**भारत सरकार/ GOVERNMENT OF INDIA**

**क़ेन्द्रीय लोक निर्माण विभाग/ CENTRAL PUBLIC WORKS DEPARTMENT**

**कालिकट/ CALICUT**

# NIT

**NIT No. 23/SE/EE-Knr/2026-27**

**Name of Work:** ***Providing Development and Bulk Services to RTC Peringome. SH: C/o 300 KLD Capacity of Rain water Harvesting System including Collection Sump filtered water distribution lines, UG Sump, Sludge Drying bed, and Plant room etc. RTC,Peringome,Kannur, Kerala..***

**NIT Amount : Rs.2,14,04,864/-**

**(Civil: Rs. 1,28,54,942/- + E&M: Rs. 85,49,922/-)**

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**Name of Work:** ***Providing Development and Bulk Services to RTC Peringome. SH: C/o 300 KLD Capacity of Rain Water Harvesting System including Collection Sump Filtered water distribution lines, UG sump, Sludge Drying bed, and Plant room etc. RTC, Peringome,Kannur, Kerala.***


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# PART-A

# INFORMATION AND INSTRUCTIONS FOR CONTRACTORS FOR e- TENDERING

## NOTICE INVITING e-TENDER

The **Executive Engineer, CPWD, Kannur - 670001 (Phone No 0497-2967449)** on behalf of President of India invites online percentage rate bids from CPWD enlisted contractors of appropriate class in Buildings& Roads category for the following work(s):

**Table 1: Brief Particulars and Timelines**

| Sl.No | **Particulars** | **Particulars** |
|---|---|---|
| 1 | NIT No. | **23/SE/EE-Knr/2026-27** |
| 2 | Name of work & Location | Providing Development and Bulk Services to RTC Peringome. SH: C/o 300 KLD Capacity of Rain Water Harvesting System including Collection sump filtered water distribution lines, UG sump, Sludge Drying bed, and Plant room etc. RTC, Peringome, Kannur, Kerala. |
| 3 | Estimated cost put to tender (In Rs.) | **Rs. 2,14,04,864/- (Civil – Rs. 1,28,54,942/- + E&M - Rs. 85,49,922/-)** |
| 4 | Earnest money (In Rs.) | **Rs.4,28,097/-** |
| 5 | Stipulated period of completion of work | **06 (Six) Months** |
| 6 | Last date & time of submission of bid, copy of receipt for deposition of original EMD and other documents as specified in the bid document | **09/11/2026 up to 15.00 Hrs** |
| 7 | Date & time of opening of tender. | **09/11/2026 on 15.30 Hrs.** |
| 8 | Last date & time of submission of hard copies of Experience certificates if any, Registration Certificates, Affidavit if any, Undertaking and other documents as specified in the NIT to Division office by the Lowest Tenderer only. | **To be submitted during office hours within a week from the date of opening of Financial Bid. In case the last day happens to be closed holiday, these documents shall be submitted on the next working day.** |

1. The intending bidder must read the terms and conditions of CPWD-6 carefully. He should only submit his bid if he considers himself eligible and he is in possession of all the documents required.
2. Information and Instructions for bidders posted on website shall form part of bid document.
3. The bid document consisting of Master plan, specifications, the schedule of quantities of various types of items to be executed and the set of terms and conditions of the contract to be complied with and other necessary documents can be seen and downloaded from websitehttps://etender.cpwd.gov.in or www.cpwd.gov.in free of cost.
4. But the bid can only be submitted after deposition of original EMD either in the office of Executive Engineer inviting bids or division office of any Executive Engineer, CPWD within the period of bid submission and uploading the mandatory scanned documents such as Insurance Surety Bonds or Account Payee Demand draft or Banker's Cheque or Fixed Deposit Receipts or/and Bank Guarantee including e-Bank Guarantee (for balance amount as prescribed) from any of the Commercial Bank towards EMD in favour of Executive Engineer as mentioned in NIT, receipt for deposition of original EMD to division office of any Executive Engineer (including NIT issuing EE/ AE), CPWD and other documents as specified. A part of earnest money (EMD) is acceptable in the form of bank guarantee also. In such cases, 50% of earnest money or Rs. 20 Lakh whichever is less, will have to be deposited in shape prescribed above

and balance can be accepted in form of Bank Guarantee issued by a Commercial bank. The bank guarantee submitted as a part of Earnest Money shall be valid for a period of 90 days or more from the last date of submission of bid.

