contractor will supply, install and maintain at his own cost, 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 Engineering-in-Charge. All equipment must conform to international standards and / or Indian Standards if available.

c. 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.

d. 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.

e. 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.

f. The contractor in co-ordination with the Employer 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.

g. The Contractor shall:

I. Furnish the source of top soil to Employer/ Employer's Representative.

II. 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.

III. Use the restored soil at site for landscape purpose, manure mixture, Neemcake, weedicide shall be added if required.

IV. 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 analyzed 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 earthern 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 respreading topsoil and decompacting, unless timing is inappropriate (for e.g., not in mid-summer).

h. 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.

i. 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.

j. The erosion and sedimentation control plan must be approved by Employer/ Employer's Representative and the erosion sedimentation control plan must be maintained throughout the execution period.

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

l. 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.

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

2.3 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

i. 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 Employer/Employers representative.

ii. 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 Employer/Employer's Representative approval, by the Employer/Employers representative.

c. <u>Quality of Workmanship and Materials</u>

i. All materials and workmanship shall be of the high standards and quality demanded by this specification. Sub-standard work and materials identified by the Employer/Employer's representative will be rejected and will be required to be rebuilt or replaced at the Contractor's costs.

ii. All plant material shall be of the genus, species and variety specified and substitutions will not be permitted unless authorized in writing by the Employer/Employer's representative. The sizes and plant description set out in the section headed Plant Material.

Iii .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.

Iv .All materials are to be approved by the Employer/Employer's representative 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 Employer/Employer's representative prior to requests for approval.

v. 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 Employer/Employer's representative.

d. Site Responsibilities

- From the commencement of the works until the Certificate of virtual Completion has been issued by the Employer/Employer's representative, 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 Employer/Employer's Representative.

- 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 Employer/Employer's representative, 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 Engineering-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 Engineering-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 orison control measures shall be installed outside the Tree Protection Zone to prevent siltation and/or erosion within the zone**.**

f. **Plant Protection**

i. 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.

ii. Any evidence of unsatisfactory protection to roots, stems, branches and leaves will result in plants being rejected.

iii. 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

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

ii. 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

i. The contractor shall give forty-eight hours written notice to the Employer/Employer's representative of his intention to commence any of the following operations:

-Setting out, Planting, Topsoiling, Turfing, Sprigging, Maintenance visits, etc.

i. Heavy Machinery

i. 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

i. If the Main contractor's specialist subcontractor is unable to supply a particular species of plant he is to notify the Employer/Employer's representative in advance of his intention to make a substitution. No substitution will be allowed without prior written agreement of the Employer/Employer's representative.

ii. 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

i. 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.

ii. Any discrepancy in site area between that shown on the drawings by Engineering-in-Chargeand the actual area on the ground shall be notified to the Employer/ Employer's representative.

iii. The Contractor shall supply all necessary materials, equipment and labour to enable the Engineering-in-Charge to check the setting out, levels and dimensions on the site along with the Employer/ Employer's representative.

l. Tools and Equipment

i. 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)

i. Any trees, shrubs, 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.

ii. 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

i. 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.

ii. The Contract Administrator shall certify the dates when in his opinion the Contractor's obligations under this clause have been discharged.

iii. 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

i. The Contractor shall submit samples of all materials and samples of workmanship for approval by Employer/Employer's representative.

ii. The Contractor shall be responsible for producing and submitting for comment and approval to the Employer/Employer's representative the and samples of all elements indicated in this section. All should be based on the drawings provided by Engineering-in-Charge.

p. Handling, Storage And Delivery

i. 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 Employer/Employer's representative 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

i. The Contractor shall protect all equipment, materials and completed work from damage until final completion of the work.

ii. The Contractor shall remove and replace damaged work at no extra cost.

r. Reference Standards

i. 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.

ii. 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.

2.4 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 Engineering-in-Charge.

Failure to procure within this time and to reveal the source of supply and location will result in the Employer/Employer's representative 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.

2.4.1 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 be 100 - 120mm circumference stem when measured 0.9m from ground level and 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, giving an overall height of 2.5 -3.0m 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.

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

2.4.2 Shrubs

These are woody perennials of generally multi stemmed and bushy habit ranging from 3 - 4.5m down to 500mm height.

Shrubs shall have no less than three main stems and shall be well balanced and bushy, with strongly developed fibrous root systems, and shall be pruned in advance as required to achieve the specified height tolerances.

Branches shall break from the base of the plant just above the root collar, and shall be well furnished with leaves right down to ground level.

All plants are to be container grown in containers of suitable dimensions for the species.

2.4.3 Herbaceous Plants

These are non-woody perennials usually of a clump forming habit.

Plants shall have a well developed main stem or stems with good symmetry, a healthy root system, free from pest or disease.

Clumps of herbaceous plants shall include rhizomes, corns, tubers or roots and soil undisturbed by lifting with evidence of growing shoots emerging above soil level.

All herbaceous plants are to be grown in containers unless specified as being produced by alternative method.

2.4.4 Groundcover plants

These are low growing, 500mm or less, or prostrate shrubs or herbaceous plants whose habit is to totally cover the soil.

All groundcover species shall be evenly balanced to allow equal growth in all directions.

Plants shall have fully developed roots and leaves.

Rooted cuttings will not be accepted. All plants to be container grown.

Rooted shoots of certain spreading ground cover plants shall be used only where specified, planted as ‘sprigs’ as opposed to established plants in soil.

Plants shall be rooted shoots and shall have at least one and evidence of vigorous root growth.

Recent cuttings with no root development shall not be acceptable.

2.4.5 Climbers

Climbers are plants whose growth habit is to climb upwards by means of twinning stems, tendrils or clinging roots.

Plants shall be grown to reach the recommended size using stocks no less than one year old, and no more than five years old at the time of the start of the contract.

Plants shall have at least two leader shoots up to the recommended height and a vigorous root system. All plants to be container grown.

2.4.6 Hedging Plants

Hedging Plants shall be shrubs such as Lawsonia, Ixoras, etc as per design requirements of Engineering-in-Charge as suited to regular clipping, previously prepared to establish a uniform height and complete foliage cover to the stem from ground level upwards.

Plants shall be a minimum overall height of 500mm with a minimum of 4 branches arising from ground level and a strongly developed fibrous root system.

Branches shall be well clothed in leaves down to ground level. All plants to be container grown in suitably sized containers.

Hedging plants shall be prepared by root and branch pruning to achieve the 'box' shape shown, at least 3 months before transplanting.

2.5 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 Engineering-in-Charge. The number of each species and variety shall be evenly distributed over the area as indicated on the drawings.

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 Engineering-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 Engineering-in-Chargebefore planting into the soil bed can commence.

2.5.1 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 Engineering-in-Charge.

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 Quadropod 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.

2.5.2 Truing: Fine Turf

Fine Turf shall consist of fine bladed rhizomatous grass such as Bermuda grass or cultivar specified by Engineering-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 metre of Fine Turf or both types shall be submitted to the Employer/Employer's representative 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 Surfing 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 metre 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 Engineering-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 fertiliser application is to be allowed for before completion, to be used if directed by the Engineering-in-Charge.

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.

2.5.3 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 up to 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.

2.5.4 Watering of all Plants

After planting all plants are to be thoroughly watered to soak the ground all around the root ball.

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 tilt.

2.5.5 Mulching

After completion of planting and watering and light cultivation operations a 50mm deep layer of approved mulch shall be spread and forked in over all 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.

2.5.5 Fertilising

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.

2.5.6 Disease Control

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

2.5.7 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.

2.5.8 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 Employer/Employer's representative for approval.

Post and string fences shall not be acceptable.

2.5.9 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 are installed in a healthy condition in the manner specified.

2.6 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/Engineering-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/Engineering-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. SPECIFICATIONS PART 3 : MAINTENANCE WORKS

3.1 General

The Contractor shall maintain the landscape for a One year period after the date certified by the Engineering-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 Engineering-in-Charge in writing.

i. The Contractor shall ensure that a senior qualified supervisor is made available for organising 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.

ii. 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.

iii. A copy of this schedule is to be submitted to the Engineering-in-Charge and Employer 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 Engineering-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.

iv. 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.

v. The Contractor shall keep the landscape areas clean and tidy at all times and dispose of all waste materials arising from the cleaning.

vi. 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.

vii. An inspection of watering requirements is to be made by the Contractor at least two times a week in dry weather.

viii. 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.

ix. 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 Engineering-in-Charge's decision.

x. After weeding, at least once per month the soil surface is to be lightly broken up between plants using a pronged fork upto 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

xi. 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.

xii. All protective fencing is to be maintained and kept in good condition and in position until the end of the maintenance period.

3.2 Pruning of Tree/ Shrub

i- 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.

ii- All shrubs and ground covers are to be reviewed monthly and pruned as and when required during the Maintenance Period to promote bushy growth and good flowering characteristics. The shrubs shall be checked and all dead wood, broken, damaged or crossed branches shall be cut back, depending on species. Pruning and removal of branches is to be carried out using sharp clean implements to give a clean sloping cut with one flat face. Ragged edges of bark or wood are to be trimmed with a sharp knife.

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.

-All hedges, mat forming herbaceous plants and ground cover plants shall be clipped with shears as often as necessary (at least monthly) to maintain a tidy appearance. Tall hedges are to be cut to forms shown on the drawings. Fertiliser is to be applied to clipped areas around 1-2 weeks after clipping.

-Selective pruning of flowering plants shall be done where special flowering characteristics are required such as for Ixoras, Hibiscus, Allamanda where flowering takes places on twig ends. Heavy clipping must not be used for these species since this will remove future flower buds. Selective pruning by clipping non flowering twigs and leaving flowering twigs is necessary for these plants, and this operation must be done by experienced workers.

-The Contractor shall allow for monthly fertiliser operations during the Maintenance Period. An approved slow release fertiliser 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 fertiliser 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 fertiliser, 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 fertilisers for sensitive plants) and variations in method will be authorised as required.

-Heavy feeding plants such as Cana, Helicon a 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 over all 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 Engineering-in-Charge is given from the Contractor stating the chemical intended for use; concentration, spraying programme and including full technical details of the product.

3.3 Maintenance of Lawn Areas

i. 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.

ii. Mowing shall be carried out generally weekly, except in dry weather and grass shall not be allowed to flower between cuts.

iii. 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.

iv. 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.

v. 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.

vi. Fertiliser 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 fertilised shall be watered if no rain falls within 24 hours.

vii. 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 movable height.

viii. There shall be at least two applications of topdressing during the maintenance period, to be directed by the Engineering-in-Charge.

ix. 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-surfing.

x. 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.

xi. All chemicals used shall be to the approval of the Employer/Employer's representative. Assessment of these operations is to be prepared on the basis of the weekly maintenance inspection chart.

xii. 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 Employer/Employer's representative.

3.4 Replacement Planting

i. 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 Employer.

ii. All questions related to responsibility for the replacement planting will be subject to site inspection and agreement of the appointment of responsibility.

iii. This will be done very month at the monthly maintenance inspections.

3.5 Final Handover

i. Two weeks before the end of the Maintenance Period a joint inspection shall be held with the Maintenance Agency, Contractor and the Employer/Employer's representative review the requirements for alteration or replacement in order to gain approval for Final Handover.

ii. In order to ensure satisfactory handover procedures, the site meetings held each month between the Contractor and Employer/Employer's Representative will be used to inspect and approve the maintenance works which will be reviewed to ensure adequate work has been done.

iii. 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.

iv. 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).

v. If, after this inspection, the Employer/Employer's representative is of the opinion that all work has been performed in accordance with the drawings and specifications, the Employer/Employer's representative will give written letter of acceptance and completion of the project.

vi. 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 Employer/Employer's representative until the defects in the work have been corrected and the work is accepted by the Employer/Employer's representative.

4. SPECIFICATIONS PART 4 :LIST OF PLANTS

List of Plants Envisaged For Gardening

TREES

2.1	Polyalthia longifolia
2.2	Jacaranda mimosaefolia
2.3	Plumeria alba
2.4	Christmas tree / Kuki
2.5	Roystonea regia
2.6	Erica palm (Butterfly palm)/ Kentia palm

2.7	**Alstonia scholaris**
2.8	**Ficus elengi**
2.9	Ficus religiosa

Shrubs

3.1	caladium/Coleus
3.2	Acalypha wilkesiana
3.4	Ficus nitida
3.5	Galphimia nitida
3.6	Hamelia patens
3.7	Hibiscus red
3.8	Jasminum sambac
3.9	Jatropha pandurifolia
3.10	Ixora
3.14	Tecoma stans
3.15	Spider Lily
5	**GROUND COVERS**
5.1	Alternenthera green

5.2	Elephant Ear Plant
5.3	Alpinia Speciosa
5.5	Ophiophogon different sp.
5.6	Wedelia trilobata
5.7	Phelodendron
5.8	Geranium/Poinsettia / Forget me not (seasonal)
5.9	Marry Christmas begonia / Polypodium / Aluminium plant (seasonal)
5.10	Nephrol epis bosteniensis

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/ Engineering-In-Charge.

5.0 SPECIFICATIONS PART 5 : HARDSCAPE WORKS

Technical Specification of Materials

Materials shall be of the approved quality best obtainable. A list of materials of approved

a) The Brand(s) is indicated in the annexure. Testing of materials of approved brand(s) may have to be done at the discretion of Architect/Employer. The cost to be borne by the contractor.

b) In case, for some reason or other materials are required to be obtained from any manufacturer other than those listed, then prior approval from Architects will be necessary supported by a relevant test certificates qualifying the required standard.

c) Further tests as directed by the Architects/Engineering-In-Charge shall also be carried out by the contractor at their own cost, if required.

d) Samples of all materials including the sources shall be got approved before placing order and the approved sample shall be carefully preserved in an appropriate manner at the site office for verification from time to time.

e) For standard bought out times, the sizes manufactured by the firms listed, shall prevail when there is discrepancy in the sizes mentioned in the schedule without any financial adjustment.

f) Materials shall be tested in any approved Testing Laboratory conforming to the requirements and frequency indicated in the list of Mandatory test. The test certificate in original shall be submitted to the Architects and entire charges connected with testing including charges for repeated tests if ordered, shall be borne by the contractor.

g) It shall be obligatory for the contractor to furnish certificates(s), if demanded by the Architects, from the manufacturer or the material supplier that the work has been carried out by using their material and as per their recommendations.

h) All materials supplied by the Employer/any other specialist firms shall be properly stored and the contractor shall be responsible for its safe custody until they are required on the works and till the completion of work.

i) The contractors without any extra cost shall provide all equipment and facilities for carrying out field tests on materials.

j) Unless otherwise shown on the drawings or mentioned in the Schedule of quantities or special specifications, the quality of materials, workmanship, dimensions etc. shall be followed hereunder.

5.1 Materials

Stones for the works shall be of the specified varieties which are hard, durable, fine grained and uniform in colour (for superstructure work) free from veins, flaws and other defects. Quality and work shall conform to the requirements specified in IS: 1597 (Part-1). The percentage of water absorption shall not exceed 0.5 percent as per test conducted in accordance with IS: 1124. The CONTRACTOR shall supply sample stones to the ENGINEER for approval. Stones shall he laid with its grains horizontal so that the load transmitted is always perpendicular to the natural bed.

Cement-sand mortar for stone masonry works shall be in the proportion of 1:6 unless otherwise specified in the respective items of work. Materials and preparation of mortar shall be as specified in clause 3.1.

5.2 Workmanship

For all works below ground level the masonry shall be random rubble un-coursed with ordinary quarry dressed stones for the hearting and selected quarry dressed stones for the facing.

For all works above ground level and in superstructure the masonry shall be random rubble un-coursed, well bonded, faced with hammer dressed stones with squared quoins at corners. The bushings on the face shall not be more than 40 mm on an exposed face and on the face to be plastered it shall not project by more than 12 mm nor shall it have depressions more than 10 mm from the average wall surface.

Face stones shall extend back sufficiently and band well with the masonry. The depth of stone from the face of the wall inwards shall not be less than the height or breadth at the face. The length of the stone shall not exceed three times the height and the breadth on base shall not be greater than three-fourths the thickness of wall nor less than 150 mm. The height of stone may be up to a maximum of 300 mm. Face stones or hearting stones shall not be less than 150 mm in any direction.

Chips and spalls shall be used wherever necessary to avoid thick mortar joints and to ensure that no hollow spaces are left in the masonry. The use of chips and spalls in the hearting shall not exceed 20 percent of the quantity of stone masonry. Spalls & chips shall not be used on the face of the wall and below hearting stones to bring them to the level of face stones.

The maximum thickness of joints shall not exceed 20 mm. All joints shall be completely filled with mortar. When plastering or pointing is not required to be done, the joints shall be struck flush and finished as the work proceeds. Otherwise, the joints shall be raked to a minimum depth of 20 mm by a raking tool during the progress of the work while the mortar is still green.

Through or bond stones shall be provided in walls up to 600 mm thick and in case of walls above 600 mm thickness, a set of two or more bond stones overlapping each other by at least 150 mm shall be provided in a line from face to back. In case of highly absorbent types of stones (porous lime stone and sand stone, etc.) the bond stone shall extend about two-thirds into the wall and a set of two or more bond stones overlapping each other by at least 150 mm shall he provided. Each bond stone or a set of bond stones shall be provided for every 0.5 sq.m of wall surface.

All stones shall be sufficiently wetted before laying to prevent absorption of water from the mortar. All connected walls in a structure shall be normally raised uniformly and regularly. However if any part of the masonry is required to be left behind, the wall shall he raked back (and not saw toothed) at an angle not exceeding 450. Masonry work shall not be raised by more than one metre per day.

Green work shall be protected from rain by suitable covering. Masonry work shall be kept constantly moist on all the faces for a minimum period of seven days for proper curing of the joints.

Type of scaffolding to be used shall be as specified in clause 3.2.

Installation of miscellaneous inserts in the masonry shall be as specified in clause 3.2.

5.3 Specifications for Cobblestone Pavement

5.3.1 Scope:

These specifications cover the construction of cobblestone pavements. The work shall consist of furnishing and setting granite cobblestone pavers on a stone dust setting bed over a gravel base course in accordance with these specifications and in close conformity with the lines and grades **shown on the plans or established by the contractor.**

5.3.2 Materials :

Materials shall meet the requirements specified in the following descriptions and/or sub-sections of Division III of the Massachusetts Standard Specifications for Bridges and Highways. Cobblestones. Cobblestones shall be granite, of fairly uniform shape and colour, free from cracks and other structural imperfections or flaws which would impair

its structural integrity, and of a smooth appearance. Natural colour variations, characteristic of the deposit source will be permitted. Cobblestones shall be similar to existing cobblestones on various downtown streets. Samples shall be submitted for approval by the Nantucket Planning Board.

5.3.3 Construction Methods:

The sub base below the stone dust setting bed shall be fine graded and thoroughly compacted (as required under section 401. of the M.S.S.B.H).

Cobblestones shall be carefully laid on a stone dust setting bed as shown on the plans, and shall be solidly rammed in position by hand.

The cobblestones shall be set with the long axis of each stone vertical to the roadway surface. The cobblestones shall be set such that each cobblestone is touching another cobblestone.

The cobblestones shall be compacted and tamped with a mechanical plate compactor or by another method approved by the Board or its Agent. After a sufficient area of pavement has been laid, the pavement surface shall be tested with a 10-foot straight edge and laid parallel with the centreline and any variations exceeding xiv 1/2 inch shall be corrected and brought to proper grade. Any stones that become cracked during these procedures shall be removed and replaced.

The cobblestones shall be swept with a sand/cement mixture (three parts dry sand, one part cement) and fogged with water. The pavement surface shall be vibrated with a lightweight plate compactor to insure compaction between the joints. Additional joint filler of sand/cement mixture shall be uniformly distributed as necessary to fill all of the voids. The process shall be repeated for a maximum of five days until all the joints are full.

5.4 Specifications for Brick Pavement

5.4.1 Scope:

These specifications cover the construction of a Brick Paving Block Pavement. The work shall consist of furnishing and setting extruded fireclay Brick Paving Block pavement on a stone dust setting bed on a dense graded crushed stone and gravel base course in accordance with these specifications and in close conformity to the lines and grades shown on the plans.

5.4.2 Materials:

Materials shall meet the requirements specified in the following descriptions and/or subsections of Division III of the Massachusetts Standard Specifications for Bridges and Highways.

Brick Pavers. Brick Paving Block shall be for exterior paving, manufactured from extruded fireclay from shale and shall be fired to produce a dense paver and shall meet the requirements of ASTM C216-69-SWFBS with water absorption not more than 5 percent with five-hour bail. Laminated brick will not be acceptable. Standard Face brick will not be acceptable.

All brick shall be batched type burned to provide the various colours by controlled atmosphere and temperature conditions, required to obtain a rustic blend (70 percent red and 30 percent brown to black). The brick shall be highly resistant to abrasion and shall have an average compressive strength of 8000 or more psi over a 100-cycle freeze-thaw test.

The brick shall be wire-cut to a size of 4 x 8 x 2.25 inches. Brick shall be delivered to the site on pallets. Samples shall be submitted for approval by the Nantucket Planning Board.

5.4.3 Construction methods:

Each pavement layer shall be fine graded and thoroughly compacted (as required under Section 401. of the M.S.S.B.H.)

The Brick Pavers shall be laid true to lines and grades with joints of uniform thickness, all surfaces true and corners straight and plumb. Paving patterns shall be as shown on the plans or to match existing patterns, as directed by the Board or its Agent. Any patterns in which the alignment is not acceptable shall be promptly removed and reset.

The Brick Pavers shall be compacted and tamped with a lightweight mechanical plate compactor or by another method approved by the Board or its Agent. After a sufficient area of pavement has been laid, the pavement surface shall be tested with a 10-foot straight edge and laid parallel with the centreline and variations exceeding 1/2 inch shall be corrected and brought to proper grade. Any pavers which become damaged during these procedures shall be promptly removed and reset.

The Brick Pavers shall be swept with a dry sand/cement mixture (three parts dry sand, one part cement) and fogged with water.

The pavement surface shall be vibrated with a lightweight plate compactor to insure compaction between joints. Additional joint filler sand/cement mixture shall be uniformly

distributed as necessary to fill all of the voids. The process shall be repeated for a maximum of five days until all the joints are full, and all pavers are stabilized.

CONTRACTOR shall do all Tiles, stone slab work etc. as per Standard specification, landscape or architectural drawing or as directed by engineer in charge.

6.0 SPECIFICATIONS PART 6 : SIGNAGES

Scope of Work and Services

Contractor to design, fabricate and install of exterior signage's in stone which consist building/ area identification signs, regulatory signs and direction always finding signs information and History about place etc). The design shall be approved by Engineering-in-Charge and client. Contractor to submit drawings of the same and take the approval before execution of the work.

Design Requirements

The following are the design requirements:

1. The signs shall be attractive and exhibit a professional quality of workmanship, which will reflect positively on site.
2. Signage should incorporate client's branding standards, as appropriate.
3. Signage should leverage the spatial organization of the facility and utilize architectural design features, destinations zones, landmarks, shape, color, lighting, etc.
4. Signage should be easy to recognize, consistent, clear, distinctive, and easy to read.
5. Signage shall be compliant with CPWD Standards or relevant norm for signage's Design.

Considerations - Services and Products

1. Perform a site review to verify locations, determine available areas for signage, confirm dimensions and identify potential conflicts with architecture or landscape designs.
2. Finalize all elements of the sign system design including materials, fabrication specifications, graphic design and installation details.
3. Prepare sign lay outs based on actual sign messages to determine sign and letter sizes and to determine the need for variations to the way finding/signage program.

4. Provide final fabrication submittals based on approved design.

5. Be responsible for fabricating the exterior signage program in accordance with the approved design.

6. Develop an installation schedule to assure timely, accurate and code compliant installation.

7. Be responsible for the installation of the exterior signage program in accordance with the design intent of the approved program.

7.0 SPECIFICATIONS PART 7 : GARDEN FURNITURE & DUSTBINS

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

The layout and design shall be submitted and take the approval by Engineering-In-Charge.

Cast in situ furniture/ sitting around the existing big trees are proposed in wood/ stone and metal.

Other readymade benches of good quality shall be provided at the interval of 50 meter.

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/ ENGINEERING-IN-CHARGE of all the garden furniture. Bidder to submit the catalogue and detail specification of the furniture's and garbage bins.

9.0 LIST OF APPROVED MAKES/BRANDS OF MATERIALS

Sl. No.	Details of Materials / Equipment	Manufacturer's Name
1.	**Erosion control mats**	Octane Exports
	(for slope retention)	Sri Venkateshwara Fibre Udyog
		Surajbhan Commodities Private Limited

2.	**Plant material**	Reputed Nursery or nurseries (Shall be approved by Engineering-in-Charge)

PART - B

TECHNICAL SPECIFICATION

FOR

CIVIL WORK

TECHNICAL SPECIFICATION

FOR CIVIL WORKS

INNOVATIVE USE OF WATER BODY
AT RANIR PUKUR POND

Innovative Use of Water Body at Ranir Pukur Pond by providing decorative boundary columns, peripheral landscaping, pathway, decorative illumination & area lighting and allied works and Post Completion Operation & Maintenance for 05 (five) years including Defect Liability Period of 01 (one) year

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 EARTHWORK

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, stock piling, 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.

1.2 GENERAL

1.2.1 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.

1.2.2 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.

1.3 SITE PREPARATION

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.

1.3.2 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.

1.3.3 The Contractor shall Construct and maintain such ditches, in addition to those shown on the plans, as will adequately drain areas under construction.

1.3.4 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.

1.4 EXCAVATIONS

1.4.1 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.

1.4.2 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.

1.4.3 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.

1.4.4 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.

1.4.5 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.

1.4.6 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.

1.4.7 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.

1.4.8 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.

1.4.9 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.

1.4.10 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.

1.4.11 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.

1.4.12 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.

1.4.13 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.

1.4.14 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.

1.4.15 Excavation for Recharge pits, Recharge trenches shall be taken out to the levels and dimensions as the Project Engineer may direct.

1.4.16 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.

1.4.17 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.

1.4.18 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.

1.4.19 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.

1.4.20 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.

1.5 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.

1.6 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.

1.7 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.

1.8 BACK FILLING

1.8.1 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.

1.8.2 The backfilling shall include filling around the foundations, trenches.

1.8.3 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.

1.8.4 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.

1.8.5 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.

1.8.6 Fill in around trenches and pits shall be carefully placed with fine material to cover the completely before the normal infilling is done.

1.8.7 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.

1.8.8 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.

1.8.9 Depending on the depth of fill the project engineer may instruct increased thickness of successive layer to be placed.

1.8.10 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.

1.8.11 Depending on the depth of fill the project engineer may instruct increased thickness of successive layer to be placed.

1.8.12 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.

1.8.13 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.

1.8.14 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.

1.8.15 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.

1.8.16 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.

1.8.17 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.

1.8.18 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.

1.9 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.

1.10 DISPOSAL OF SURPLUS MATERIAL

1.10.1 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.

1.10.2 The disposal of surplus excavated material shall include loading, unloading, transporting, stacking, spreading as directed by the Project Engineer.

1.11 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.

1.12 PAYMENT

Payment will be made for acceptable measured quantity of backfill/ fill 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.

2.0 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.

2.1 GENERAL

2.1.1 Full co-operation shall be given to other trades to install embedded items and/or any associated services.

2.1.2 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.

2.1.3 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.

2.1.4 Contractor shall prepare bar bending schedules, and get the same approved by the project engineer, prior to commencement of work.

2.1.5 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

2.1.6 MATERIALS

2.1.6.1 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.

2.1.6.2 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 the sand from the local queries (Coarse or fine as per availability in in the local query in Tripura) and shall conform to requirements of IS: 383 latest editions.
d. Coarse aggregate shall be gravel or broken stone or hard, durable material free from laminated structure and conforming to IS: 383 latest editions. 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

2.1.6.3 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.

2.1.6.4 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.

2.2 CONCRETE MIX PROPORTIONS

2.2.1 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.

2.2.2 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.

2.2.3 DURABILITY

Requirements of Clause 7 of IS: 456-1978 shall be followed.

2.2.4 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.

2.2.5 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.

2.2.6 ADMIXTURES:

If required or permitted, admixtures used shall be in accordance with the manufacturer's instructions except as otherwise specified herein.

2.2.7 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.

2.3 Ready mix concrete

2.3.1 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 flyash 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.

2.4 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.

2.5 CONCRETE PLACEMENT

2.5.1 Concrete, when deposited, shall have a temperature of not less than 5°c (41°f) and not more than 32°c (90°f).

2.5.2 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.

2.5.3 Contractor shall give adequate notice to the architect/project manager of his intention to concrete any section of the works.

2.5.4 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.

2.5.5 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.

2.5.6 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.

2.6 Quality Control

2.6.1 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.

2.6.2 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.

2.6.3 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.

2.6.4 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.

2.6.5 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.

2.6.6 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.

2.6.7 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.

2.6.8 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.

3.0 STEEL REINFORCEMENT

3.1 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.

3.2 Material and size of bars

3.2.1 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.

3.2.2 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.

3.2.3 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.

3.2.4 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

3.2.5 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.

3.2.6 Reinforcement of all types is to be stored on site in approved manner so as to avoid damage.

3.2.7 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.

3.2.8 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.

3.2.9 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.

3.2.10 Reinforcement of all types is to be stored on site in approved manner so as to avoid damage.

3.2.11 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.

3.2.12 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.

3.2.13 Applicable standards

Latest editions of Indian Standards as per 4.3 or other International Standards

3.3 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.

3.4 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.

3.5 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.

4.0 BRICK MASONRY

4.1 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.

4.2 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.

4.3 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.

4.4 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.

4.5 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.

4.6 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.

4.7 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.

4.8 MEASUREMENT AND PAYMENT

4.8.1 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.

4.8.2 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.

4.8.3 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.

5.0 Concrete Block Masonry

5.1 MATERIALS

Masonry units of hollow and solid concrete blocks shall conform to the requirements of IS: 2185 (Part 1).

Masonry units of hollow and solid light-weight concrete blocks shall conform to the requirements of IS: 2185 (Part 2).

Masonry units of autoclaved cellular concrete blocks shall conform to the requirements of IS: 2185 (Part 3).

The height of the concrete masonry units shall not exceed either its length or six times its width.

The nominal dimensions of concrete block shall be as under.

1) Length 400,500 or 600 mm.

2) Height 100 or 200 mm.

3) Width 100 to 300 mm in 50 mm increments

Half blocks shall be in lengths of 200, 250 or 300 mm to correspond to the full length blocks. Actual dimensions shall be 10 mm short of the nominal dimensions.

The maximum variation in the length of the units shall not be more than ±5mm and maximum variation in height or width of the units shall not be more than ±3mm.

Concrete blocks shall be either hollow blocks with open or closed cavities or solid blocks.

Concrete blocks shall be sound, free of cracks, chipping or other defects which impair the strength or performance of the construction. Surface texture shall be as specified. The faces of the units shall be flat and rectangular, opposite faces shall be parallel and all arises shal1 be square. The bedding surfaces shall be at right angles to the faces of the block.

The concrete mix for the hollow and solid concrete blocks/light weight concrete blocks shall not be richer than one part of cement to six parts of combined aggregates by volume i.e. (1:6).

Concrete blocks shall be of approved manufacture, which satisfy the limitations in the values of water absorption, drying shrinkage and moisture movement, as specified for the type of block as per relevant IS code. CONTRACTOR shall furnish the test certificates and also supply the samples, for the approval of Engineer.

5.2 WORKMANSHIP

The type of the concrete block, thickness and grade based on the compressive strength for use in load bearing and/or non-load bearing walls shall be as specified in the respective items of work. The minimum nominal thickness of non-load bearing internal walls shall be 100 mm. The minimum nominal thickness of external panel walls in framed construction shall be 200 mm.

The workmanship shall generally conform to the requirements of IS: 2572 for concrete block masonry IS: 6042 for light weight concrete block masonry and IS: 6041 for autoclaved cellular concrete block masonry works.

From considerations of durability, generally concrete block masonry shall be used in superstructure works above the damp-proof course level.

Concrete blocks shall be embedded with a mortar which is relatively weaker than the mix of the blocks in order to avoid the formation of cracks. Cement mortar of proportion 1:6 shall be used for the works unless otherwise specified in the respective items of work. Preparation of mortar shall be as specified in clause 3.1 to 3.1.

The thickness of both horizontal and vertical joints shall be 10 mm. The first course shall he laid with greater care, ensuring that it is properly aligned, levelled and plumb since this will facilitate in laying succeeding courses to obtain a straight and truly vertical wall. For the horizontal (bedding) joint, mortar shall be spread over the entire top surface of the block including front and rear shells as well as the webs to a uniform layer of 10 mm. For vertical joints, the mortar shall be applied on the vertical edges of the front and rear shells of the blocks. The mortar may be applied either to the unit already placed on the wall or an the edges of the succeeding unit when it is standing vertically and then placing it horizontally, well pressed against the previously laid unit to produce a compacted vertical joint. In case of two cell blocks with slight depression on the vertical sides these shall also be filled up with mortar to secure greater lateral rigidity. To assure satisfactory bond, mortar shall not be spread too far ahead of actual laying of the block as the mortar will stiffen and lose its plasticity. Mortar while hardening shrinks slightly and thus pulls away from the edges of the block. The mortar shall be pressed against the units with a jointing tool after it has stiffened to effect intimate contact between the mortar and the unit to obtain a weather tight joint. The mortar shall be raked to a depth of 10 mm as each course is laid to ensure good bond for the plaster.

Dimensional stability of hollow concrete blocks greatly affected by variations of moisture content in the units. Only well dried blocks should be used for the construction. Blocks with moisture content more than 25% of maximum water absorption permissible shall not he used. The blocks should not be wetted before or during lying in the walls. Blocks should be laid dry except slightly moistening their surface on which mortar is to be applied to obviate absorption of water from the mortar.

As per the design requirements and to effectively control cracks in the masonry, RCC bond beam/studs, joint reinforcement shall he provided at locations as per details indicated in the construction drawings. Joint reinforcement shall be fabricated either from mild steel wires conforming to IS: 280 or welded wire fabric/high strength deformed bass as per the drawings.

For jambs of doors, windows and openings, solid concrete blocks shall he provided. If hollow units are used, the hollows shall be filled with concrete of mix 1:3:6. Hold fasts of doors/windows should be arranged so that they occur at block course level.

At intersection of walls, the courses shall laid up at the same time with a true masonry bond between at least 50% of the concrete blocks. The sequence for construction of

partition walls and treatment at the top of load bearing walls for the RCC slab shall be as detailed under clause 3 for the brick work.

Curing of the mortar joints shall be carried out for at least 7 days. The walls should only be lightly moistened and shall not be allowed to become excessively wet.

Double scaffolding as per clause 3.2 shall be adopted for execution of block masonry work.

Cutting of the units shall be restricted to a minimum. All horizontal and vertical dimensions shall be in multiples of half length and full height of units respectively, adapting modular co-ordination for walls, opening locations for doors, windows etc.

Concrete blocks shall be stored at site suitably to avoid any contact with moisture from the ground and covered to protect against wetting.

6.0 FINISHING

6.1 GENERAL

6.1.1 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.

6.1.2 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.

6.1.3 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.

6.1.4 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.

6.1.5 PLASTER WORK

6.1.5.1 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.

6.1.5.2 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.

6.1.5.3 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

6.1.5.4 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.

6.1.5.5 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.

7.0 UPVC –SWR PIPING WORK

7.1 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

7.2 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.

7.3 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.

7.4 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.

7.5 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.

7.6 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.

7.7 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.

7.8 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.

7.9 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.

7.10 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.

7.11 MODE OF PAYMENT

The contract shall be for unit running meter length of pipe line laid.

8.0 GENERAL REQUIREMENTS

The work shall be executed on Item rate basis. Details and drawings given in Tender document is to 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.

a. The contractor will have to construct according to the layout plan and detailed architectural drawings issued by Engineering-in-charge.
b. Agency has to obtain labour 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 etc. 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.

PART- C

TECHNICAL SPECIFICATION

FOR

ELECTRICAL WORKS

TECHNICAL SPECIFICATION FOR ELECTRICAL WORKS

INNOVATIVE USE OF WATER BODY AT RANIR PUKUR POND

Innovative Use of Water Body at Ranir Pukur Pond by providing decorative boundary columns, peripheral landscaping, pathway, decorative illumination & area lighting and allied works and Post Completion Operation & Maintenance for 05 (five) years including Defect Liability Period of 01 (one) year

1.0 **SCOPE OF WORK:**

1.1 The scope of services covers the supply, packing, forwarding and delivery from manufacturer's works/ place of storage to erection site including transit insurance, unloading, storage at site, assembly, erection, testing, installation, commissioning & performance demonstration and handing over to ASCL along with all necessary spares of original ratings. Inland and overseas transit insurance, transport, testing at site shall be Contractor scope.

1.2 The scope of work broadly includes;

1.2.1 Providing Basic lighting that meets the requirements of Functional Illumination complemented by aesthetic and architectural lighting for the below mentioned elements at Ranir Pukur Pond

(a) Pathways / Walkways

(b) Step Light

(c) Tree and RCC Column Up-lighting

(d) Illumination of Toilet Blocks

1.2.2 Installation of power distribution equipment and other Misc. Supplementary works as mentioned below;

(a) Outdoor Feeder Pillar (OFP), Sub Feeder Pillar and Junction Box for power supply distribution for the above

(b) Cabling and Earthing system

(c) Point Wiring for indoor lighting points

(d) Diesel Generator set for emergency power supply arrangement

(e) Civil works including Foundation for the Outdoor feeder pillar, lighting poles etc.

(f) Liaison with Govt. Authorities for making Power supply arrangement for the project areas

1.3 General Instruction to Bidders

1.3.1 The Contractor shall prepare design calculations based on parameters/ design criteria indicated in the specifications.

1.3.2 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. All design documents/ calculations prepared by Contractor shall be with ISO documentation i.e. with duly singed by qualified authorities and stamped. Design documents/ calculations prepared by sub-Contractors shall be approved by Contractor and stamped copy of approval along with no-deviation sheet from sub-contractor shall be submitted by the Contractor to Purchaser/ Consultant for final review/ approval.

1.3.3 Expert or manufacturer supervision for sub-contractor supplied material shall be provided by Contractor and included in offer.

1.3.4 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, wharf age and other such charges claimed by the transporters, railways etc. shall be to the account of the Contractor.

1.3.5 Nothing in this specification shall be construed to relieve the Contractor of his/ her responsibilities towards following best engineering practices established in the country.

1.3.6 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.

1.3.7 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.

1.3.8 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.

1.3.9 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.

1.3.10 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.

1.3.11 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.

1.3.12 Contractor should visit site and get himself/ herself ascertained regarding the scope of work for the complete Electrical works before submission of quote/ offer.

1.3.13 Contractor's scope shall include design, engineering, manufacture, supply, testing, commissioning and handover of following electrical equipment/ systems as per

tender specifications, BOQ and reference electrical SLD & other relevant details.

1.3.14 Tariff metering equipment & electric supply connection shall be provided by TSECL for which necessary liaison shall be done by Contractor.

1.3.15 Incoming point of supply till tariff meter is in the scope TSECL. Further, the entire distribution is in the scope of contractor.

1.3.16 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.

1.3.17 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.

1.3.18 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.

1.3.19 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.

1.3.20 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.

1.3.21 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.

1.3.22 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.

1.3.23 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.

1.3.24 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 Ranirpukur Pond Area

4.1.1 There are no existing power supply arrangements or Lighting post in the Pond area.

4.1.2 The LT power shall be tapped from the nearest LT point in discussion with TSECL and terminated at Consumer's Main DB through a LT tariff meter for the proposed Pond area.

4.2 The Main DB shall have the configuration like two incomers from Grid and DG. The no of outgoings shall be as per requirements.

4.2.1 DG mounted in Acoustic enclosure shall be provided for emergency back up in case of grid failure.

4.3 There shall be an outdoor lighting distribution board installed in the Ranirpukur Pond area which shall be fed from the nearest Overhead LT power line available via LT power cable.

4.4 The outdoor lighting DB shall distribute power to the landscape lighting fixtures proposed around the Pond.

4.5 Compound wall with embedded RCC light post shall be provided along the periphery of the Pond as shown in the tender drawings.

4.6 A string of Columns provided at the front side of the Pond along the Airport road shall be lit with uplighters such that the column is lit from all directions.

4.7 Similar uplighting shall be provided for the Tree in the planters provided around the Pond.

4.8 Refer Single Line Drawing (SLD) - TCE.10198A-EL-4000-AU-40003

5.0 DESIGN CRITERIA FOR ELECTRICAL SYSTEMS:

5.1 GENERAL

5.1.1 The design criteria, given below has to be followed by the contractor for designing/ sizing of electrical equipment covered under Contractor's battery limits; However it is to be noted by the Contractor that, following this design criteria does not relieve the Contractor from adherence to the standards, regulatory requirements & best engineering practices.

The Electrical Power Distribution System shall be designed to provide:

(a) Safety to Personnel and equipment during both operation and maintenance

(b) Reliability & Continuity of Service

(c) Minimal fire risk

(d) Ease & flexibility of maintenance and operation

(e) Protection of all electrical equipment

(f) Electrical supply to equipment and machinery within the design operating limits

(g) Adequate provision for future extension and modification

(h) Maximum inter-changeability of equipment

(i) Fail safe feature

(j) Energy efficient equipment/ system

(k) Suitability for applicable environmental factors

(l) Service Condition

5.1.2 All the components of the electrical system shall be sized to suit the maximum load under the most severe operating conditions. Accordingly, the maximum simultaneous consumption of power, required by continuously operating loads shall be considered and an additional margin shall be taken into account for intermittent service loads, if any. The amount of electrical power consumed by each area shall be calculated for its operation at the design capacity.

5.1.3 The equipment shall be designed and manufactured in accordance with the best engineering practices and shall be suitable for the intended purpose.

5.2 ESTIMATION OF LOAD/ MAX DEMAND

5.2.1 Load factor and Diversity factors shall be considered while calculating the running load. For lighting loads these factors shall be considered as 1.