5. Those contractors who are not registered or have not updated their profile on the website mentioned above, are required to get registered/update their profile beforehand. The necessary training materials including the videos with step-to-step process are available on download section of https://etender.cpwd.gov.in.
6. The intending bidder must have valid class-II digital signature certificate with encryption key (combo type) to perform any operations / transactions on the e-tendering portal / website and the bidder should download and install the eMsigner on their system as per instructions available on download section of https://etender.cpwd.gov.in.
7. On opening date, the contractor can login and see the bid opening process. After opening of bids he will receive the competitor bid sheets.
8. Contractor can upload documents in the form of JPG format and PDF format.
9. a) The contractor must ensure to quote rate in the prescribed column(s) meant for quoting

   rate in figures appears in yellow colour and the moment rate is entered, it turns sky blue.

   b) Tenderer shall quote the percentage rate above or below two places of decimals only.

   c) The tenderer shall quote only one overall percentage rate above or below on the designated place, which shall be applicable on Civil and E&M components.
10. In addition to this, while selecting any of the cells a warning appears that if any cell is left blank the same shall be treated as "0" (ZERO). However, if a bidder quotes nil rate, the bid shall be treated as invalid and he will not be considered as lowest bidder

    a) If a tenderer quotes nil rates against each item in item rate tender or does not quote any percentage above/below on the total amount of the tender or any section/sub-head in percentage rate tender, the tender shall be treated as invalid and will not be considered as lowest tenderer.

    b) It is mandatory to upload scanned copies of all the documents including GST registration. If documents are not uploaded, then bid will become invalid and shall summarily be rejected.

    c) Please read point No. 9 of CPWD-6 for further details.
11. Tenders with any condition including that of conditional rebates shall be rejected forthwith.
12. The Subject work is targeted for compliance with 3 Star GRIHA rating. In order to achieve these ratings, a high degree of responsibility and cooperation is necessary from the contractors. All materials and systems used in the project are intended to maximize energy efficiency for operation of Project throughout service life (substantial completion to ultimate disposition – reuse, recycling, or demolition) with an emphasis on top quality Materials and systems are to maximize environmentally-benign construction techniques, including construction waste recycle, reusable delivery packaging, and reusability of selected materials. All vendors / contractors must adhere to best practices related to Green Buildings. Other than the general guidelines outlined here, all vendors/contractors will be furnished with a supplementary set of guidelines more specific to their nature of service/product. Nothing extra shall be paid for the same, unless specifically provided in any item.
13. This work requires engaging more than 20 nos. of labours / workers and therefore all necessary licenses such as labour license, EPFO and ESI, BOCW welfare registration etc., shall be taken by contractor within the time limits as prescribed under clause 1 of schedule 'F'
14. The Department reserves the right to reject any prospective application without assigning any reason and to restrict the list of qualified contractors to any number deemed suitable by it, if too many bids are received satisfying the laid down criteria.

15. Contractor shall not divert any advance payments or part thereof for any other purpose other than needed for completion of the contracted work. All advance payments received as per terms of the contract (i.e., mobilization, secured against materials brought at site, secured against plant & machinery and / or for work done during interim stages, etc.) are required to be re-invested in the contracted work to ensure advance availability resources in terms of materials, labour, plant & machinery needed for required pace of progress for timely completion of work.

16. Any dispute arising out of this tender including dispute related to encashment of any Bank Guarantee/ FDR etc., shall be subject to the jurisdiction of courts of Kerala State only.

17. **List of Mandatory Documents to be scanned and uploaded within the period of bid submission:**