5.3 FAULT LEVEL CALCULATIONS

5.3.1 The fault level at the primary of the transformer shall be calculated based on the Fault level at the TSECL substation and impedances of the intermediate bus, cable/ conductor etc.

5.3.2 Fault level at the Main DB shall be calculated based on the respective DT rating, its impedance and length and size of the connecting conductor/ cables.

5.4 CABLE AND WIRE SIZING:

5.4.1 The BIDDER shall ensure that cable and wires associated with the power distribution and control systems in all the installations throughout the Works are adequately rated for their use.

5.4.2 The following main aspects shall also be considered while deciding the final size of the cables/ wires -

(a) Supply voltage and frequency

(b) All cables shall be selected to carry the corresponding full load current under site conditions.

(c) Route length and disposition of cables

(d) Maximum short circuit current duration (fault clearing time) and final temperature of cable during short circuit current flowing through the cable.

(e) Fault clearing time of the upstream circuit breaker:

(i) Cables from CSS outgoing to Main Panel (MDB) incomer, the fault clearing time shall be 1sec

(ii) Cables emerging from outgoing of the Main panel (MDB) , fault clearing time shall be considered as 0.01 second for MCCB/MCB Outgoing (for Tie feeders if any it shall be 0.5 second)

(iii) For the HT incomer cables (metering kiosk to CSS) minimum fault clearing time shall be considered as 1 sec.

5.4.3 For cable from RMU outgoing to transformer, fault clearing time shall be considered as 0.16 second.BIDDERS to note that, the above fault clearing times are minimum to be considered. Actual fault clearing time shall be considered as per actual relay co-ordination.

5.4.4 Appropriate de-rating factors as per cable manufacturer's catalogue shall be considered for sizing the cable.

5.4.5 In running condition, cumulative voltage drop (Including HV and LV at 100% rated load) shall not exceed 5% (measured at load end) for the LV loads.

5.4.6 All the HV cables shall be Earthed grade (as per system requirement), multi-stranded Al conductor, XLPE insulated, inner/ outer extruded PVC sheath ST2, galvanized steel flat strip armoured cables or as per TSECL specifications.

5.4.7 The LV cables shall be 1.1 kV grade, multi-stranded Copper/ Al conductor, XLPE insulated, colour coded, inner and outer extruded PVC sheathed, galvanized steel round wire/ flat strip armoured cables.

5.4.8 Cables up to & including 4.0 sq.mm shall be Cu multi-stranded conductor with galvanized steel round wire armoured & balance cables shall be Al multi-stranded conductor with galvanized steel round wire/ flat strip armoured.

5.4.9 Single core cable shall have non magnetic material armouring.

5.4.10 Control cables shall be Cu multi-stranded conductor with galvanized steel round wire/ flat strip armoured. For cables above 7 cores, minimum two spare cores shall be considered.

5.5 LV SWITCHGEAR PANELS

5.5.1 All panels (other than CSS LT Panel) shall be Free standing, outdoor type with double door construction, conforming to IP55 ingress protection protected mounted on steel structures at least 400mm above ground. The panel has separate compartments for Incomer & outgoing switchgear and outgoing Cable termination connectors.

5.5.2 The bus-bars shall be sized considering the following criteria:

(a) Sleeves made of insulating material on all bus bars.

(b) Design ambient temperature 50ºC.

(c) Final temperature of the bus-bars complying with requirements of IS 8623 & IEC 61947.

(d) Bus bars being inside the panel; De- ration for enclosure and ventilation.

(e) Bus bar suitability for carrying rated current continuously. The current density (A/sq mm) of the bus bar shall not exceed 1 for Aluminum bus and 1.5 for Copper bus.

(f) Configuration of bus bars and Proximity effect

(g) The main bus shall be designed based on the load rating as well as the

actual fault level for specified duration at the location of the Panel/ board with 10% tolerance

(h) Tinned copper bus bar for panels rated below and upto 63 A whereas Aluminum bus bars for panels rated above 63A.

5.5.3 Earth bus of the panel shall be sized suitable for the above fault level for the same duration.

5.5.4 Switchgear Sizing/ Selection:

5.5.5 Switchgear shall be sized/ selected considering the following:

(a) Rating suitable for carrying full load current of the equipment.

(b) Suitability for Short Circuit Rating for specified duration.

(c) Switchgear for motors shall be suitable for motor duty application.

(d) Switchgear for all the motor feeders shall be Type-2 co-ordination.

5.5.6 In-panel de-rating factor of minimum 20% or as provided in Manufacturer's catalogue, whichever is higher shall be considered.

5.6 ILLUMINATION SYSTEM:

5.6.1 Only LED Luminaires shall be considered for this project.

5.6.2 Illumination for various indoor & outdoor areas shall be conforming to the requirements mentioned below:

(a) Latest version of related IS Standards, NBC and National Lighting Code (NLC) shall be referred for designing Illumination for different areas.

(b) Lighting design shall be performed using latest version of DiaLux Software/ Original Equipment Manufacturer (OEM) validated software. The Validation Report along with software and data files shall be acceptable to PURCHASER/ PURCHASER's representative.

5.6.3 The basis of design shall be based on the following lighting engineering criteria:

(a) Lighting Lux level.

(b) Luminance distribution.

(c) Glare restriction.

(d) Direction of incidence of light and shadow effect.

(e) Colour appearance and colour rendering of the light source

5.6.4 The illumination levels to be considered for the design of lighting system for various areas shall be as following. These are the illumination levels achieved at Work plane.

Table E1 –Lux Table

Area	Illumination Level (Lux) - Average values
Pathways within Pond area	15 Lux
Toilet	100 Lux

5.6.5 Various design factors shall be considered as following:

Table E2 –Design Factors

a)	Incoming supply Maintenance Factor:		
	i) Outdoor area	:	0.8
	ii) Indoor areas	:	0.8
b)	Reflectance Factors for indoor areas:		
	i) Wall	:	30%
	ii) Ceiling	:	10%
	iii) Floor	:	30%
c)	Uniformity (Min. / Avg.)	:	Minimum 0.5 for indoor and 0.4 for outdoor

5.6.6 Selection of Luminaries

(a) For Pathway Lighting-

(i) Pathway Lighting through the Concrete Post of Lanterns shall be design such that, it enable a visitor to navigate down the walkway safely.

(ii) The lighting arrangement inside the Concrete can either be carried out by Bare LED Lamp of adequate wattage. However, the BIDDER has to ensure and prove the Water tightness, corrosion in case of leakage and electrical safety under such circumstances. Alternately, min IP67, Uplighter of adequate wattage can be provided with in the space.

(iii) It shall provide better aesthetic to overall landscape.

(iv) It shall be designed with LED luminaries.

(v) The luminary wattage should not be more than 50 W for Post of Lantern.

(vi) The lighting Level to be achieved on pathways/walkways shall be 15 Lux with Uniformity ratio of 0.4. Luminaire with colour temp of minimum 3000K shall be used.

(b) For Tree Lighting-

(i) Bidder has to illuminate the trees considering its foliage, size & shape. Trees are to be lit up using Up lighters / beamers / washers, positioning them intelligently at different locations to create interesting effect and better aesthetic to overall landscape. Tree lighting shall be designed such that, it highlight the tree structure.

(ii) All of the trees would be illuminated using single colour.

(iii) It shall be designed to install recess mounted either in ground or inside the planter for better daytime appearance.

(iv) The luminary wattage for tree uplighter should not be more than 30 W. It shall have color temperature of 3000 K for single colour.

(v) Luminaires shall be used with different lenses to achieve the required size and shape of beam of light to suit the structure of trees and foliage.

(vi) The bushes in Ranir Pukur Pond shall be lit with Bush Lighters or Spike lights proposed to be mounted in bunches of three along either side of the pathway. Minimum three Bush lights shall be provided for the alternate bunches of bushes in uniform manner.

(c) Column Up lighting at Ranirpukur

(i) Recess mounted Up-lighters similar to tree up-lighters shall be provided to lit up all the columns of the Pergolas provided at the entrances as well as those provided at the viewing deck along the Pond.

(ii) All the columns shall be provided with recess mounted uplighters on all four side of appropriate wattage not more than 15 W and 3000K CT.

(d) Step Lighting

(i) IP 68 recessed mounted Luminaires shall be considered for step lighting in Ranir Pukur Pond

(ii) The Luminaire wattage shall be within 12W and 3000K CT.

5.7 EARTHING SYSTEM:

5.7.1 The safety earthing and lightning protection system will be generally on the basis of following codes and standards (including their latest editions).

(a) IS 3043 -1987: Code of practice for Safety Earthing.

(b) IEEE 80 - 2000.

(c) CEA guidelines - 2010: Measures related to safety & electric supply.

(d) The fault levels considered shall be as follows:

Table E3 – Proposed Fault levels

System	Fault level in kA
415V System	* (10 kA) for 1 sec
11kV System	As per TSECL network

(*) Contractor to design on the basis of actual impedance;

Adequacy calculations for sufficiency of earth conductor size shall be provided.

5.7.2 Following factors shall be considered for sizing the earthing conductor:

Table E4 – Design Criteria for Earthing

a)	Design Ambient Temperature	:	50°C
b)	Allowable temperature rise for steel welded joints	:	500°C
c)	Fault clearing time	:	1 Second
d)	Overall earthing resistance	:	≤ 1 Ohms

5.7.3 Measurement of soil resistivity shall be done using Wenner's 4 electrode method as described in IS 3043 -1987 including its latest amendment.

5.7.4 The soil resistivity has not yet been measured; the same should be carried out

during detailed engineering by successful Contractor.

5.7.5 After soil resistivity measurement; length of conductor, no. of earth electrodes and no. of test pits shall be finalized based on these design criteria & the requirements specified in earthing requirements.

6.0 GENERAL TECHNICAL & PARTICULAR REQUIREMENTS FOR ELECTRICAL, EQUIPMENT/ SYSTEMS:

6.1 COMPACT SUBSTATIONS (CSS)

6.1.1 Each CSS shall typically consist of the following major parts:

(a) Metallic Enclosure with ventilation and rain/ dust protection as appropriate.

(b) Ring Main Unit (RMU).

(c) Oil type Transformer of respective rating with required accessories.

(d) LT switchgear.

(e) Power pack with One (1) Hr backup to take care of the DC load requirements within the CSS.

(f) FRTU for remote access and monitoring.

6.1.2 Apart from the above components if any other equipment or accessories are required as per TSECL specifications, the BIDDER shall consider the same in the BID and specify.

6.1.3 All the above components of each CSS shall conform to latest relevant standards and specifications and requirements of TSECL.

6.1.4 Civil works for the preparation of equipment foundation, cable trench, earth pits electrodes, earth grid around CSS and chain link fencing with gate for each CSS shall conform to latest relevant standards and State electricity board specifications and requirements.

6.1.5 CSS foundation shall be as per the applicable specification

6.1.6 Electrical Works like HT/LT cable termination in the respective boards inside the CSS shall conform to latest relevant standards and specifications and requirements of TSECL.

6.1.7 All SAFETY considerations in design and manufacturing for safe operation & maintenance by TSECL's personnel and safe practices during installation at site shall be in the scope of the BIDDER. Cost towards accomplishing the same shall be included in the BID price and no extra claim shall be entertained later.

6.1.8 Equipment furnished 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.

6.1.9 The BIDDER 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.

6.1.10 Codes And Standards:

(a) The design, manufacture and performance of equipment shall comply with latest applicable Codes of Standards.

(b) All components as well as the CSS as a whole shall be Type tested in accordance with the above standards.

(c) **BIDDER shall submit the type test certificates for Heat run test, Short circuit test and Ingress protection test for the CSS components of similar equipment along with the BID.**

6.1.11 Specific Requirements Of Compact Substation:

(a) Enclosure For CSS:

(i) The CSS shall be skid mounted, metal clad housing, single enclosure with modular construction housing with all necessary requirements as specified in this specification.

(ii) The complete design shall be Compartmentalized design. The enclosure shall have three distinct compartments with two distinct access isolated from each other for HT RMU, Transformer and LV Switchboard along with their respective accessories. If APFC is to be incorporated then another compartment shall be carved out in the enclosure.

(iii) The CSS metal clad housing shall be fabricated of powder coated hot dipped galvanised CRCA sheet of minimum 4mm thickness for outer enclosure and base while minimum 2 mm thickness for the rest balance enclosure parts.

(iv) The base of the enclosure shall ensure rigidity for easy transportation & installation. The base frame shall be fabricated of Mild steel channel of minimum size ISMC 100 mm or suitable enough to bear the load of the entire components on ground as well as when lifted as one entity. The structure of the substation enclosure shall be capable of supporting the gross weight of all equipment.

(v) The structure of the enclosure shall be capable of supporting the gross weight of all the equipment & the roof of the enclosure compartment shall be designed to support adequate loads.

(vi) Intermediate water proof ceiling roof shall be provided. A minimum clearance shall be left between the top of any component installed in the substation and the roof of the substation.

(vii) The enclosure shall conform to IEC 61330 standards, for Prefabricated Secondary Substation and must provide high level of personal safety by protecting all live parts against any accidental contacts either during commissioning, operation or maintenance. All electrical clearances shall be as per relevant Standards for HV as well as for LV. All doors and ventilation grills shall be earthed to provide a fully earthed enclosure for better personal safety.

(viii) All non-galvanised parts of the enclosure shall undergo rigorous seven tank process before applying epoxy powder coating of designated shade of RAL 7035(Siemens Grey) or as per TSECL's choice. Base frame shall be painted Tar Black. The paints shall be carefully selected to withstand tropical heat & rain. The paint shall not scale off or crinkle or be removed by abrasion due to normal handling.

(ix) The CSS enclosure shall be dust and vermin proof suitable for outdoor application, compact and easily portable. Long lasting and durable Neoprene gasket shall be provided on all doors, cut outs, louvers etc. to achieve internal protection.

(x) Access Doors of suitable/ convenient size for entry movement of respective components and humans in and out of the enclosure, shall be provided in each compartment with hinged construction with stoppers. All doors shall be provided with Pad locking and/or lock protected arrangement as well as an Internal Emergency handle so that door can be opened quickly in case of emergency.

(xi) The doors shall be provided with proper interlocking arrangement with the VCB for safety of operator.

(xii) Aluminium grilled Louvers with dust and vermin filter suitable for carrying out natural ventilation and adequate for limiting the temperature rise shall be provided in each compartment of the enclosure. No Forced cooling is allowed.

(xiii) The enclosure shall conform to IP54 for RMU and LV compartment while the transformer compartment shall conform to IP34. The entire enclosure shall confirm to temperature class K10.

(xiv) All cable entry shall be from Bottom. All the trenches below shall be at least 800mm wide.

(xv) Climate proof connection equipment shall be used to avoid leakage current and flashovers due to moisture/ condensation/ dust.

(xvi) Anodized Aluminium Sheet labels in English, Hindi and Local Language for warning, manufacturer's operating instructions etc., identifying the systems/ sub-systems inside/ outside the enclosure shall be provided in all the compartments as per state electricity board requirements or else with black engraving on white background of appropriate size. Danger boards on Anodized aluminium plate shall be provided on all Doors as well as on all four sides of the enclosure. The instructions shall be durable & clearly legible.

(xvii) Special care shall be taken by the manufacturer to ensure against rusting of nuts, bolts and fittings during operation. All current carrying parts shall be cleaned properly after final painting.

(xviii) The fabrication process shall ensure that there are no sharp edges on the GI sheets used.

(xix) One (1) no. 11W LED Lighting fixture and protection MCB shall be provided in each compartment. The power for the same shall be tapped from the LT side of the CSS. One additional lamp shall be provided for the transformer compartment.

(xx) One (1) no. Self-contained, Non Maintained, Emergency lighting luminaries suitable for 1x20W FTL or 11W LED with 3 hr backup & sealed rechargeable Ni-Cd batteries (high temperature type) shall be provided in each compartment for Emergency lighting. Suitable charging point with 5A switch socket shall be provided for each such luminaries

(xxi) The supply for all accessories like lighting within the CSS shall be tapped through DP MCBs in order to restrict the fault level within that of available MCBs.

(xxii) The connection of HT switchgear to Transformer shall be with the help of suitable size of cables from Transformer to LT switchgear with the help of suitable size of Aluminium/Copper busbars.

(xxiii) The enclosure shall have terminal intended for connection to the earth system of the installation, by way of flexible jumpers/strips & Lug arrangement. The continuity of the earth system shall be ensured taking into account the thermal & mechanical stresses caused by the current it may have to carry. The components to be connected to the earth system shall include:

- The enclosure of Package substation, doors, ventilators etc.
- The enclosure of High voltage switchgear & control gear from the terminal provided for the purpose.

- The transformer tank or metal frame of transformer & transformer neutral.

- The frame &/or enclosure of low voltage switchgear.

(b) Ring Main Unit (RMU) For CSS

(i) The RMU shall consist of Two Load Break Switch (LBS) and One Vacuum Circuit Breaker (VCB) housed in an enclosure as specified above.

(ii) The RMU shall be compact, maintenance free, reliable, easy to install, safe and easy to operate and complete with all necessary accessories and spares. The design, material and manufacturing of the RMU shall be of the highest order to ensure continuous and trouble free service over the years.

(iii) The RMU components viz., Load Break Isolator, VCB and Bus bars shall be sealed for life time in robotically welded 3mm thick stainless steel tank with SF6 as insulating media and conforming to IP67. Above inner tank along with all essential indications, measuring and protection components enclosed in a compact metal enclosure made of galvanised sheet steel of 1.6mm thickness conforming to IP54.

(iv) The operating mechanism of the switches and breakers shall be outside the SF6 tank and accessible from front. There shall be provision for filling the SF6 gas at site. The Gas Tank shall confirm to the sealed pressure system as per IEC and ensure the gas leakage to 0.1 % per year as per IEC.

(v) Vacuum Circuit Breaker shall be complete with operating mechanism; self-powered, static type SC,O/C,E/F protection relay with associated Current Transformers for control and protection of the distribution transformer. An integral cable earthing switch with full making capacity shall be provided.

(vi) The LBS, VCB and the bus bars shall have continuous rating in accordance with relevant IS / IEC standard.

(vii) The Load Break Switches shall be capable for breaking rated full load current. Its earthing switch shall also be suitable for full making capacity of the system as specified. The complete switchgear shall be suitable for breaking capacity of 25kA symmetrical at 11kV three phase.

(viii) Self-sufficient Power pack with One (1) Hr backup shall be provided in each RMU to take care of the DC load requirements within the CSS or as Specified by TSECL.

(ix) Provision shall be there for remote operation of the switchgears - Isolator & Breaker. It shall be possible to fit the motors either directly in manufacturing plant or on site as & when required. Installation on site shall be possible.

(x) Each Cable compartment shall be provided with three bushings of adequate sizes to terminate the incoming/ outgoing 11kV 3 Core cables. There shall be enough height from the base of the mounted switchgear so that the cables can be bent and taken vertically up to the bushings. Adequate clearances shall be maintained between phases for Termination. Access to all the cables should be possible from the front of RMU. Cable Termination boots shall be supplied by the switchgear manufacturer.

(xi) Suitable padlocking arrangements shall be provided as stated below…

(xii) CB manual operating handle in the “OFF” position.

(xiii) Each isolator operating handle in ‘Closed’, ‘ Open’, or ‘Earth’ position.

(xiv) System Particulars

- Frequency : 50Hz ±3%
- No. Of Phases : 3 Phase
- Neutral Grounding: Solidly Grounded
- Fault level :As per the TSECL network/ BIDDER calculation for 1s
- Internal Arc Tested : As per IEC 61641 for 1s

- Equipment Particulars :
- RMU type : Non extendible type
- Bus rating : As per the BIDDER calculation
- Bus bar material : EC grade Copper
- Load Break Isolator rating : As per the BIDDER calculation
- Load Break Isolator type : Electrically operated Triple Pole with spring operated non automatic mechanism, quick break contacts with integral earthing arrangement. Interlock shall be provided between Earth and Main switch.
- Breaker type : VCB

- Breaker rating : As per the BIDDER calculation
- Breaker operation : O-3Min-CO-3Min-CO
- CT ratio/ Class : 5P10
- Protection relay : Numerical with 2OC (10%- 200%) and 1 EF (10%-40%).

(xv) The VCB shall be interlocked with the door Limit switches of the RMU such that the VCB shall trip if the doors are opened.

(xvi) The above requirements are project specific requirements. However, the same shall stand superseded as per TSECL/ Local Power supply Authority Guidelines & requirements if required.

(xvii) Voltage indications (VPI) and Fault Passage Indicators (FPI) shall be provided for all the RMU enclosure.

(xviii) Testing and warranty terms for equipment and components shall be as per Local Power supply Authority Guidelines &requirements if required. The Breaker and the components like energy meter and relay shall be SCADA compatible for remote control and operation.

(xix) Field Remote Terminal Unit (FRTU) shall be provided for the remote monitoring and control. FRTU shall be as per TSECL specification and shall be provided if required by TSECL.

(xx) Data Sheet

Table E5 – RMU Data Sheet

	Switchgear Data	
1.0	Service	Indoor
2.0	Type	Metal clad
3.0	Number of phases	3
4.0	Voltage	11000V

5.0	Rated Frequency	50 Hz
6.0	Rated Current	By Bidder
7.0	Short Circuit rating	
a.	Breaking	25 kA rms for Breaker
b.	Short time withstand for 1 Sec.	25 kA rms
8.0	Rated S/c making	62.5 kA peak for Breaker
9.0	Short duration power freq.	28 kV
10.0	Insulation Level	75 Kv Peak
11.0	System earthing	Solidly earthed at substation
12.0	**Breaker**	
a.	Type	VCB Circuit Breaker in SF6 tank
b.	Rated voltage	11 kV
c.	Number of breaker	As per SLD.
d.	Breaking current	
e.	i) Load breaking	25 KA rms.
f.	Making current	62.5KA peak
g.	Rated current	By Bidder
h.	No. of poles	3
i.	Operating mechanism.	Trip free & free handle type with mechanically

		operated indication & pad locking.
13.0	**Isolators**	
a.	Type	Load Breaking & Fault Making in SF6 tank
b.	Number of Isolators	As per SLD.
c.	Rated current	By Bidder.
d.	Rated breaking capacity	By Bidder
e.	Fault making capacity	62.5KA peak
f.	No. of poles	3
g.	Operating mechanism	Operating handle with ON, OFF, Earth positions with arrangement for padlocking in each position.
14.0	**Busbars**	
a.	Material	Copper
b.	Type	SF6 insulated
c.	Rated Current	By Bidder

6.1.12 Transformer

(a) Applicable Standards: Transformer shall comply with all currently applicable statutes, regulations and safety codes in the locality where the equipment will be installed. **Transformer rating shall be same as existing DT or as specified by TSECL.**

(b) % Impedance shall be as per IS 1180-2014/ IS 2026: 1977 – (Part-1) or as per TSECL specifications.

(c) The values of load- losses and No-load losses shall be as given in IS 1180-2014 or as per TSECL specifications.

(d) Transformers shall be oil-immersed type, hermetically sealed with corrugated tank.

(e) Equipment Particulars:

(i) Voltage Ratio: 11/0.433kV

(ii) Cooling: ONAN

(iii) Vector Group: DYn11

(iv) Tap Changer: -5% to +15% in steps of 2.5%

(v) Type of tap Changer: OCTC/OLTC.

(vi) Temperature Rise of top Oil: 40ºC

(vii) (above ambient temperature measured with thermometer)

(viii) Temperature Rise of winding: 45ºC

(ix) (above ambient temperature measured by resistance method)

(x) No load current: 1.5% of full load current

(xi) Max flux density: 1.55T

(xii) Current density: Max 2.8A/sq mm

(xiii) Clearances: As per relevant standards,

(xiv) Transformer Oil: As per IS 335 and TSECL requirements.

6.1.13 General Constructional Features of Transformer:

(a) **All the constructional features shall be as per latest IS standards and TSECL specifications**

(b) All material used shall be of best quality and of the class, most suitable for working-under the conditions specified and shall withstand the variations of temperature and atmospheric conditions, overloads, over-excitation, short-circuits as per specified standards or as per TSECL specifications, without distortion or deterioration or the setting up of undue stresses in any part,

and also without affecting the strength and suitability of the various parts for the work which they have to perform. The transformer construction shall be suitable for Seismic Data (As per latest edition of BIS) or mentioned elsewhere in the specification.

(i) The exterior of tank and other steel surfaces shall be thoroughly cleaned and have a priming coat of zinc chromate applied. The second coat shall be of an oil and weather-resistant nature, preferably of distinct colour from the prime and finish coats. The final coat shall be of a flossy, oil and weather resisting non-fading paint of specified shade. The interior of the tank shall be cleaned by shot blasting and painting with two coats of heat resistant and oil insoluble paint.

(ii) Steel bolts and nuts shall be galvanized.

(iii) Vacuum & Pressure Tests- Various Vacuum & Pressure Tests for tank, conservator, radiator, pipes etc. shall be as per mentioned in the CBIP Manual on Transformer – Publication no. 317: 2013 & latest edition thereof.

(iv) The core and coil assembly shall be securely fixed in position so that no shifting or deformation occurs during movement of transformer. The core and coil assembly shall be capable of withstanding without injury, the thermal and mechanical effects of short circuit at the terminals of any winding as per IS:2026.

(c) Noise level of transformers shall be as per latest NEMA standard.

(d) Oil - Transformers shall be supplied complete with transformer oil. Transformer oil shall be as per IS-335:1993, BS 148 or IEC 296. 10% extra oil shall be supplied with transformer in non-returnable drums.

6.1.14 Field Remote Terminal Unit (FRTU)

FRTU shall be as per TSECL specification

6.1.15 LV Switchboard For CSS

(a) The LV Switchboards housed inside the CSS enclosure shall be as per the requirements of this specification or as per TSECL Specifications.

(b) All panels shall be Type tested in accordance with IS 8623/ IEC 61439-1 and Arc resistant tested in accordance with IEC 61641-part 500, supplement 2 for 0.3sec minimum or as specified by TSECL.

(c) Provision for interlocking of LV Incomer breaker with HV side breaker shall be provided such that if the HV breaker trips then the LV breaker will trip and it shall not be possible to close the LV breaker unless the HV side breaker is closed.

(d) Constructional Requirements:

(i) Constructional requirements of the LV panel inside the CSS shall be as per relevant standards or TSECL specifications.

(ii) All Circuit Breakers shall be provided with Microprocessor based Overload/ Short Circuit and Earth Fault (Inbuilt) releases.

(iii) Adequate space shall be provided for terminating the outgoing cables.

6.1.16 Installation Of CSS

(a) All installation works shall be carried out by Manufacturer's trained/ skilled personnel and supervised by Manufacturer Certified/ Approved Engineer as per good and safe engineering practices and relevant standards for installation of particular components.

(b) All routine and pre-commissioning tests shall be carried out by certified engineer of BIDDER at site and test reports shall be submitted duly signed and stamped. This is included in the scope and quoted price offered by BIDDER. Proper tools for unloading/ lifting and erection shall be arranged by BIDDER.

(c) All testing equipment and setups shall be arranged by BIDDER. This is included in the scope and quoted price offered by BIDDER.

(d) Proper unloading, handling, storage and security arrangement of all the materials/ equipment supplied are included in the scope and the BIDDER shall ensure the same without any additional extra cost to the PURCHASER.

(e) Assembly of the various sections of the equipment, either free issue by PURCHASER or supplied/ procured by BIDDER, dispatched separately

from the factory shall be in the scope of BIDDER.

(f) Installation shall be considered as being the erection of equipment at its permanent location. Thus, unless otherwise specified, shall include shifting from place of storage to the place of erection, unpacking, cleaning, assembly and lifting into position, grouting, levelling, aligning, coupling of or bolting down to previously installed equipment bases/ foundations, performing the alignment check and final adjustment prior to initial operation, testing & commissioning in accordance with MANUFACTURER's tolerances, instructions and the specifications.

(g) It is expected that equipment/ systems shall be installed as per the best engineering practice and in strict accordance with the MANUFACTURER's recommendation(s). TSECL shall have full authority to reject all/ any portion of the work that is considered bad in quality or workmanship. The rejected work shall be made good by the BIDDER free of cost. In this regard the decision of TSECL would be final and binding

(h) Pre-commissioning checks and final commissioning of the equipment's being supplied by the TSECL or the equipment/ system supplied by the BIDDER shall be carried out as per the provisions of this specification, relevant standards, TSECL Guidelines and MANUFACTURER's erection / commissioning manual.

(i) BIDDER shall submit site test reports & its test procedures; details of test equipment used etc. in printed format with sufficient no. of copies along with originals duly signed & stamped by appropriate authority as may be decided by relevant Statutory Bodies.

(j) BIDDER shall maintain necessary co-ordination with the TSECL and various other agencies working at the same site as the BIDDER.

6.1.17 Equipment Foundations:

(a) The foundation shall be designed for Seismic Zone for the location as per BIS.

(b) Foundation shall be proportioned in such a way that the allowable soil bearing capacity is not exceeded and the resulting settlement is within the acceptable limit in case of shallow foundation.

(c) EGL (Existing ground level) and FGL (Finished ground level) shall be marked on all drawings showing foundation/sub-structure details and related design documents. Machine/static equipment foundations shall be separated from adjoining parts of buildings, other foundations and floor/pavement slabs. Joints at floor/pavement slabs shall be suitably sealed.

(d) Foundations and structures for machines subject to vibrations shall be so proportioned that the amplitude and frequency of the foundation/structure are within the permissible limits as per relevant BIS codes (or as required

by the machine vendor).

(e) Machine foundations shall be designed and detailed as per IS: 2974.

(f) Adequate reinforcement shall be provided around bolts subjected to high pull out forces.

(g) Minimum Depth of Foundation: GL- 1500mm for all major foundations to consider.

(h) Clear gap shall be provided in superstructure to avoid transmission of vibration to adjacent structures.

(i) Foundation shall be of uniform rectangular/ square shape and shall extend minimum 1000mm and 600mm from the edge of base frame along the length and breadth respectively.

(j) The Foundation shall be raised minimum 450mm above the FGL.

(k) The geometric layout of the foundation and structure shall be basically symmetric with respect to the vertical plane passing through the rotational axis of the equipment.

(l) Minimum reinforcement as per requirements of IS: 2974 shall be provided unless required otherwise by design.

(m) Block foundations shall be preferably cast in a single concreting operation.

6.1.18 Fencing and Gate

(a) The work of erecting chain link fencing includes excavation, UCR wall construction, erection of angle/ channel supports, providing chain link mesh on angle/ pipe frame barbed wire fencing at the top, concreting of support members, painting the complete structure and white washing the walls. All materials, hard wares, labours etc. are in the scope of BIDDER.

(b) Fencing height shall be minimum 2.5 meter (2m + 0.5m barbed wire) & shall be complying with CEA guide lines requirements.

(c) Gate for entry in the fenced compound shall be fabricated from pipes of heavy duty class. Design of gate shall be got approved from the engineer in charge before starting the fabrication work. All necessary hard wares, fittings, stoppers, locking arrangements with brass pad locks of 100 mm size are in the scope of gate works. Gates shall be self-supporting type.

6.1.19 Maintenance Requirements:

(a) Easy access shall be provided for all components in the CSS for maintenance.

(b) The BIDDER shall furnish operating and maintenance instructions manual to enable the PURCHASER to carry out maintenance of the equipment effectively and safely after the defect liability period.

(c) As far as possible the components & switchgears shall be so designed that

no special tools are necessary for installation and maintenance. However, if special tools are required, the BIDDER shall include price of one complete set in his BID and indicate the same for PURCHASER's approval.

(d) BIDDER shall furnish detailed inter panel wiring diagrams, internal wiring diagrams, detailed component layout drawings to enable the PURCHASER to carry out maintenance work the defect liability period.

(e) Consumable required for installation like greases, jointing compounds or pastes, etc. shall be supplied along with the equipment including 10% extra and their prices shall be included in the offer. Detailed technical descriptions for future purchase shall be also submitted.

6.1.20 Performance Tests:

(a) Prices quoted shall include the cost of all Routine & Acceptance tests as per relevant IS standards.

(b) BIDDER shall carry out all Routine and Functional tests as specified in the relevant IS standard requirements on the completely assembled components of the CSS (RMU, Transformer and LV Panels) in the presence of the TSECL representative as may be decided later, at its/ sub vendor's works before dispatch and furnish copies of test reports for approval.

(c) BIDDER shall furnish copies of Routine and Type test report for all bought out items, as may be demanded by PURCHASER, for approval during the inspection or prior as instructed by them.

(d) The BIDDER shall also make available at works as well as at site various instruments, meters etc. necessary for testing and commissioning of the equipment under scope of work duly calibrated within not more than one (1) year from accredited laboratory.

7.0 DIESEL GENERATOR

7.1.1 The scope of works include supply, installation, testing and commissioning of DG-Set with weather proof acoustic enclosure, AMF panel for providing stand-by source of power supply.

7.1.2 Diesel engine

The DG set shall be for stand-by operations. The diesel engine shall be vertical cylinder, single acting, and mechanical injection type and furnished with all the required equipment as per standard practice. The engine should develop rated horse power to drive the rated kVA alternator. The required auxiliaries, guarantee of fuel consumption for rated output, provision for parallel operation, governor performance and torsional vibration shall be in accordance with BS: 649.

7.1.3 The engine shall be provided with an exhaust gas turbo charger and a charged air cooler, integral air intake filter and silencer. The engine should have throttle control, the engine water cooling should have radiator. For charged air cooler, the cooling water inlet flow shall be thermostatically controlled.

7.1.4 Fuel system

Fuel (Diesel) system to the engine shall be supplied from a fuel tank. The supplier should provide a fuel tank of adequate capacity, including 10% reserve capacity to be installed in a weather proof enclosure. The supplier should provide mechanical fuel level indicator with 'Low' and 'High' markings. Also fuel level indication should be provided in the AMF panel with alarm for Fuel level 'low'. The fuel tank shall be free standing, floor mounting type with mounting brackets, fuel inlet and outlet, air vent, drain plug, opening with cover for direct filling from the top of the tank.

7.1.5 Engine starting system

Starting of the diesel engine shall be of electric starting. The electric starting system should have starter motor, Lead acid starter Batteries, battery charger and necessary instrument and accessories to indicate the condition of the batteries.

7.1.6 Batteries

The batteries shall be sized taking in to account the starting load requirement of the DG set. Lead acid batteries, of suitable capacity to start the engine by 24V DC electrical starting Motor without struggling, and with suitable capacity of battery cable. The batteries must be capable to try 3 unsuccessful starts continuously. The batteries have to be placed on a suitable well painted steel stand.

7.1.7 Air intake system:

Air intake system should have requisite air filters and complete interconnecting piping, supports etc.

7.1.8 Exhaust system

Engine exhaust system shall consist of exhaust gas driven turbo charger with lagged piping, interconnecting cylinder head outlets with the turbo charger inlet. Exhaust gas from the turbo charger shall be let out through exhaust gas silencer. The exhaust gas silencer, necessary pipes etc., shall be provided by the contractor. Exhaust piping shall be suitably cladded with aluminium sheets, mineral wool etc. The silencer should be of residential type. Flexible connection (expansion joints) shall be provided in the exhaust piping to avoid transmission of vibration from engine to the structure (acoustic and weather proof enclosure etc.). Also the exhaust line with suitable bends, collars, flanges, angle supports and other accessories should be provided. Provide necessary arrangements to avoid entry of rain water, falling dust etc. at the top of the exhaust pipe. The exhaust piping system should be designed and laid upto a height above the acoustic

enclosure as permissible by local regulation or CPCB norms to suit the site and environmental condition.

Engine governing system: The engine governing system shall be of class 'A' hydraulic governor. An over speed trip mechanism shall be provided to automatically shut off the fuel supply in case of set speed reading above 110% of rated speed.

7.1.9 The Alternator

The Alternator shall be screen protected, drip proof, separately excited system (with PMG) of brush less, continuously rated to give an output at 0.8 pf at 415V, 50Hz, 1500rpm,3 phase, 4wire. The alternator should be provided with automatic voltage regulator with voltage regulation of ± 0.5% (MX321) and is designed, tested for confirming to IS 4772/1992 or IEC 34.

The insulating material of the alternator shall be non-hygroscopic and fully tropicalised. The Alternator shall be suitable for operation with its neutral solidly grounded. The neutral shall be formed at the terminal box.

Alternator windings shall be of Class H insulation with Class F temperature rise and tropicalised. The alternator shall have pre-packed grease lubricated ball or roller bearings and provided with facilities for re-greasing whilst in service.

The alternator shall be capable of maintaining a short circuit current of three times full load current for a period of 10 seconds. The alternator shall be fitted with an anti-condensation heater. No individual harmonic shall exceed 1% and the total harmonic shall not exceed 3%. The alternator, its neutral and control panel shall be earthed as per relevant standards.

The alternator rotor assembly shall comprise exciter rotor, full wave silicon bridge rectifier surge protection device and salient pole rotating field system. The rotor shall be fitted with interconnected pole face damping windings. Voltage regulation shall be maintained to within ±2.5% for a power factor of 0.8 to unity, including hot to cold variations. The steady state frequency droop between no load and full load shall not exceed 5%.Transient voltage deviation following a step load of 60% of rated at a power factor of between 0.4 and zero shall not exceed 15% with a voltage recovery time to 97% rated voltage not exceeding 0.5 second. The set shall be capable of continuous operation with a phase current imbalance of 33% of rated current whilst maintaining the output voltage within ±5% of rated.

7.1.10 Mounting

Design, fabricate suitable base frame, which is a welded construction using channel iron etc. to mount D-G set. The whole set and base frame should be mounted on 12 Nos. (min) of heavy duty type Anti vibration mounts of DUNLOP' (b – SERIES) or its equivalent make.

7.1.11 AMF control panel

The automatic mains failure (AMF) panel should be made out of well painted 16SWG sheet steel enclosure with necessary components like MCCB for local isolation, control relays, timers, busbars, protective relays, metering, battery charger, indication, annunciation system etc. should be provided.

The panel shall be inbuilt in the DG acoustic enclosure, mounted on the surface such that it can be operated and monitored from outside/ without entering the enclosure.

The AMF should be operating in Test/ manual / auto mode and 3 attempt starting facility with necessary control relays.

7.1.12 Earthing

The Generator Neutral should be earthed with 2Nos. of Copper plate electrode and GI pipe electrode for Body earthing as per IS 3043

7.1.13 Tests

Supplier shall perform all standard tests (Shop tests) on Engine and alternator and the test reports pertaining to the engine and alternator should be submitted.

7.1.14 Commissioning

Supplier shall perform the following tests at site to the satisfaction of GSCL

(a) Testing the set in Auto / Manual / Test modes.

(b) Testing for all Interlocks

(c) Full load test on the set for Eight hours

7.1.15 Acoustic and Weather proof Enclosure

The DG Set shall be provided with acoustic enclosure, fully integrated, weather proof with superior finish for long and durable life. The enclosure should be well fabricated structure on all sides. Provide sufficient working clearance around the D-G set inside the enclosure.

(a) Special acoustic panels of optimum sound attenuation using special aluminium sheets (perforated) and acoustic grade high density wool sandwiched with gypsum.

(b) Self-insulated ventilation louvers for proper air aspiration and temperature control with suitable incorporation of special blower / axial fans of heavy duty depending on the on-site fresh air needs.

(c) Corrugated steel frames and sturdy supporting material for housing the panels, effective sealing with the right gasket/ neoprene materials.

(d) Well fabricated / nylon wheeled smooth sliding doors to be provided for easy access to the set. Suitable locking arrangement has to be provided on the doors.

(e) Aesthetic finish (with intensive painting care) for perfect integration with the surroundings.

(f) Noise level should be less than 65 ± 3dB at 3 meter distance from the enclosure.

(g) Acoustic and weather proof enclosure system should be complete in all respect as per prevailing standards.

(h) Adequate and suitable lighting arrangement inside the acoustic enclosure shall be made.

7.1.16 Documents to be submitted after award of Order

(a) DG sizing Calculations

(b) General Arrangement and Sectional Drawing of the DG Set with and Without Acoustic Enclosure, Fuel tank and Foundation

(c) Data sheets of Engine, Alternator, Battery, AVR, AMF panel

(d) General Arrangement of Foundation

(e) Civil Construction drawing of Foundation

(f) Piping layout – Diesel, Exhaust

(g) Earthing Layout

(h) Fence details if provided

(i) Engine Drawings and Test Certificates

(j) Alternator Drawings and Test Certificates

(k) AMF Panel

(i) GA Drawing

(ii) Power and control Wiring Diagram

(iii) Type test certificate for IP protection

(l) Bill of Quantities along with Make and Model of each item.

(m) Type test certificates of DG set including Heat Run test and IP protection with Acoustic enclosure

8.0 OUTDOOR & WEATHERPROOF DISTRIBUTION BOARDS

8.1 GENERAL:

8.1.1 The scope of this specification includes design, engineering, manufacture/ assembly, installation, testing and performance demonstration of the LV Panel boards for various sizes and ratings to be provided for the distribution of the power supply.

8.1.2 The panels shall include

(a) Floor mounted panels –

(i) Main Distribution Board (MDB) in each the Pond Area for receiving Grid power and providing Change over with DG power.

(ii) Outdoor Lighting Distribution Boards (OLDB) fed from the MDB

(iii) Outdoor Power DB Panel (PDB) for Supplying power to the retail Shops

(b) Wall mounted Distribution Board for

(i) Indoor Lighting cum receptacle Panels (L+PDB) for lighting fixtures and decorative sockets and exhaust fan loads – Toilet, Retail Shops

8.1.3 Applicable Standards: The design, manufacture and performance of equipment shall conform to the latest standards

8.2 The MDB 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).

8.2.1 The OLP and PDB shall be Similar in construction as MDB.

8.2.2 The front Door shall be provided with Toughened Glass to see through the equipment mounted on the internal Door.

8.2.3 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.

8.2.4 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.

8.2.5 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.

8.2.6 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.

8.2.7 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.

8.2.8 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.

8.2.9 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.

8.2.10 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.

8.2.11 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.