| | |
|---|---|
| 1. | Insurance Surety Bonds/ Account payee Demand Draft/ Fixed Deposit Receipt (FDR)/ Banker's cheque or Bank Guarantee (as prescribed) issued by a Commercial Bank against EMD, as specified in Para 7 of CPWD – 6 for e - Tendering. |
| 2. | Enlistment order of the Contractor |
| 3. | GST registration certificate of the State in which the works is to be taken up, if already obtained by the bidder.<br>If the bidder has not obtained GST registration as applicable, then he shall scan and upload following undertaking along with bid documents.<br>"If work is awarded to me, I/we shall obtain GST registration certificate, as applicable, within one month from the date of receipt of award letter or before release of any Payment by CPWD, whichever is earlier, failing which I/we shall be responsible for any delay in payments which will be due towards me/us on account of the work executed and/or for any action taken by CPWD or GST department in this regard". |
| 4 | Receipt for deposition of original EMD issued from division office of any Executive Engineer (Including NIT issuing EE, CPWD) (Form–C). |
| 5 | Declaration about site inspection (Form 'K') |
| 6 | Undertaking on structural stability and soundness of already completed buildings and infrastructure projects (Form 'F') |
| 7 | Copy of ERP Training Certificate issued through LMS (Learning Management System) module in ERP. |

**If any mandatory document listed above is not scanned and uploaded while submitting bid, the bid submitted shall become invalid and will not be considered in e-Tendering process and the bid shall be summarily rejected. It is the duty of bidder to ensure that documents shall be fully legible.**

**Executive Engineer**
**CPWD, Kannur**

## CPWD-6 for e-TENDERING

**1.** Percentage rate tenders are invited on behalf of President of India from CPWD enlisted contractors of appropriate class in Buildings & Roads category for the work of "**Providing Development and Bulk Services to RTC Peringome. SH: C/o 300 KLD Capacity of Rain Water Harvesting System including Collection sump filtered water distribution lines, UG sump, Sludge Drying bed, and Plant room etc. RTC, Peringome, Kannur**, Kerala.

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

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

1.1 The work is estimated to cost **Rs. 2,14,04,864/- (Civil – Rs. 1,28,54,942/- + E&M Rs.85,49,922/-).** This estimate, however, is given merely as a rough guide.

1.1.1 The authority competent to approve NIT (Notice Inviting Tender) for the combined cost and belonging to the major discipline will consolidate NITs for calling the tenders. He will also nominate Division which will deal with all matters relating to the invitation of tenders. For composite bid, besides indicating the combined estimated cost put to bid, should clearly indicate the estimated cost of each component separately. The eligibility of bidders will correspond to the combined estimated cost of different components put to bid.

1.1.2 **The Minimum Eligibility Criteria for Associated Agencies For E&M Components**

Should have satisfactorily completed the works as mentioned below during the last Seven years ending last day of the month previous to the one in which tenders are invited. The value of executed works shall be brought to current costing level by enhancing the actual value of work at simple rate of 7% per annum calculated from the date of completion to last date of submission of tender. For other conditions, refer special conditions specified in Part C.
The applicant shall either himself meet the eligibility conditions for the respective E&M packages or otherwise, he will have to associate an agency meeting the eligibility requirements as given in this tender document and submit the details as per Annexure-4A in Part C of this tender document within 30 days of award of work OR before start of minor component of work whichever is earlier.

| S.N. | COMPONENT OF E&M WORKS | ESTIMATED COST (Rs.) | ELIGIBILITY |
|---|---|---|---|
| I | INTERNAL ELECTRICAL INSTALLA-TIONS | Rs.13,95,128/- | If the main contractor does not possess valid Electrical license of appropriate class/voltage for executing the work then, he shall associate with eligible class registered contractor, possessing valid Electrical Contractor License of appropriate Class/Voltage issued by competent authority and fulfilling the following eligibility criteria of having successfully completed during last seven years ending up to previous day of last date of submission of tender as given below with completion certificate issued by an officer not below the rank of Executive Engineer or equivalent duly attested. |

1.1.3 **The Minimum eligibility criteria for Specialized work for Civil and E& M Works**

Should have satisfactorily completed the works as mentioned below during the last Seven years ending last day of the month previous to the one in which tenders are invited. The value of executed works shall be brought to current costing level by enhancing the actual value of work at simple rate of 7% per annum calculated from the date of completion to last date of submission of tender. For other conditions, refer special conditions specified in Part C.

The applicant shall either himself meet the eligibility conditions for the respective E&M packages or otherwise, he will have to associate an agency meeting the eligibility requirements as given in this tender document and submit the details as per Annexure-4A in Part C of this tender document within 30 days of award of work OR before start of minor component of work whichever is earlier.