8.2.12 Bus-bar rating of all panels shall be suitable for Continuous current rating at site conditions.

8.2.13 All bus-bars rated below and upto 63A shall be tinned copper whereas bus-bars rated greater than 63A shall be electrolytic grade Aluminium.

8.2.14 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.

8.2.15 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.

8.2.16 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.

8.2.17 20% extra terminals shall be provided for power as well as control for PURCHASER's use in each terminal strip/feeder.

8.2.18 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.

8.2.19 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.

8.2.20 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.

8.2.21 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).

8.2.22 It shall be VENDOR's responsibility to maintain uniformity across various items/panels being procured.

8.2.23 Panel wiring & cabling shall be cross-ferruled. Ferrules shall be etched & painted type.

8.2.24 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.

8.2.25 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

8.2.26 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.

8.2.27 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.

8.2.28 Two nos. Pipe earthing electrode shall be provided for each Feeder pillar and connected with 25X6 mm GI earth strip. The pipe electrode shall be as per the latest version of IS 3043

8.2.29 The feeder pillar shall be mounted on prefabricated Galvanised Steel Support structure duly fastened with a concrete foundation with grade M20

8.2.30 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.

8.2.31 The equipment shall be given tropical and fungicidal treatment.

8.2.32 Each compartment & component shall be provided with name plates (with black letters on white background) at front, inside & rear side.

8.2.33 Equipment nameplates shall be fixed by screws/ rivets and shall not be pasted.

8.2.34 Main Distribution Board (MDB)

(a) Refer SLDs for reference configuration of respective MDBs with two incomers – One from Grid and the Other from DG.

(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 both the Incomers of the MDB with thermal magnetic Overload, Short circuit and Earth fault release.

(d) Either Motorised MCCB based or Contactor based auto changeover scheme or Online Changeover switch based scheme shall be provided for change of power from Grid to DG and back. The reverse changeover from DG to Grid shall be carried out with certain time delay of 3 min to allow the supply voltage to stabilize and to avoid any surges.

(e) All outgoings shall be four (4) pole MCBs.

(f) R,Y,B indications shall be provided at the incomer of both the MCCBs; 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.

(g) One no. digital Multi-Function Meter (MFM) shall be provided on each incomer bus. The Meters 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.

(h) All instrument transformers shall be cast resin type and shall have insulation of class B or better.

(i) 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.

(j) 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.

8.2.35 Outdoor Lighting Distribution Board (OLDB)

(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) Pole MCBs.

(c) 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

8.2.36 Indoor Wall mounted Distribution Boards (L+PDB)

(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, RCCB sensitivity shall be 30mA.

(e) The power to the lighting and receptacle for the shops shall be provided through the L+PDB (lighting and power distribution board). And L+PDB shall be supplied through PDB.

(f) The power to the lighting and receptacle for the toilet shall be provided through the L+PDB (lighting and power distribution board). And L+PDB shall be supplied through outdoor lighting DB.

8.2.37 JUNCTION BOX

(a) Junction Boxes shall be suitable for 4CX16 Sqm Al PVC Insulated Armoured cable as incomer and 3 nos. 4CX2.5 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.

8.2.38 Lighting Panel, Raw power distribution boards, outdoor lighting panel configuration shall decide by the contractor.

8.2.39 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

8.2.40 Inspection

8.3 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.

8.3.1 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.

8.3.2 Entire LV system shall be fuse less type.

8.3.3 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:

9.0 **CABLING SYSTEM:**

9.1 Cables Laid Direct in Ground –

(a) Buried cable up to 1.1 kV shall have a 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 cable within the Pond area.

(b) 11kV cables shall be laid as per requirement of TSECL in DWC pipes or RCC pipes of adequate size at a depth of minimum 1 meter from the FGL.

9.2 Armoured cables shall be laid upto the load point (Pergola or Viewing Deck) 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.

9.3 All armoured cables shall be 4 C cables while the flexible cables shall be 3 Core cables.

9.4 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.

9.5 Point wiring in the Toilet block & Retail Shops 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. The necessary connector if found required for looping of wires from one switchboard to another switchboard shall be included in the scope.

(c) Lighting fixtures and toilet exhaust fans 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

10.0 EARTHING AND LIGHTNING PROTECTION SYSTEM

10.1 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.

10.2 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

10.3 The maximum values of earth fault current for the design of the earthing system shall be calculated as per the design criteria.

10.4 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.

10.5 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.

10.6 The contractor shall base his earthing calculations on actual measurement carried out by him in the presence of Purchaser/ Purchaser's Representative.

10.7 Copper Plate earthing electrodes shall be considered for the neutral earthing of Transformer and DG while GI Pipe earthing electrodes shall be provided for all other the equipment and systems. All the earth electrodes shall comply to the requirements specified in IS 3043 or as specified by CEIG/ TSECL.

10.8 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.

10.9 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.

10.10 Earth electrode provisions shall be made as follows;

(a) Outdoor Panels – 2 Nos.

(b) CSS – 8 Nos. – 2 Nos. for HT, 4 Nos. for Trafo and 2 Nos. for LT.

(c) DG – 4 Nos. – 2 Nos. body and 2 no. Neutral

10.10.2 GI/ Cu Earth flats, as applicable, of adequate size shall be provided for connecting the electrodes to the equipment

10.11 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.

10.12 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.

10.13 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.

10.14 The earthing conductors in outdoor areas shall be installed at a minimum depth of 600 mm below FGL.

10.14.1 Lightning Protection:

(a) 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.

10.14.2 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.

11.0 LANDSCAPE LIGHTING LUMINARIES

11.1 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.

11.2 Luminary/Fixture Description

11.2.1 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.

11.2.2 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.

11.2.3 All luminaires shall be manufactured from well binned LEDs to provide and maintain same Colour consistency over long duration of operations.

11.2.4 The Luminaires shall offer Flicker free output for long duration.

11.2.5 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.

11.2.6 The luminaire light output (lumen) shall be constant and shall be able to withstand allowable supply source voltage variations/ fluctuations, spikes.

11.2.7 The entire fixture shall consume rated wattage as per data sheet maximum at full output.

11.2.8 The LED luminaries shall be single, self-contained device with integral electronic control gear, without requiring on-site assembly for installation.

11.2.9 Fixture shall have lens options.

11.2.10 All the Luminaire shall be complete with necessary accessories & mounting arrangements.

11.2.11 The Luminaries shall have housing as mentioned in datasheet.

11.2.12 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

11.2.13 All the connecting wires inside the Luminaire shall be low smoke halogen free, fire retardant cable.

11.2.14 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.

11.2.15 The electrical component of the LED and LED driver must be suitably enclosed in sealed unit to function in environment conditions mentioned earlier.

11.2.16 Design of the thermal management shall be done in such a way that it shall not affect the properties of the diffuser.

11.2.17 All LED fixtures shall undergo a minimum 24-hour burn-in test during manufacturing.

11.2.18 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.

11.2.19 High-power LED fixtures shall be thermally protected using metal core board, gap pad, and/or internal monitoring firmware thermal management techniques.

11.2.20 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.

11.2.21 The equipment should be compliant to IEC 60598-1, IEC 62031 and IEC/ PAS 62612 depending on the type of luminary.

11.2.22 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.

11.2.23 The control gear shall comply to the provisions of IEC 61347-2-13, IEC 62031 and IEC 62384 as appropriate.

11.2.24 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.**

11.2.25 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.

11.2.26 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.

11.2.27 Adequate protection against Overloading, Short Circuit, Over Voltage, Over temperature, Under Voltage, String Open shall be provided within the Luminaries.

11.2.28 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.

11.2.29 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.

11.2.30 The lighting fixtures offered shall comply with the data sheet.

11.2.31 The luminaire shall have a warranty period of 5 years.

11.2.32 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.

11.2.33 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).

11.2.34 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.

11.2.35 Year of Manufacture, Batch No., Serial Number or Identification No. Luminaries Manufacturer's Name / Logo, Wattage and Frequency should be embossed on the housing.

11.2.36 Maintenance Requirements:

(a) 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

11.2.37 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.

11.2.38 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.

11.3 Data sheets for Luminaires -

(a) **For Step Lighting Luminaries-**

Table E6 – Step Light Data Sheet

Parameters	Requirement
Type	LED Luminaries complete with all accessories for Step Lighting
CCT	3000 K
Ingress Protection	IP68
Rated luminous flux	MInimum 40 Lumen
System efficacy (lm/w)	Minimum 10
CRI (typical)	75
Wattage	Not more than 12 W

Power factor	>0.9
Input Voltage	140 V — 270 V at 50Hz (+/- 5%)
Safety Class	Class 1
Rated voltage	220-240V, 50 Hz
Working temperature	0 to +45 degree Centigrade
Housing Material	Die Cast aluminium
Diffuser Material	Polycarbonate
Lifetime	25000 hrs @ L70 @35deg Centigrade
Surge Protection	Minimum 5kV
Mandatory Certification	Luminaire should be UL/cUL/FCC/Class A/CE/PSE certified.
Mandatory test reports	LM-79,LM80
Product Image	

(b) **For Bush Lighting Luminaries-**

Table E7 – Bush Lighting Data Sheet

Parameters	Requirement
Type	LED Luminaries complete with all accessories for Monument Lighting
Make of LED	Cree/Nichia/Osram/Lumileds
Body of fittings	Die Cast Aluminium
Wattage	< 12 W
Lumens Output	250 Lumens
CCT	3000K
Beam Angle	As per design criteria and site requirement
Operating voltage	100-240 VAC
Lifetime	25000Hours @L70 35Degree C
Operating Temperature	0 to+ 45 Deg Centigrade
Ingress Protection	IP65
Impact protection	IK08
Luminaire connectors	Weather proof IP rated connectors

Lens type	Tampered glass
Surge Protection	Minimum 5kV
Mandatory Certification	Luminaire should be UL/cUL/FCC/Class A/CE/PSE certified.
Mandatory test reports	LM-79,LM80
Product Image	

(c) **Column Lighting Luminaires**

Table E8 – Column Lighting Data Sheet

Parameters	Requirement
Type	LED Luminaries complete with all accessories for Monument Lighting
CCT	3000 K
Ingress Protection	IP67
Impact protection	IK10
Wattage	As per design criteria
Rated luminous flux	Minimum 790 Lumen
System efficacy (lm/w)	Minimum 100
Beam Angle	As per design criteria and site requirement
Operating Voltage	220-240V, 50/60 Hz
Rated voltage	220-240V, 50/60 Hz
Working temperature	0 to +45 degree Centigrade
Housing Material	Die Cast aluminium
Diffuser Material	Polycarbonate
Lifetime	25000 hrs @ L70 @35deg Centigrade
Surge Protection	Minimum 5kV
Mandatory Certification	Luminaire should be UL/cUL/FCC/Class A/CE/PSE certified.
Mandatory test reports	LM-79,LM80

Product Image	

a) For Tree Lighting Luminaries-

Table E9 – Step 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	As per design criteria
Luminaries capable for color changing	No
Beam Angle	As per design criteria and site requirement
Lumens Output	Minimum 1500 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	IP66
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
Image	

12.0 **MAKE LIST**

Table E10: Make List

Sr. No.	Material/ Equipment	Vendor

A	Compact Substation	Siemens, ABB, Schneider Electric, L&T
B	Outdoor Panels	Manufacturer with Type Tested Design at CPRI or equivalent labs for minimum Heat Run test, Short circuit test, and IP protection tests.
1.	Switchgear	Siemens, ABB, Schneider Electric, L&T
2.	Potential & control Transformer (PT)	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
13.	Astronomical Timer	ABB, Siemens, GIC, L&T
C	Distribution Boards	Legrand, Schneider ,Siemens ,ABB
D	DG	Cummins, Kirloskar Oil Engines, Caterpillar, Greaves
1.	Sealed Maintenance Free Batteries	Amar Raja, Exide, Hitachi, HBL
F	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 panel wiring)	Finolex, RR Kabel, KEI, Havel
G	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

H	Cables	
1	HT Armoured Cable	As approved by TSECL
2	LT armoured Cable	Finolex, RPG, Polycab, Universal
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
K	Earthing Strip, and accessories	Shruti, Profab, Sadhana, Sterlite
M	Misc.	
1	Fire Sealant & Fire Retardant Paint	3 M India Ltd., HILTI, Promat, OBO

13.0 LIST OF DRAWING AND DOCUMENTS

13.1 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.

13.2 The Following minimum Documents shall be submitted by the BIDDER to PURCHASER for the approval

13.2.1 Calculations

(a) Electrical Load List and demand Calculations

(b) Transformer Sizing calculations

(c) DG Sizing Calculations

(d) Earthing Calculations for Electrical System & Instrumentation and Server System

(e) Cable schedule with Sizing Calculations

(f) Lighting Calculations for each Area (DiaLux Files shall be provided along with PDF)

13.2.2 Single Line Diagrams

13.2.3 Incoming power scheme

(a) All drawings related to Capacity augmentation at the source substations

(b) Data sheet of major Equipment

(c) Cable or OH line routing

(d) Data sheet of major Equipment

(e) Type test certificates of the above equipment

(f) Earthing layout of the structure

(g) Lighting layout

(h) Civil Drawings of the Structure including Foundation, Chain link Fence, Gate etc.

13.3 CSS

(a) Overall GA

(b) Data sheet of major Equipment

(c) Single Line Diagram

(d) Type test Certificates

(i) IP Protection

(ii) Impact Withstand capacity

(iii) Heat Run test

(e) Mounting Arrangement

(f) Foundation Details with calculations – GA; Civil Construction drawings

(g) Trench Details

(h) Earthing Layout

(i) Fence details if provided

(j) Bill of Materials

(k) Makes of Components offered

(l) RMU

(i) GA drawings of the unit along with sectional view and foundation plan duly completed with dimensions.

(ii) Type test certificates as specified above including but not limited to the following;

1. Short circuit withstand test for the required rating of each component of the RMU unit.
2. Internal Arc test for the required rating for the RMU unit
3. Temperature rise test for the switchboard inside outdoor enclosure
4. Enclosure protection class test
5. SF6 tank pressure and vacuum test

(iii) List of makes as will be offered

(iv) Relay details

(v) Auxiliary Power source details

(vi) Single line diagram

(vii) Adequacy calculations for Bus bars, CT, PT and control transformers.

(viii) Bill of material

(ix) Control schematic diagrams

(x) Instruction manuals

(xi) Interconnection diagrams

(xii) FRTU Data Sheets and catalogues

(m) Transformer

(i) General arrangement of Transformer and enclosure.

(ii) Rating & diagram plate

(iii) General arrangement of HV cable box.

(iv) General arrangement of LV termination box for bus duct arrangement.

(v) General arrangement of marshalling box & wiring diagram.

(vi) Core Coil Assembly Drawing

(n) LV Panels

(i) GA Drawing

(ii) Wiring Diagram

(iii) Type test Certificate for Short Circuit withstand capacity

(iv) Type test certificate for IP protection

(o) DG

(i) Overall GA

(ii) Single Line Diagram

(iii) Data sheet of major Equipment

(iv) Type test Certificates

1. IP Protection
2. Impact Withstand capacity
3. Heat Run test

(v) Mounting Arrangement

(vi) Foundation Details with calculations – GA; Civil Construction drawings

(vii) Trench Details

(viii) Piping layout – Diesel, Exhaust

(ix) Chimney Structural Drawings with Foundation and Calculations

(x) Earthing Layout

(xi) Fence details if provided

(xii) Bill of Materials

(xiii) Makes of Components offered

(xiv) Engine Drawings and Test Certificates

(xv) Alternator Drawings and Test Certificates

(xvi) AMF Panel

1. GA Drawing
2. Wiring Diagram
3. Type test Certificate for Short Circuit withstand capacity
4. Type test certificate for IP protection

(p) LV Panels – Floor Mounted and Wall Mounted

(i) GA Drawing

(ii) Door open view of Wall mounted Distribution boards

(iii) Data sheet of major Equipment

(iv) Data sheet of motor starter

(v) Wiring Diagram

(vi) Type test Certificate for Short Circuit withstand capacity

(vii) Type test certificate for IP protection

(viii) Bill of Quantities

(ix) Makes Of Components offered

(x) Bus bar sizing calculations

(xi) Foundation drawings

(q) Construction Drawings of the following for Toilet & retails Shops

(i) Lighting Layout

(ii) Receptacle Layout

(iii) Switch Board Schedule

(iv) Point Wiring Drawing for Lighting and power

(r) 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

(s) Both hard and soft copies of all BIDDER drawings shall be furnished right from approval stage.

(t) 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.

(u) Upon completion of the installation, the BIDDER shall furnish the following:

(i) Three (3) Complete set of construction As Built drawings

(ii) Soft copies of the construction As Built drawings in CDs.

(iii) Four (4) Sets of All Instruction and Operation & Maintenance Manuals for each equipment

(iv) Two (2) Sets of Test Certificates of equipment provided by the BIDDER along with that of the respective Components outsourced.

(v) 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.

13.3.2 **PRE COMMISSONING TESTS ON ELECTRICAL SYSTEM EQUIPMENT TO BE CARRIED OUT AFTER INSTALLATION:**

(a) PRE-COMMISSION TESTS: Pre-commissioning tests in addition to mentioned in the specification requirements for various equipment 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.

(b) 11 KV Equipment (LBS or VCB)

(i) Visual checks for cracks in insulators.

(ii) Earth secured continuity check

(iii) IR Test with 5KV Megger

(c) Power / Distribution Transformer

(i) Insulation resistance test HV side, LV side and HV - LV.

(ii) Magnetizing current test.

(iii) Winding resistance test.

(iv) Voltage Ratio & Tap continuity test at all tap.

(v) Vector group test.

(vi) Magnetic Balance Test.

(vii) Buchholz Relay Test (if any)

(viii) Neutral CT Test (if any)

(ix) Winding Temperature Indicator / Oil Temperature Indicator Test

(x) Polarization Index Test (For LV windings 3.3 KV and above)

(xi) Local / Remote operations of OLTC (if any)

(xii) Operational tests of RTCC panel (if any) as per schematic drawing.

(xiii) No load test and performance observations

(d) 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.

(e) Power and Control Cables:

(i) IR Values before Hipot

(ii) Hipot Test - Measurement of leakage current

(iii) IR Values after Hipot

(f) Control Panels for Miscellaneous Equipment:

(i) IR Values of all power circuits

(ii) Operational test and scheme - wiring testing as per control schematics

(g) Lighting System:

(i) Visual inspection for operating problems

(ii) System activation -burning in the lamps for 100 Hrs

(iii) Measuring light level & reflectance.

(h) Earthing System:

(i) Earthing resistance of each electrode.

(ii) Earthing resistance of grid.

SECTION - VII

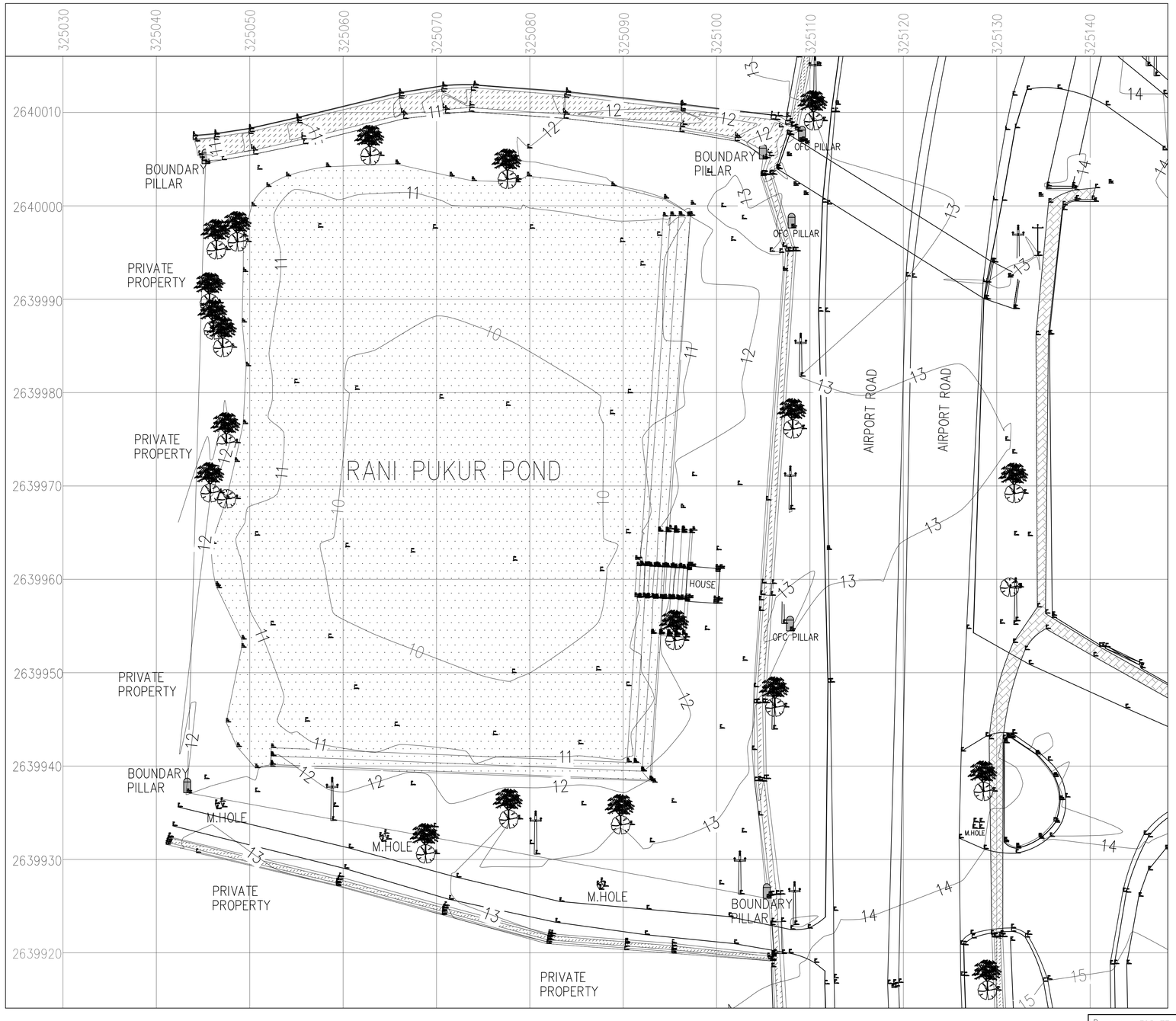
DRAWINGS

LIST OF DRAWINGS:

SL NO	DRAWING NUMBER	DESCRIPTION
	TOPOGRAPHICAL SURVEY	
1	TCE-10918A-AC-1018-LP-10016	Topographical Survey Plan of Ranir Pukur Pond
	LANDSCAPE & ARCHITECTURE	
2	TCE-10918A-AC-1018-LP-10010	Proposed Layout Plan
3	TCE-10918A-AC-1018-LP-10011	Proposed Sections & Details of Ranir Pukur Pond
4	TCE-10918A-AC-1018-LP-10012	Proposed Material Plan of Ranir Pukur Pond
5	TCE-10918A-AC-1018-LP-10013	Proposed Planting Plan of Ranir Pukur Pond
6	TCE-10918A-AC-1018-LP-10014	3D Visualization of Ranir Pukur Pond
7	TCE-10918A-AC-1018-LP-10015	3D Visualization of Ranir Pukur Pond
	IRRIGATION	
8	TCE-10918A-AC-1018-LP-10017	P & I Diagram for Irrigation System of Ranir Pukur Pond
	ELECTRICAL	
9	TCE.10918A-EL-4001-EL-40001	Schematic Single Line Diagram (SLD) for Ranir Pukur Pond
10	TCE.10918A-EL-4001-EL-40002	Lighting Layout for Ranir Pukur Pond

DWG NO

TITLE:



N

W E

S

LEGEND

1.ROAD
2.BOUNDARY WALL
3.BOUNDARY
4.PILLAR
5.POND
6.HOUSE
7.BOX CULVERT
8.GATE
9.DRAIN
10.TREE
11. ELECTRIC POLE
12. TRENFORMER

GRID INTERVALS = 10 meters

	SIGN.												
	INITIALS												
	REVISIONS												
	SIGN.												
	INITIALS												
	REVISIONS												
P0	SIGN.												16-04-2018
	INITIALS												
ISSUE		DRN	DSN	CHD	CV	EL	IC	ME	PL	HVAC	PE/PM	APPD	DATE
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AGARTALA SMART CITY LIMITED

TOPOGRAPHICAL SURVEY PLAN OF RANIR PUKUR
AGARTALA, TRIPURA

Purpose : FOR TENDER PURPOSE ONLY

DO NOT SCALE

'P' (PRELIMINARY) ISSUES ARE NOT TO BE USED FOR CONSTRUCTION / FABRICATION BUT ARE ISSUED FOR LIMITED PURPOSES ONLY AS INDICATED IN THE SMALL BLOCK ABOVE THIS BLOCK.

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FILE NAME : 10918AAC10016P0.dwg

TATA CONSULTING ENGINEERS LIMITED
MUMBAI

SCALE : 1:250
DC & DISC : DC-MUM

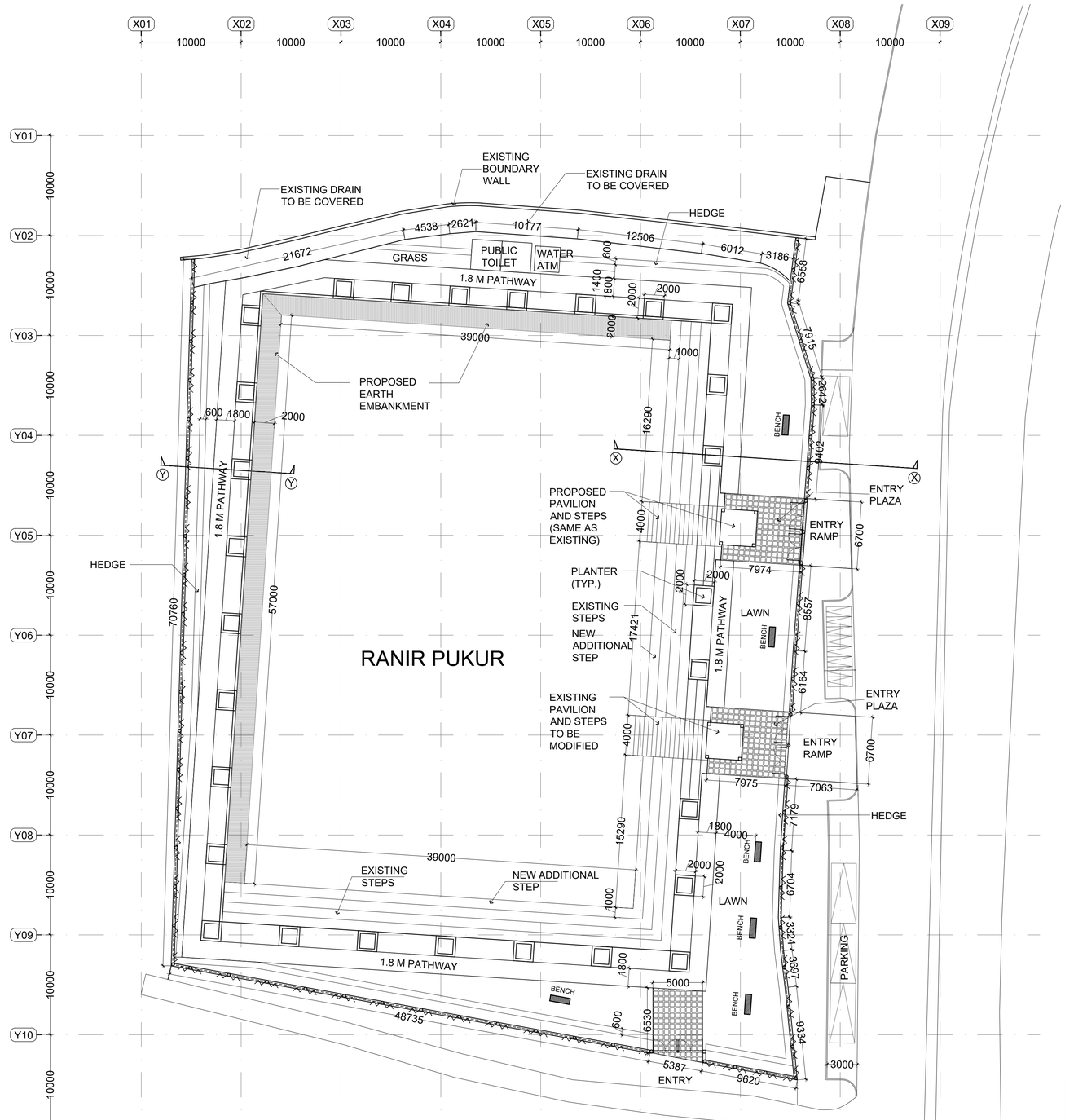
DWG NO. TCE.10918A-AC-1018-LP-10016

ISSUE P0

SIZE-A1

TCE FORM NO. 091 R0

FILE NAME: F-091-Rev-R0.dwg



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FILE NAME : 10918AAC10010P0.dwg

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	REVISIONS													
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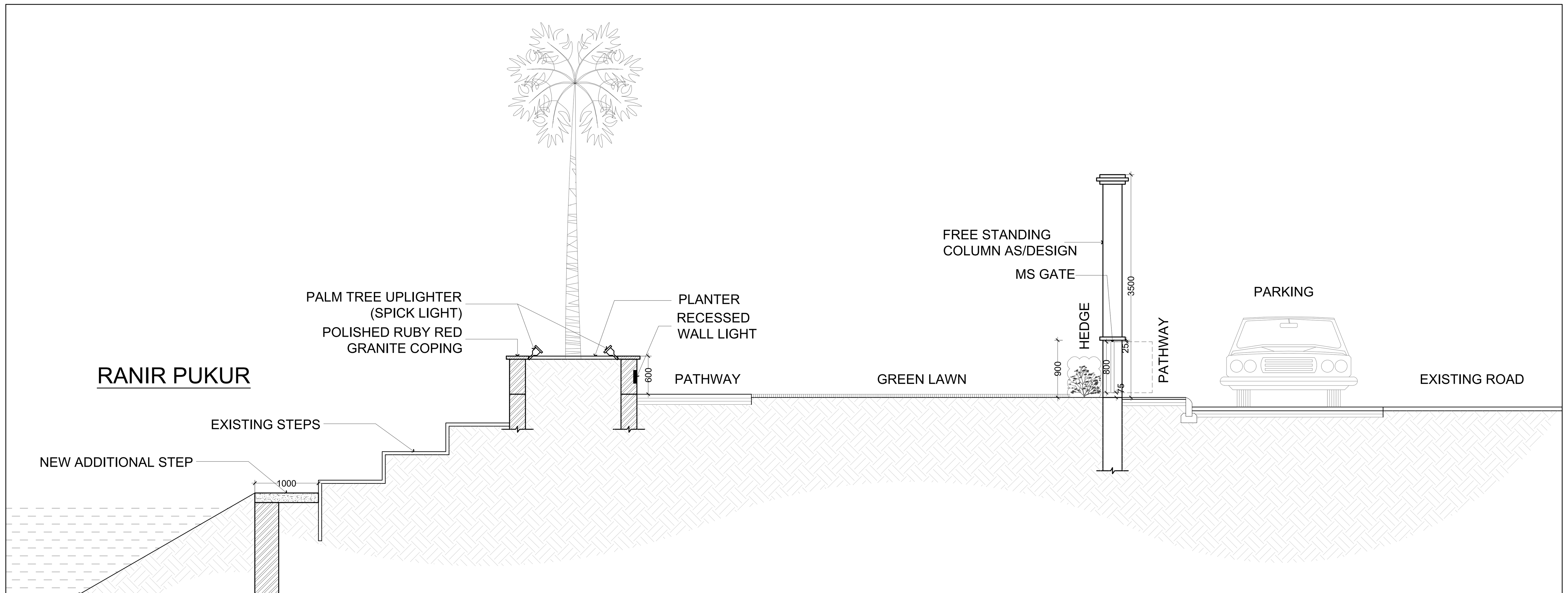
	INITIALS													
	REVISIONS													
P0	SIGN. INITIALS													24-04-2018
ISSUE		DRN	DSN	CHD	CV	EL	IC	ME	PL	HVAC		PE/PM	APPD	DATE
					CLEARED									

AGARTALA SMART CITY LIMITED

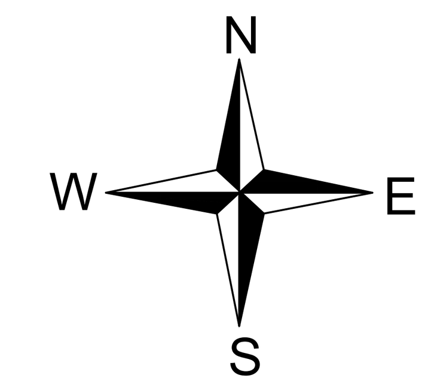
PROPOSED LAYOUT PLAN OF RANIR PUKUR
AGARTALA, TRIPURA

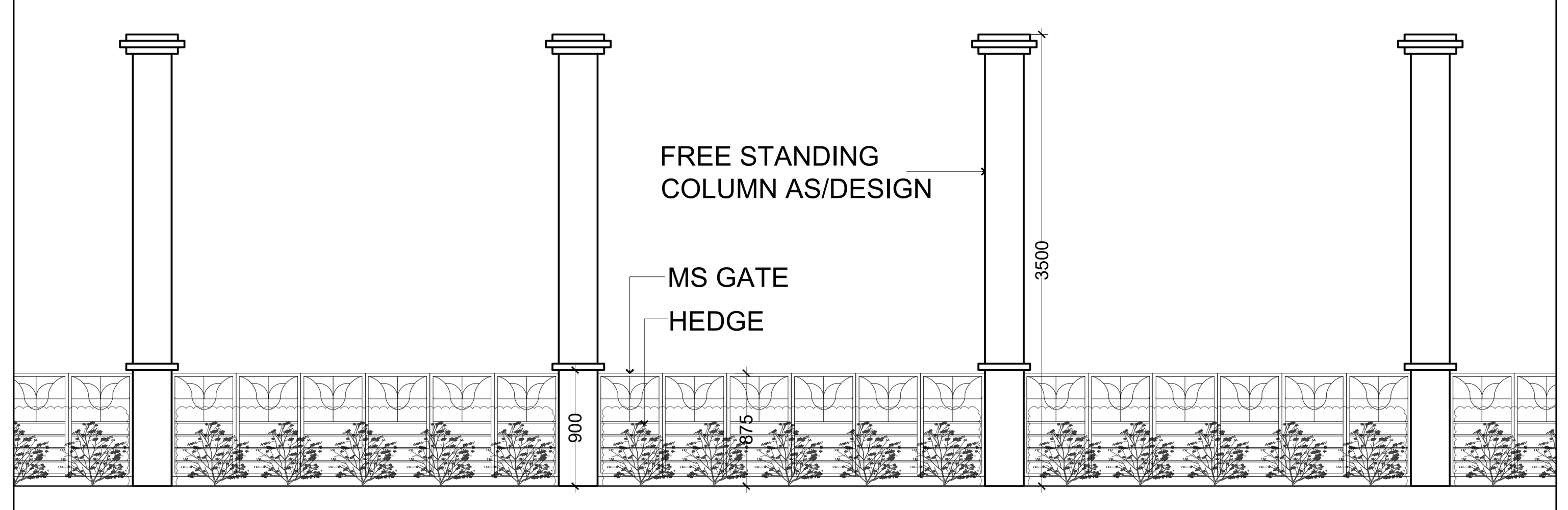
TATA CONSULTING ENGINEERS LIMITED
MUMBAI