**E & M WORKS**

| Sl. No. | COMPONENT OF E &M WORKS | ESTIMATED COST(Rs.) | ELIGIBILITY |
|---|---|---|---|
| I | Water Treat-ment plant | Rs. 71,54,794/- | The main contractor shall have to associate with agency fulfilling the following eligibility criteria having successfully completed during last seven years ending up to previous day of last date of submission of tender as given below with completion certificate issued by an officer not below the rank of Executive Engineer or equivalent duly attested.<br>Three similar works each of value not less than **Rs. 28.60 Lakhs.**<br>OR<br>Two similar works each of value not less than **Rs. 42.90 Lakhs.**<br>OR<br>One similar work of value not less than **Rs. 57.20 Lakhs.**<br><br>Similar work shall mean**"SITC** Water Treatment plant**"** |

**Note:**

a) The main contractor shall submit name and credentials w.r.t. meeting eligibility criteria for specialize agency he proposes to associate for the specialize work(s). The approval of specialize agency shall be given by Engineer-in-charge of work. The Contractor and the associated specialized agencies shall give required affidavit to confirm their association.

b) However, the contractor shall also be eligible to carry out himself any or all of these works without associating any specialized agency provided:

(i) He fulfils the prescribed eligibility criteria respectively for these work(s). or

(ii) He directly procures the equipment of approved make from manufacturer and get it installed from authorised agency/service provider of the manufacturer or specialized agency as per criteria mentioned above.

c) Contractor has to submit Bank Guarantee or Guarantee for these items for specific mentioned period. Proforma is given hereinafter. If no Performa is available, same shall be approved by Engineer in charge.

d) Wherever work is specified to be done or material procured through specialized agencies, their names shall be got approved well in advance from Engineer- in-charge of relevant component. Failure to do so shall not justify delay in execution of work. It is suggested that immediately after award of work, contractor should negotiate with concerned specialist agencies and send their names for approval to Engineer-in-charge. Any material procured without prior approval of Engineer- in- charge in writing is liable to be rejected. Engineer-in-charge reserves right to get the materials tested in laboratories of his choice before final acceptance.

e) The value of executed works shall be brought to current costing level by enhancing the actual value of work at simple rate of 7% per annum calculated from the date of completion to last date of submission of tender. For other conditions, refer special conditions specified in Part C.

f) The applicant/ main contractor has to submit consent letters from at least one eligible associate agency of the respective component within 15 days of award of work OR before start of minor component of work whichever is earlier.

The main contractor will submit Affidavit of MOU signed with eligible associated contractor. The Affidavit of MOU shall be signed by both contractors, Main contractor as 1st party and associated contractor as 2nd party, independently for "**Providing Development and Bulk Services to RTC Peringome. SH: C/o 300 KLD Capacity of Rain water Harvesting System including Collection sump filtered water distribution lines,UG sump, Sludge Drying bed, and Plant room etc. RTC, Peringome, Kannur**, **Kerala"** specified as above.

g) If the main contractor fails to associate agency for execution of minor components of work within 15 days of award of work OR before start of minor component of work whichever is earlier or furnishes incomplete details or furnishes details of ineligible agencies even after the tenderer is given due opportunity, the entire scope of such component of work shall be withdrawn from the tender and the same shall be got executed by the Engineer-in–Charge at the risk and cost of the main contractor.

h) Verifiable completion certificates of the work, registration/approval documents, self-attested GST registration documents in respect of the associated agencies as the case may be, duly attested by the applicant shall be submitted within 15 days of award of work OR before start of minor component of work whichever is earlier.

i) Self-attested GST registration documents in respect of the associated agencies shall be submitted within 15 days of award of work OR before start of Specialized / minor component of work whichever is earlier.

2 Agreement shall be drawn with the successful bidders on prescribed Form No. **CPWD 7** (or other Standard Form as mentioned) which is available as a Govt. of India Publication and also available on website **www.cpwd.gov.in**. Bidders shall quote his rates as per various terms and conditions of the said form which will form part of the agreement.

3 The time allowed for carrying out the work will be **06 (Six) Months** from the date of start as defined in Schedule 'F', or from the first date of handing over of the site, whichever is late in accordance with the phasing, if any, indicated in the tender documents.

4 (I) The site for the work is available.

5 The bid document consisting of specifications, the schedule of quantities of various types of items to be executed and the set of terms and conditions of the contract to be complied with and other necessary documents except Standard General Conditions of Contract Form can be seen on website https://etender.cpwd.gov.in or www.cpwd.gov.in free of cost.