SCALE : 1:250
DC & DISC : DC-MUM
DWG NO. TCE.10918A-AC-1018-LP-10010
ISSUE P0
SIZE-A1

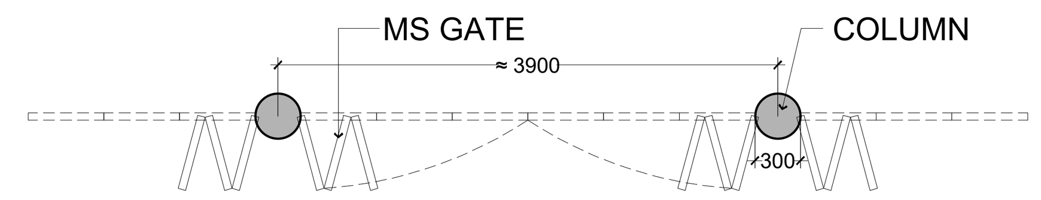


TYPICAL SECTION THROUGH XX

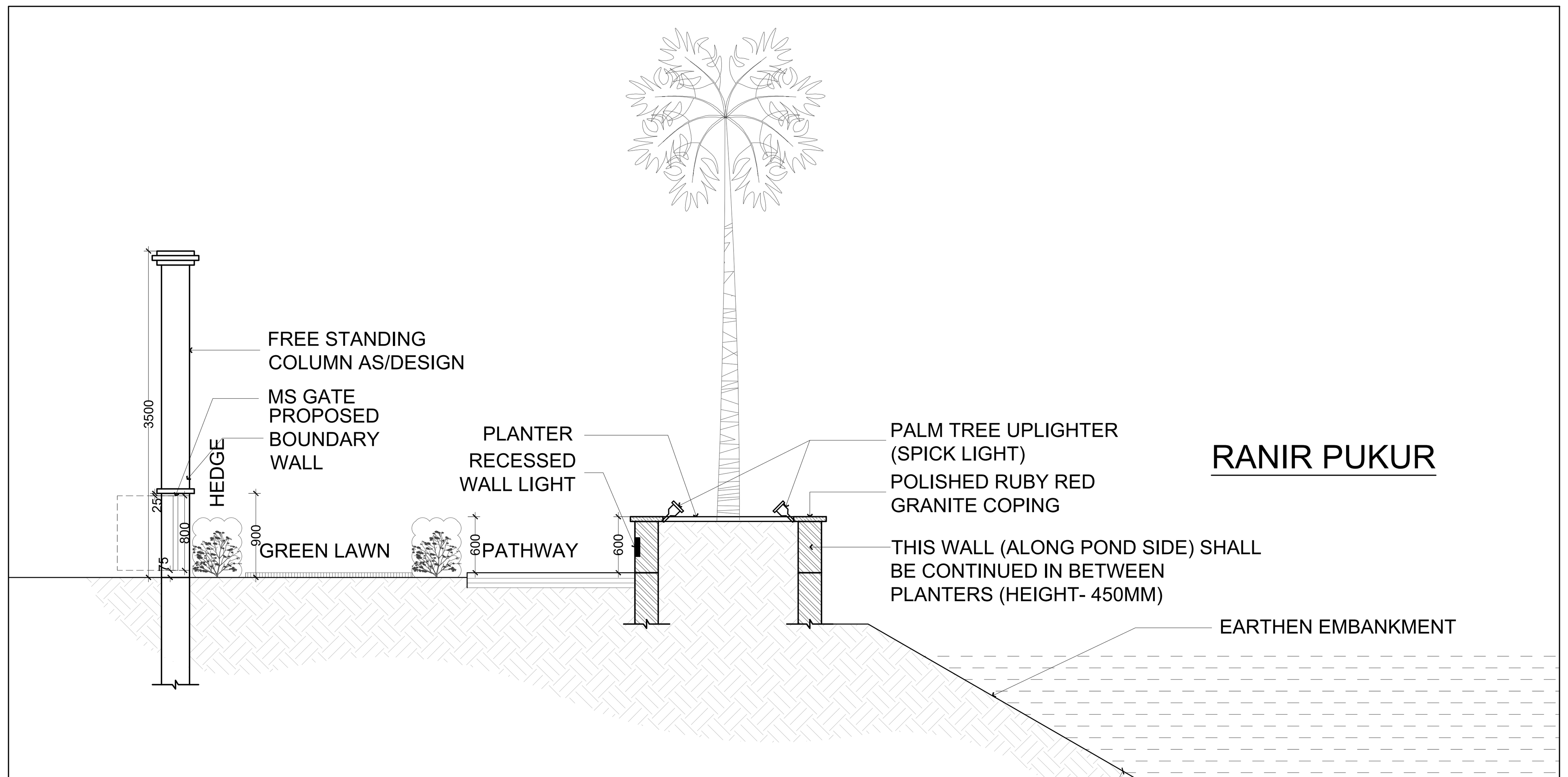




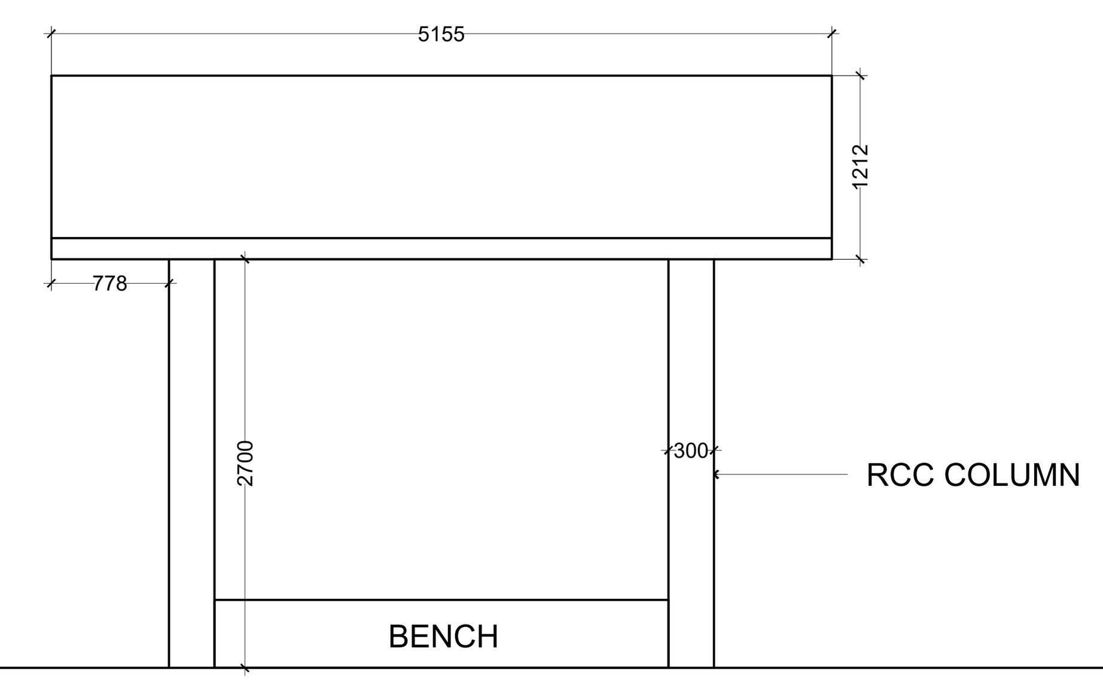
NEW BOUNDARY ELEVATION



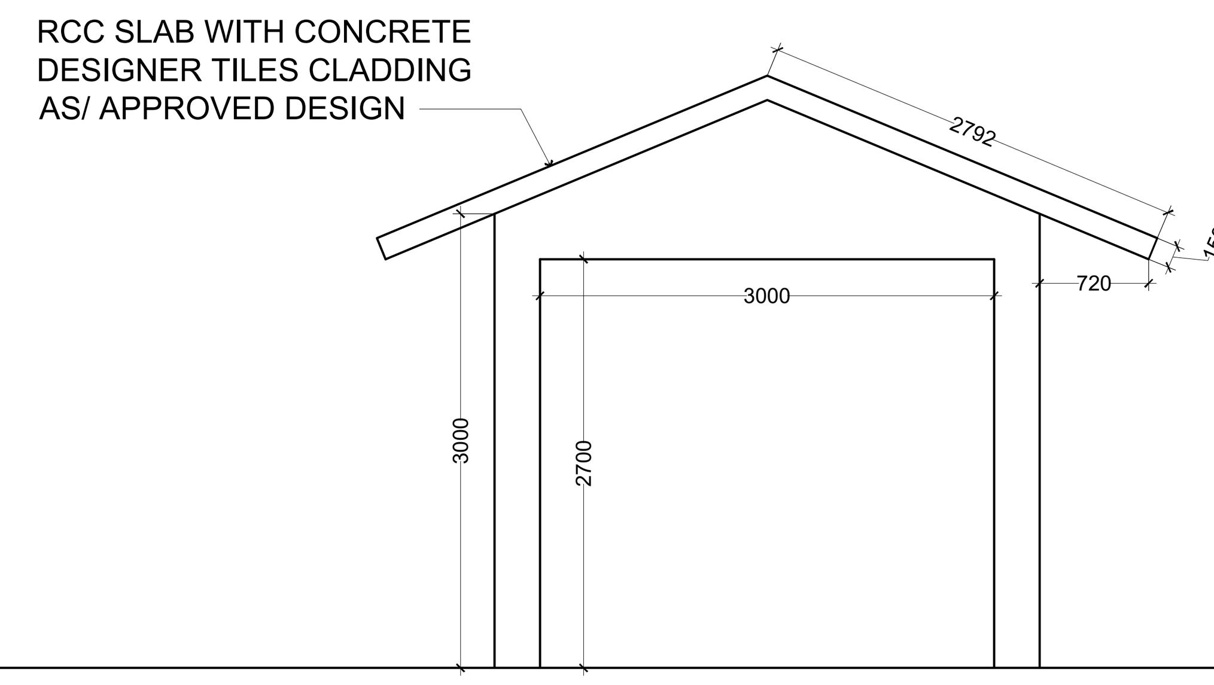
TYPICAL PLAN OF NEW BOUNDARY



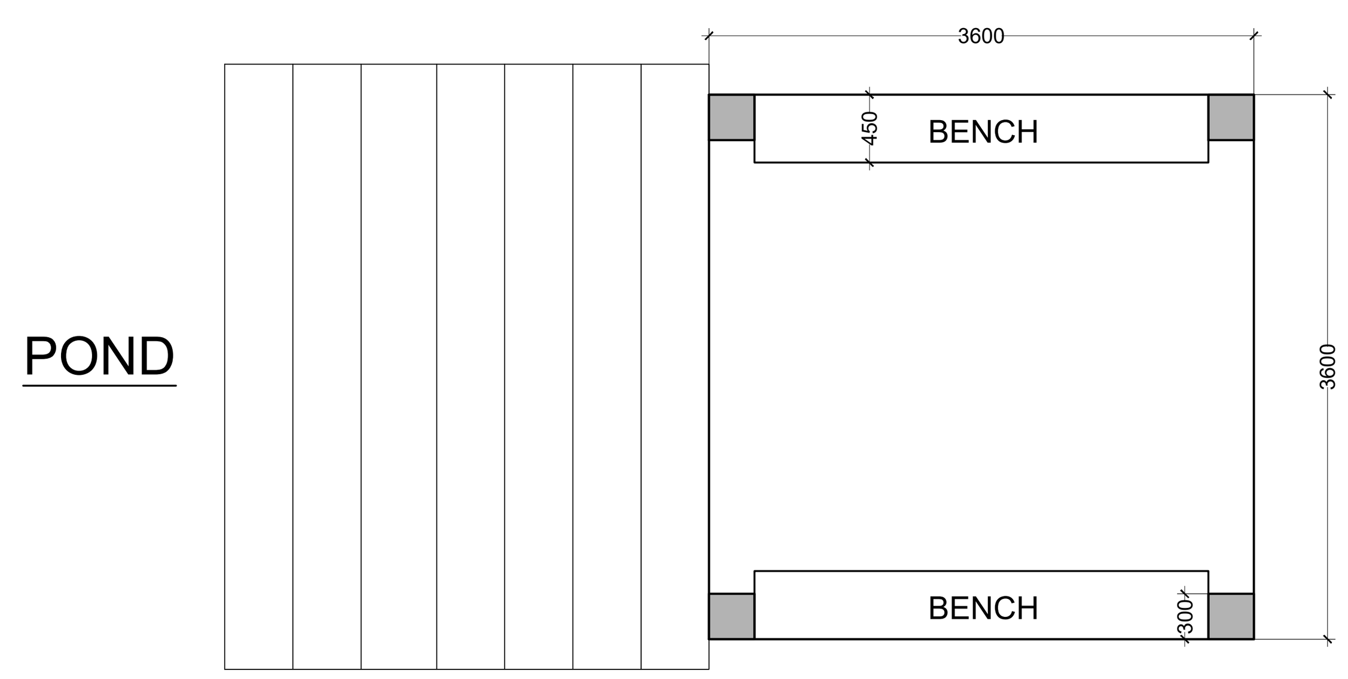
TYPICAL SECTION THROUGH YY



SIDE ELEVATION



FRONT ELEVATION



PLAN

[NOTE: PLEASE VERIFY ALL DIMENSION AT SITE]

EXISTING PAVILION DETAIL

Purpose : FOR TENDER PURPOSE ONLY

DO NOT SCALE

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FILE NAME : 10918AAC10011P0.dwg

ISSUE		DRN	DSN	CHD	CV	EL	IC	ME	PL	HVAC	PE/PM	APPD	DATE
P0	SIGN. / INITIALS												24-04-2018

CLEARED

AGARTALA SMART CITY LIMITED

AGARTALA, TRIPURA

SECTION & DETAILS OF RANIR PUKUR

TATA CONSULTING ENGINEERS LIMITED

MUMBAI

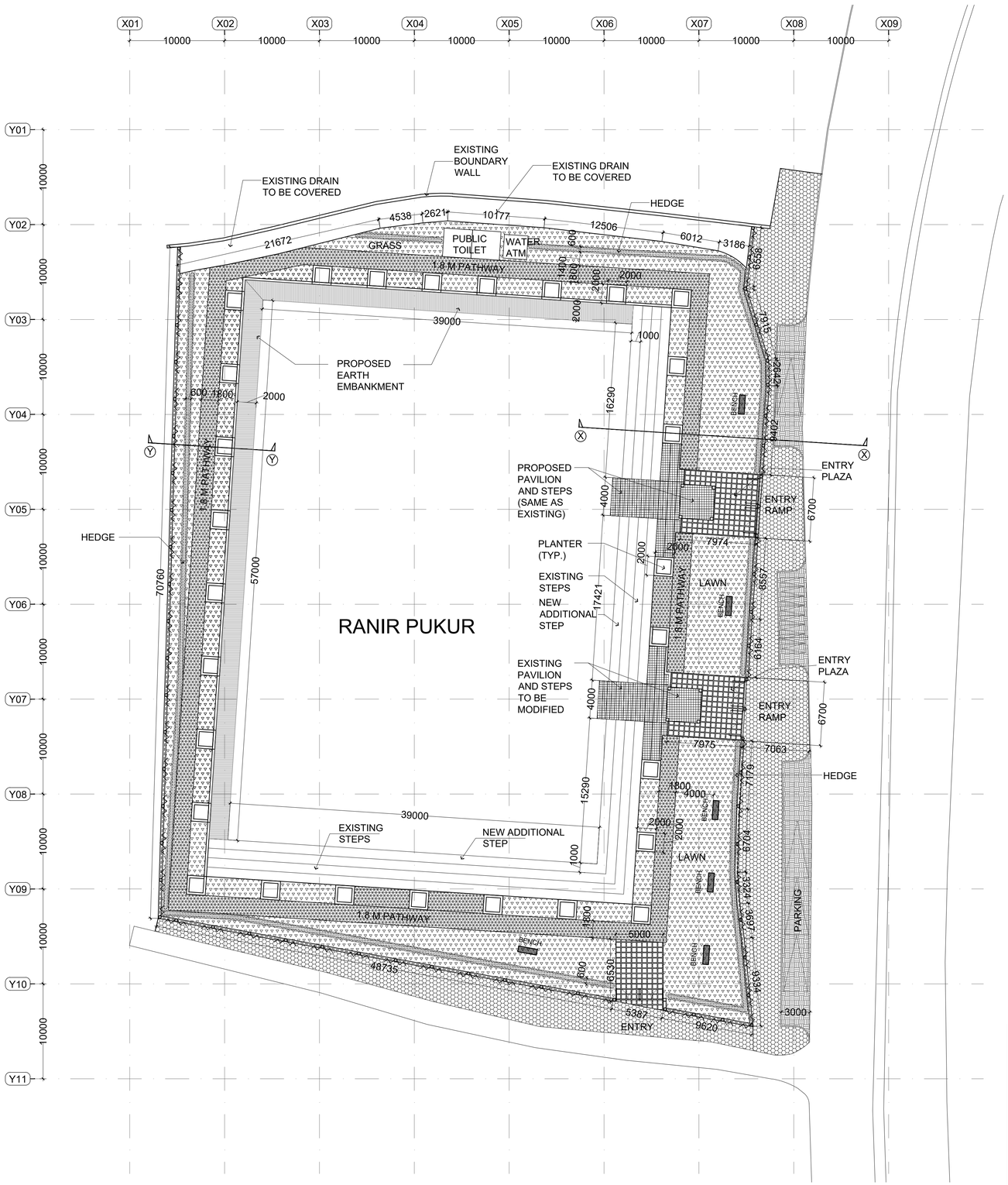
SCALE : 1:250

DC & DISC : DC-MUM

DWG. NO. TCE.10918A-AC-1018-LP-10011

ISSUE P0

SIZE-A1



N

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LEGEND:

- PAVER BLOCK
- 450 x 450mm KOTA STONE FLOORING WITH 100 mm GRASS STRIP IN BETWEEN
- KOTA STONE (AT STEPS)
- GRASS
- HEDGE
- COBBLES STONE
- GRASS CRETE PAVERS
- EARTH EMBANKMENT
- BENCH AS/ APPROVED DESIGN

	SIGN.													
	INITIALS													
	REVISIONS													
	SIGN.													
	INITIALS													
	REVISIONS													
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	INITIALS													
ISSUE		DRN	DSN	CHD	CV	EL	IC	ME	PL	HVAC	PE/PM	APPD	DATE	
					CLEARED									

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FILE NAME : 10918AAC10012P0.dwg

AGARTALA SMART CITY LIMITED

AGARTALA, TRIPURA

PROPOSED MATERIAL PLAN OF RANIR PUKUR

TATA CONSULTING ENGINEERS LIMITED

MUMBAI

SCALE : 1:250

DC & DISC : DC-MUM

DWG NO. : TCE.10918A-AC-1018-LP-10012

ISSUE P0

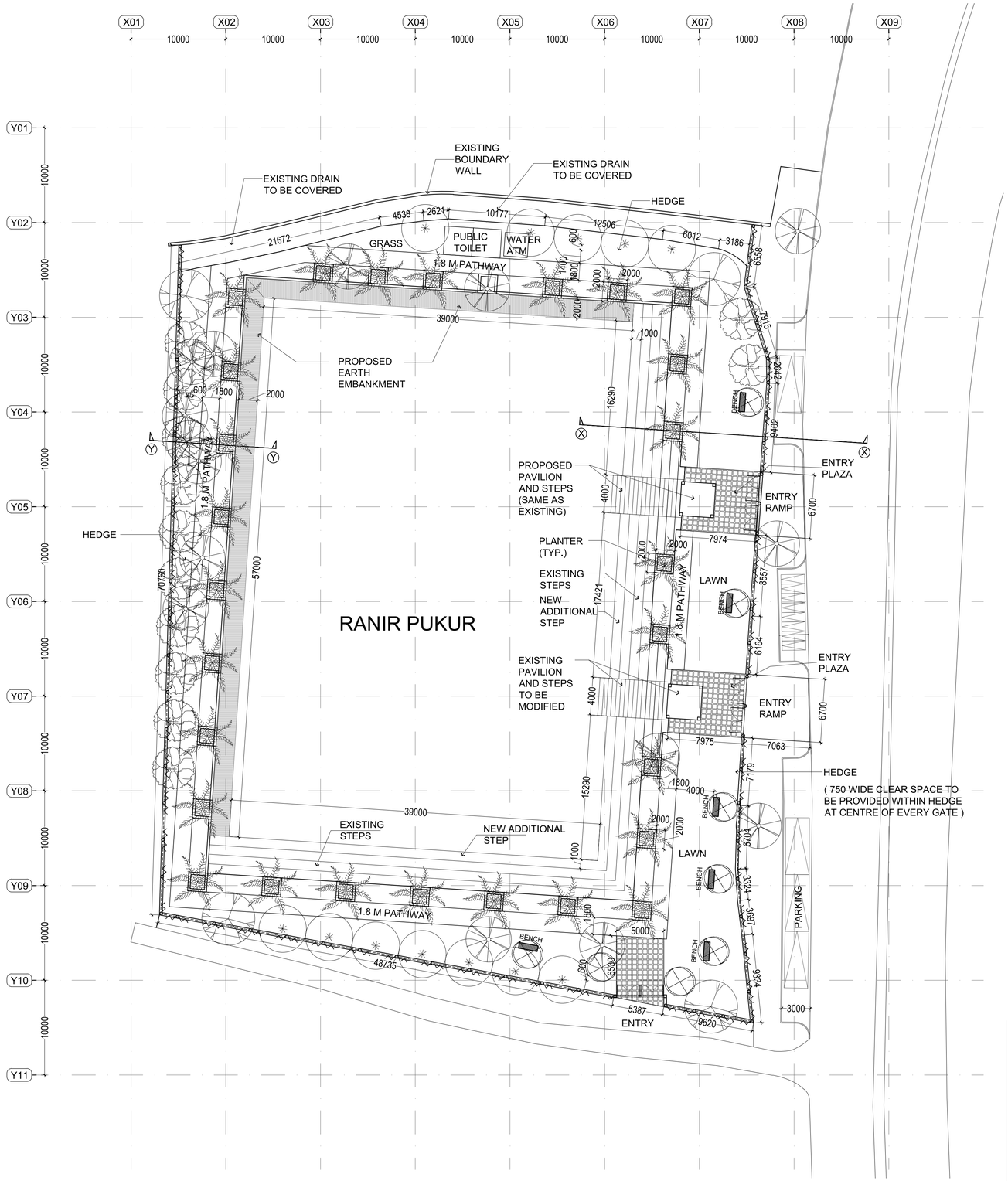
SIZE-A1

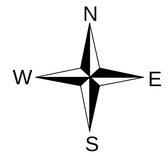
FILE NAME: F-091-Rev-R0.dwg

TCE FORM NO. 091 R0

DWG NO

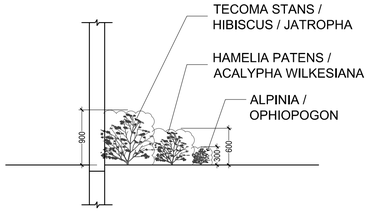
TITLE:





LEGEND:

- EXISTING TREE
- PLUMERIA ALBA
- ALSTONIA SCHOLARIS @ 5 M C/C
- DELONIX REGIA @ 5 M C/C
- PEEPAL / FICUS RELIGIOSA
- BOTTLE PALM



TYPICAL HEDGE DETAIL

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ISSUE		DRN	DSN	CHD	CV	EL	IC	ME	PL	HVAC	PE/PM	APPD	DATE
		CLEARED											

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FILE NAME : 10918AAC10013P0.dwg

AGARTALA SMART CITY LIMITED

PROPOSED PLANTING PLAN OF RANIR PUKUR AGARTALA, TRIPURA

TATA CONSULTING ENGINEERS LIMITED
MUMBAI

SCALE : 1:250

DC & DISC: DC-MUM

DWG NO. TCE.10918A-AC-1018-LP-10013

ISSUE P0

SIZE-A1

FILE NAME: F-091-Rev-R0.dwg

TCE FORM NO. 091 R0

DWG NO

TITLE:

ARIEL VIEW

ARIEL VIEW FROM FRONT

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FILE NAME : 10918AAC10013P0.dwg

AGARTALA SMART CITY LIMITED

3D VISUALISATION OF RANIR PUKUR
AGARTALA, TRIPURA

TATA CONSULTING ENGINEERS LIMITED
MUMBAI

SCALE : NTS

DC & DISC : DC-MUM

DWG. NO. : TCE.10918A-AC-1018-LP-10014

ISSUE P0

SIZE-A1

TCE FORM NO. 091 R0

FILE NAME: F-091-Rev-R0.dwg

DWG NO

TITLE:

VIEW FROM SEATING STEPS

VIEW FROM SOUTH-WEST CORNER

N

W E

S

VIEW SHOWING LAWN

VIEW FROM ROAD SIDE

	SIGN.											
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	REVISIONS											
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	REVISIONS											
P0	SIGN.											
	INITIALS											24-04-2018
ISSUE		DRN	DSN	CHD	CV	EL	IC	ME	PL	HVAC	PE/PM	APPD	DATE
					CLEARED								

Purpose : FOR TENDER PURPOSE ONLY

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FILE NAME : 10918AAC10013P0.dwg

AGARTALA SMART CITY LIMITED

3D VISUALISATION OF RANIR PUKUR AGARTALA, TRIPURA

TATA CONSULTING ENGINEERS LIMITED

MUMBAI

SCALE : NTS

DC & DISC : DC-MUM

DWG NO : TCE.10918A-AC-1018-LP-10015

ISSUE : P0

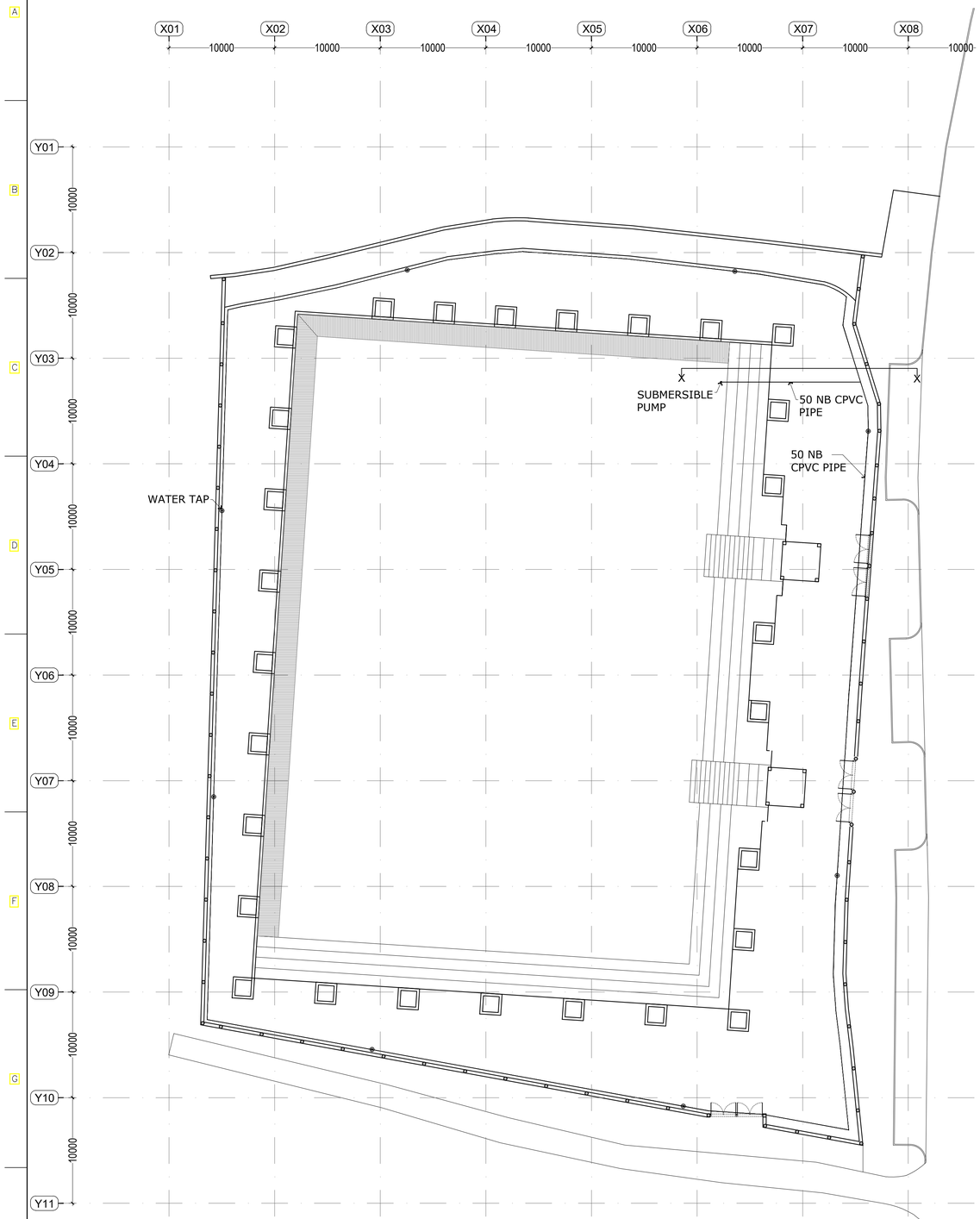
SIZE-A1

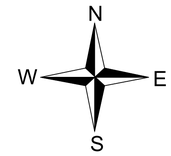
FILE NAME: F-091-Rev-R0.dwg

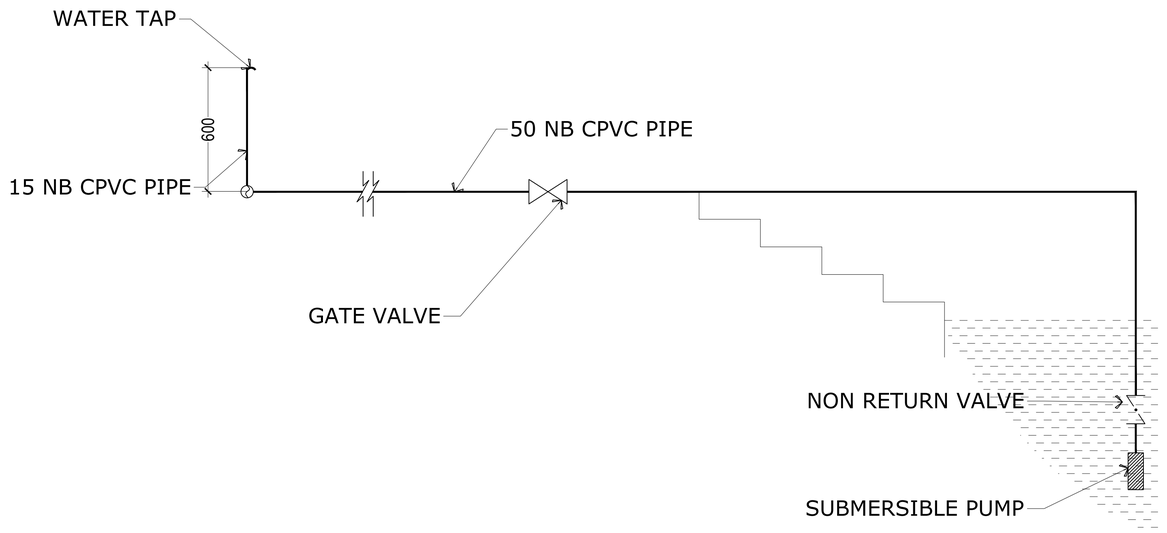
TCE FORM NO. 091 R0

TITLE: P & I DIAGRAM FOR IRRIGATION SYSTEM, RANIR PUKUR AGARTALA, TRIPURA

DWG NO: TCE.10918A-AC-1018-LP-10017







TYPICAL SECTION THROUGH XX

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ISSUE		DRN	DSN	CHD	CV	EL	IC	ME	PL	HVAC	PE/PM	APPD	DATE		
					CLEARED										

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FILE NAME : 10918AAC10013P0.dwg

AGARTALA SMART CITY LIMITED

P & I DIAGRAM FOR IRRIGATION SYSTEM
OF RANIR PUKUR
AGARTALA, TRIPURA

TATA CONSULTING ENGINEERS LIMITED
MUMBAI

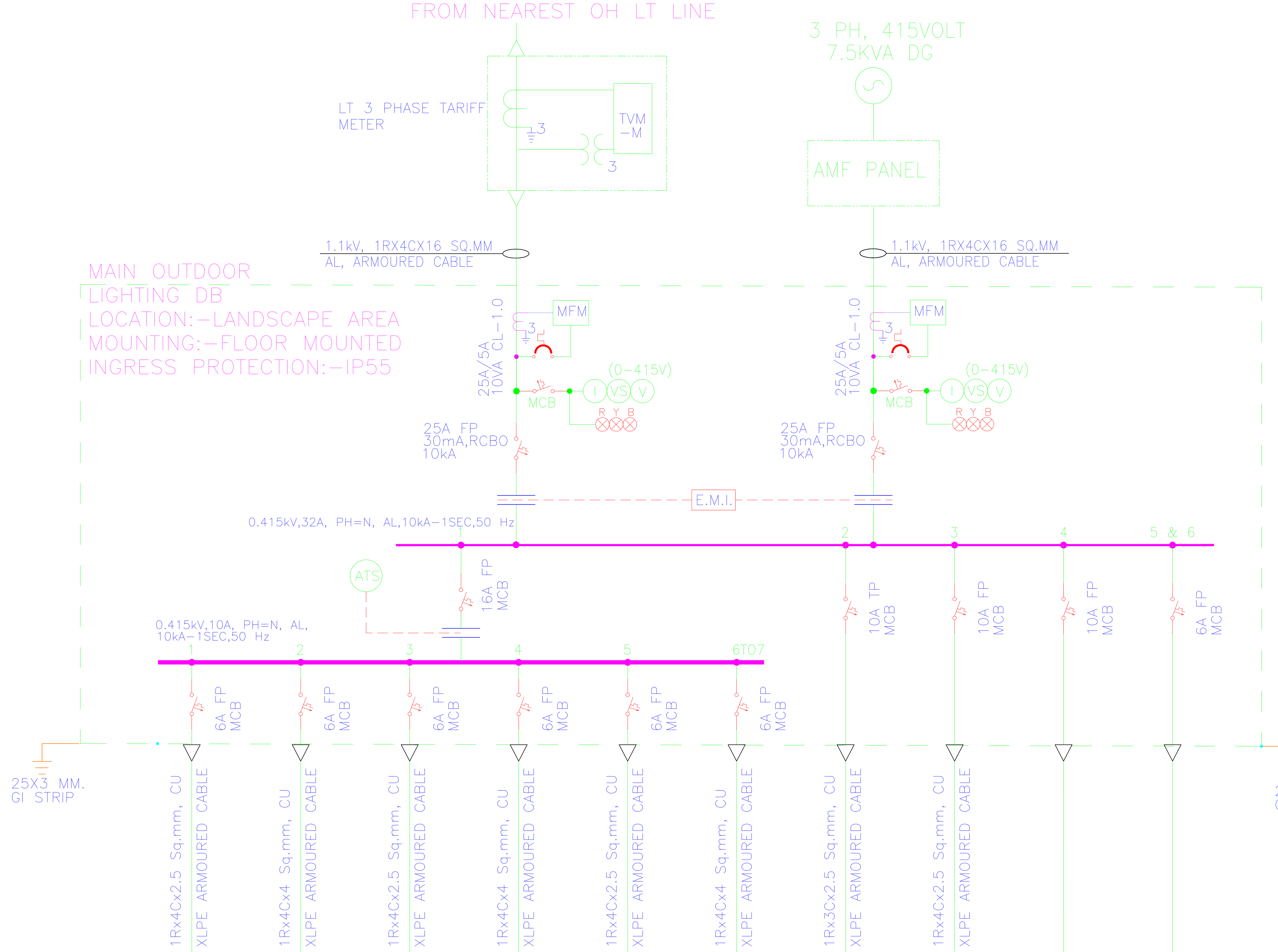
SCALE : 1:250
DC & DISC: DC-MUM
DWG NO: TCE.10918A-AC-1018-LP-10017
ISSUE P0
SIZE-A1

FILE NAME: F-091-Rev-R0.dwg

TCE FORM NO. 091 R0

TCE.10918A-EL-4001-AU-40001

RANIRPUKUR LAKE SCHEMATIC SINGLE LINE DIGRAM



LOAD DESCRIPTION	CONNECTED LOAD IN KW
CKT-01 POST LAMP	0.40 KW
CKT-02 POST LAMP	0.30 KW
CKT-01 TREE PLANTER	0.28 KW
CKT-02 TREE PLANTER	0.28 KW
CKT-01 COLUNM UPLIGHTER	0.50 KW
CKT-02 COLUNM UPLIGHTER	0.50 KW
SUBMERSIBLE PUMP STARTER	0.75 KW
BIOTOILET & WATER ATM	1.0 KW
SPARE	
SPARE	

LEGENDS:

SYMBOL	DESCRIPTION
	MCB
	INDICATING LAMP
	CURRENT TRANSFORMER (CT) (FIGURE INDICATES NO. OF CT's)
LM	LOAD MANAGER
	DIESEL GENERATOR
AS	AMMETER SELECTOR SWITCH
	ANALOG AMMETER
VS	VOLTMETER SELECTOR SWITCH
V	ANALOG VOLTMETER
E.M.I.	INTERLOCK
LT METER	LT ENERGY METER
MFM	MULTIFUNCTIONAL METER
	CONTACTOR

NOTES

1. THIS SLD IS INDICATIVE AND FOR REFERENCE PURPOSE ONLY. LIST OF EQUIPMENT & KW RATING IS TENTATIVE SHALL BE FINALISED DURING DETAIL ENGINEERING.
2. THE SLD SHOULD NOT BE READ IN ISOLATION BUT IT SHOULD BE READ IN CONJUCTION WITH THE TECHNICAL SPECIFICATION.
3. ALL THE EQUIPMENTS WILL BE AS PER RELEVANT IS/IEC STANDARD AND TENDER SPECIFICATIONS.
4. ALL MCCBS SHALL BE CURRENT LIMITING TYPE.
5. FOR MAIN OUTDOOR LIGHTING DISTRIBUTION BOARD WITH TWO INCOMER FROM GRID AND DG, SHALL BE FP MCBS AND ELECTRO-MECHANICALLY INTERLOCKED SUCH THAT BOTH THE POWER SUPPLY ARE NOT PRESENT AT THE SAME TIME.
6. ALL THE LT SWITCHGEARS SHALL BE FREE STANDING, OUTDOOR METAL ENCLOSED FLOOR MOUNTED OF UNIFORM HEIGHT & DEPTH. MAIN LIGHTING DB SHALL BE OUTDOOR & WEATHERPROOF CONFORMING TO IP55 PROTECTION MOUNTED ATLEAST 400MM ABOVE FGL. ALL CABLE ENTRIES SHALL BE BOTTOM OF THE PANEL.
7. R,Y,B PHASE INDICATION SHALL BE PROVIDED MAIN OUTDOOR LDB, ALL INDICATING LAMPS SHALL BE MULTICHIP LED TYPE.
8. MAIN OUTDOOR LIGHTING DB SHALL BE EXTENDIBLE ON BOTH SIDES.
9. DG SET SHALL BE INSTALLED IN ACOUSTIC ENCLOSURE AND SHALL BE OPERATED IN AMF MODE. THE POWER CHANGE OVER SHALL HAPPEN AUTOMATICALLY THROUGH CONTACTORS.
10. MAIN OUTDOOR LIGHTING DB SHALL BE PROVIDED WITH 24 HRS ASTRONOMICAL TIME SWITCH FOR OPERATION AS PER SUN RISE/ SUN SET TIMINGS.
11. SUBMERSIBLE CABLE FOR PUMP SHALL BE OEM VENDORS SCOPE.

ISSUE	DRN	DSN	CHD	CV	EL	IC	ME	PE/PM	APPD	DATE
	KDP	KDP	TSG					AKG	VVB	07-05-18

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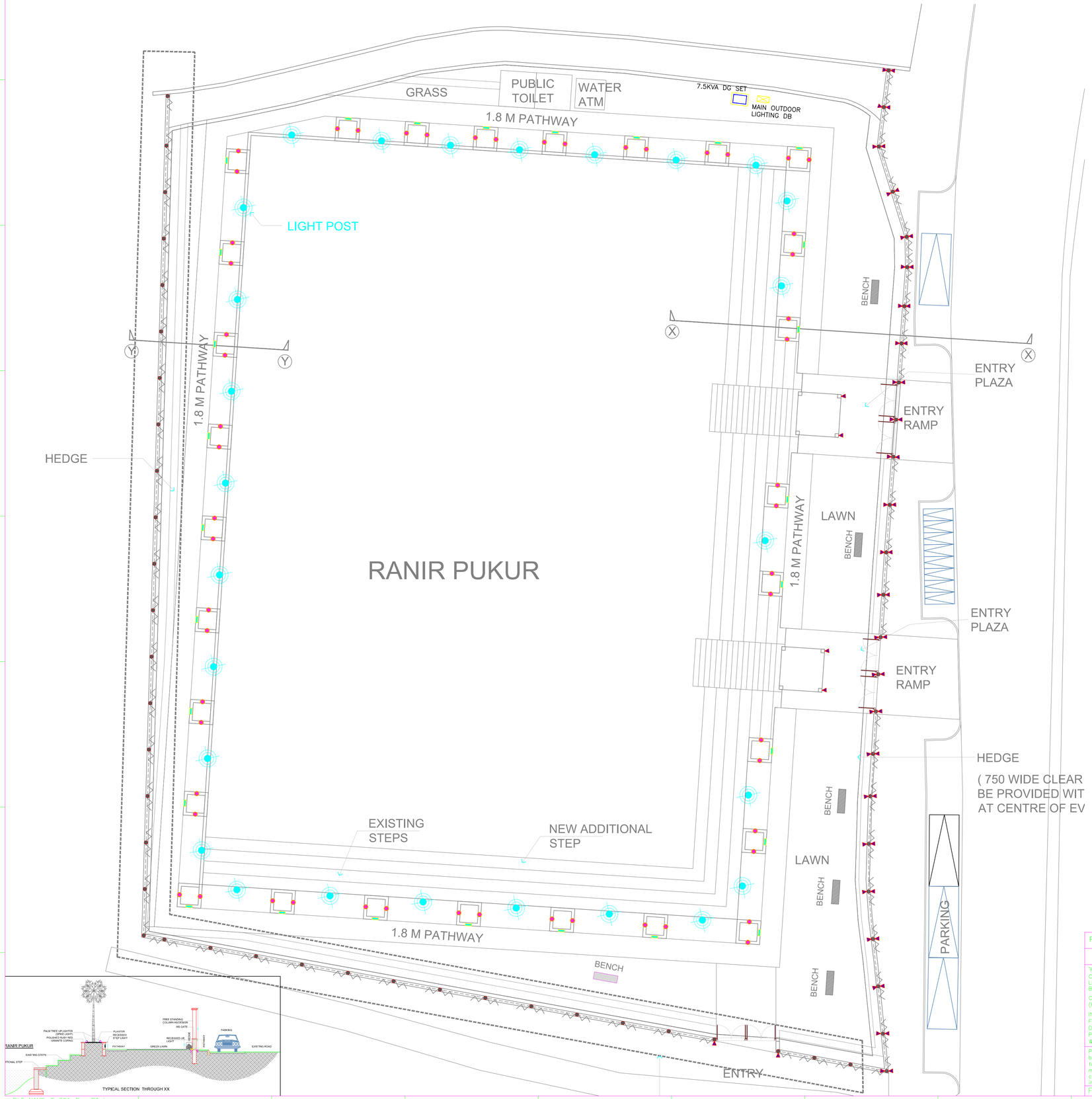
AGARTALA SMART CITY LIMITED

SCHEMATIC SINGLE LINE DIGRAM
RANIRPUKUR LAKE

TATA CONSULTING ENGINEERS LIMITED
MUMBAI

SCALE : NTS
DC & DISC: PUN-EL
DWG NO. TCE.10918A-EL-4001-AU-40001
ISSUE P0

FILE NAME : TCE.10918A-EL-4000-AU-40003-Rev-P0



	16WATT LED RECESS MOUNTED UPLITER
	8WATT LED SURFACE MOUNTED BUSH LIGHT
	4WATT LED RECESS MOUNTED STEP LIGHT
	16 WATT LED RECESS MOUNTED POST LAMP
	7.5KVA DG SET
	OUTDOOR MAIN LIGHTING DB

NOTES

1. ALL DIMENSIONS ARE IN MM & ELEVATIONS IN METRES UNLESS OTHERWISE SPECIFIED.
2. ALL POST LAMP POLES SHALL BE PRECAST PROVIDED BY CIVIL VENDOR.
3. THE CABLING LOOPING FROM OUTDOOR MAIN LIGHTING DB TO LIGHTING FIXTURE JB & FROM JB TO ANOTHER JB SHALL BE DONE WITH 1100V GRADE, 4Cx4 SQ.MM & 4CX2.5 SQ.MM. MULTISTRANDED COPPER CONDUCTOR, XLPE INSULATED, ARMOURED CABLE.
4. CABLING FROM JB TO LIGHTING FIXTURE SHALL BE DONE WITH 3Cx2.5 SQ.MM CU MULTISTRANDED CONDUCTOR PVC INSULATED FLEXIBLE CABLE. THIRD CORE OF 3Cx2.5 SQ.MM CABLE SHALL BE USED FOR EARTHING OF LUMINAIRE.
5. OUTDOOR LIGHTING CABLES SHALL BE LAID IN DWC PIPE IN GROUND AT A MINIMUM DEPTH OF 600MM.
6. WIRING & EARTHING FROM JB TO FIXTURE SHALL BE IN THE SCOPE OF ELECTRICAL CONTRACTOR INCLUDING THE EXCAVATION.
7. LANDSCAPE LIGHT FIXTURES SHALL BE CONNECTED & DISTRIBUTED IN A SEQUENCE OF R-Y-B-R ON EACH 3 PHASE CIRCUIT CABLE FED FROM OUTDOOR MAIN LIGHTING PANEL. ADJACENT FIXTURES SHALL NOT BE ON SAME PHASE.
8. MINOR ALTERATIONS MAY BE CARRIED OUT IN THE LOCATIONS OF LIGHT POLES TO SUIT SITE CONDITIONS IN CONSULTATION WITH SITE ENGINEERS.
9. WHEREVER LIGHTING CABLE CROSSES ANY UTILITY, CONTRACTOR HAS TO MAINTAIN THE 300MM GAP BETWEEN THE UTILITY AND CABLE.
10. ALL LIGHTING INSTALLATION WORKS SHALL BE CARRIED OUT AS PER LATEST APPLICABLE STANDARDS, STATUTORY REGULATIONS & SAFETY CODES IN THE LOCALITY.
11. SAMPLE APPROVAL FOR ALL MATERIAL LIKE LIGHT FITTING, DECORATIVE BRACKETS, LIGHTING PANEL & CABLE TERMINATION ETC. SHALL BE TAKEN FROM CLIENT BEFORE PROCUREMENT & INSTALLATION

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	INITIALS	KDP	KDP	TSG								AKG	VVB	07-05-2018
ISSUE		DRN	DSN	CHD	CV	EL	IC	ME	PL	HVAC	CLEARED	PE/PM	APPD	DATE

AGARTALA SMART CITY LIMITED

LIGHTING LAYOUT FOR RANIR PUKUR LAKE AGARTALA, TRIPURA

Purpose : FOR TENDER PURPOSE ONLY

DO NOT SCALE

'P' (PRELIMINARY) ISSUES ARE NOT TO BE USED FOR CONSTRUCTION / FABRICATION BUT ARE ISSUED FOR LIMITED PURPOSES ONLY AS INDICATED IN THE SMALL BLOCK ABOVE THIS BLOCK.

CONSTRUCTION / FABRICATION WORK IS PERMITTED ON 'R' (RELEASED) ISSUES ONLY.

INFORMATION CONTAINED WITHIN 'HOLD' IS NOT RELEASED FOR CONSTUCTION / FABRICATION. FIELD MUST GET DESIGN OFFICE TO CLEAR 'HOLDS' IN TIME BEFORE PROCEEDING WITH ANY CONSTRUCTION / FABRICATION WORK RELATED TO 'HOLDS'.

FILE NAME : 10918AAC10010P0.dwg

TATA CONSULTING ENGINEERS LIMITED
MUMBAI

SCALE	DWG NO.	ISSUE
: 1:250	TCE.10918A-EL-4026-GL-40002	P0
DC & DISC : DC-MUM		

SIZE-A1