6 After submission of the bid the contractor can re-submit revised bid Any number of times, but before the last time and date of submission of tender as notified.

7 While submitting the revised bid, the contractor can revise the consolidated percentage rate any number of times (he need not re-enter percentage rate of all the schedules or sub heads) but before last time and date of submission of tender as notified.

8 Earnest Money in the form of Insurance Surety Bonds or Account Payee Demand Draft, Fixed Deposit Receipt, Bankers Cheque or Bank Guarantee including e-Bank Guarantee (for balance amount as prescribed) from any of the Commercial Banks (drawn in favour of **The Executive Engineer - Kannur, CPWD, Kannur**)shall be scanned and uploaded on the e-Tendering website within the period of bid submission. The original EMD should be deposited either in the office of Executive Engineer inviting bids or division office of any Executive Engineer, CPWD within the period of bid submission. The EMD receiving Executive Engineer (including NIT issuing EE/AE) shall issue a receipt of deposition of earnest money deposit to the bidder in a prescribed format (enclosed) uploaded by tender inviting EE in the NIT.

A part of earnest money is acceptable in the form of bank guarantee also. In such case, minimum 50% of earnest money or Rs. 20 lac, whichever is less, shall have to be deposited in shape prescribed above, and balance may be deposited in shape of Bank Guarantee including e-Bank Guarantee of any Commercial bank having validity for a period of 90 days for single bid works and 180 days for two bid system or more from the last date of receipt of bids which is to be scanned and uploaded by the intending bidders.

The earnest money given by all the tenderers except the lowest tenderer shall be refunded immediately after the expiry of the stipulated bid validity period or immediately after acceptance of the successful bidder, whichever is earlier. However, in case of two/ three bid system, earnest money deposit of bidders unsuccessful during technical bid evaluation etc. should be returned within 30 days of declaration of result of technical bid evaluation.

Copy of Enlistment Order and certificate of work experience and other documents as specified in the notice inviting e-tender shall be scanned and uploaded on the e-Tendering website within the period of bid submission. However, certified copy of all the scanned and uploaded documents as specified in e-tender notice shall have to be submitted by the lowest bidder within a week physically in the office of tender opening authority. Online bid documents submitted by intending bidders shall be opened only of those bidders, who has deposited EMD with any division of CPWD and other documents scanned and uploaded are found in order.

The bid submitted shall be opened at **15.30 Hrs on 09/11/2026**

9 The bid submitted shall become invalid and e-Tender processing fee (if applicable) shall not be refunded if:

(i) The bidder hides facts and furnishes false information, details and certificates as per NIT condition.

(ii) The bidder does not deposit original EMD with division office of any Executive Engineer, CPWD.

(iii) The bidder does not upload all the documents as stipulated in the bid document.

(iv) If a bidder quotes NIL rates against each item in item rate tender or does not quote any percentage above/below on the total amount of the tender or any section/sub head in percentage rate tender, the tender shall be treated as invalid and will not be considered as lowest bidder

10 The contractor whose tender is accepted will be required to furnish Performance Guarantee (PG)as mentioned in schedule 'E' and within the period specified in Schedule F. PG shall be 5% of the Estimated cost put to tender (ECPT) or contract amount whichever is higher, or as prescribed from time to time. If the quoted bid amount is less than 80% of the estimated cost put to tender, the bidder shall be required to submit Additional Performance Guarantee (if applicable) in addition to the Standard Performance Guarantee (PG). The amount of

Additional Performance Guarantee (if applicable) shall be equivalent to the difference between the 80% amount of ECPT and quoted amount. (e.g. if ECPT is A and quoted amount is 0.7A then the amount of APG shall be 0.8A-0.7A). The Additional Performance Guarantee (if applicable) shall be in the prescribed format of Performance Guarantee and has to be submitted within the time frame prescribed for submission of Performance Guarantee. These guarantees shall be in the form of Insurance Surety Bonds or Account Payee Demand Draft, Fixed Deposit Receipt or Bank Guarantee from any of the Commercial Banks in accordance with the prescribed form. In case the contractor fails to deposit the said performance guarantee and Additional Performance Guarantee (if applicable) within the period as indicated in Schedule F, including the extended period if any, the Earnest Money deposited by the contractor shall be forfeited automatically without any notice to the contractor. The earnest money deposited along with bid shall be returned after receiving the aforesaid performance guarantee and Additional Performance Guarantee (if applicable). In case of forfeiture of EMD as aforesaid, the bidder will be debarred from re-tending process of the work. The contractor whose bid is accepted will also be required to furnish either copy of applicable licenses/ registrations or proof of applying for obtaining labour licenses, registration with EPFO, ESIC and BOCW Welfare Board including Provident Fund Code No. If applicable and also ensure the compliance of aforesaid provisions by the sub-contractors, if any engaged by the contractor for the said work within the period specified in Schedule F.

11 Intending Bidders are advised to inspect and examine the site and its surroundings and satisfy themselves before submitting their bids as to the nature of the ground and sub-soil (so far as is practicable), the form and nature of the site, the means of access to the site, the accommodation they may require and in general shall themselves obtain all necessary information as to risks, contingencies and other circumstances which may influence or affect their bid. A bidder shall be deemed to have full knowledge of the site whether he inspects it or not and no extra charge consequent on any misunderstanding or otherwise shall be allowed. The bidders shall be responsible for arranging and maintaining at his own cost all materials, tools & plants, water, electricity access, facilities for workers and all other services required for executing the work unless otherwise specifically provided for in the contract documents. Submission of a bid by a bidders implies that he has read this notice and all other contract documents and has made himself aware of the scope and specifications of the work to be done and of conditions and rates at which stores, tools and plant, etc. will be issued to him by the Government and local conditions and other factors having a bearing on the execution of the work.

12 The competent authority on behalf of the President of India does not bind it self to accept the lowest or any other tender and reserves to it self he authority to reject any or all the tenders

Received without the assignment of any reason. All tenders in which any of the prescribed condition is not fulfilled or any condition including that of conditional rebate is put forth by the tenderer shall be summarily rejected.

13 Canvassing, whether directly or indirectly, in connection with tenderers is strictly prohibited and the tenders submitted by the contractors who resort to canvassing will be liable to rejection.

14 The competent authority on behalf of President of India reserves to himself the right of accepting the whole or any part of the bid and the bidders shall be bound to perform the same at the rate quoted.

15 The contractor shall not be permitted to bid for works in the CPWD Circle (Division in case of contractors of Horticulture/Nursery category) responsible for award and execution of contracts, in which his near relative is posted a Divisional Accountant or as an officer in any capacity between the grades of Superintending Engineer and Junior Engineer (both inclusive). He shall also intimate the names of persons who are working with him in any capacity or are subsequently employed by him and who are near relatives to any Gazetted officer in the Central Public Works Department or in the Ministry of Urban Development. Any breach of this condition by the contractor would render him liable to be removed from the approved list of contractors of this Department.

16 No Engineer of Gazetted Rank or other Gazetted Officer employed in Engineering or Administrative duties in an Engineering Department of the Government of India is allowed to work as a contractor for a period of one year after his retirement from Government service, without the prior permission of the Government of India in writing. This contract is liable to be cancelled if either the contractor or any of his employees is found any time to be such a person who had not obtained the permission of the Government of India as aforesaid before submission of the bid or engagement in the contractor's service.

17 The bid for the works shall remain open for acceptance for a period of Thirty (30) days from the date of opening of bids in case of single bid system.

18 The bid will become invalid:

i. If any tenderer withdraws his tender or makes any modification in the terms & conditions of the tender which is not acceptable to the department within 7 days after last date of submission of bids, then the government shall without prejudice to any other rights or remedy, be at liberty to forfeit 50% of the earnest money absolutely irrespective of letter of acceptance for the work is issued or not.

ii. If any tenderer withdraws his tender or makes any modification in the terms & conditions of the tender which is not acceptable to the department after expiry of 7 days after last date of submission of bids, then the Government shall without prejudice to any other rights or remedy, be at liberty to forfeit 100% of the earnest money absolutely irrespective of letter of acceptance for the work is issued or not.

iii. In case of forfeiture of earnest money as prescribed in para (i) and (ii) above, the bidders shall not be allowed to participate in the rebidding process of the same work.

19 This notice inviting Bid shall form a part of the contract document. The successful bidders/ contractor, on acceptance of his bid by the Accepting Authority shall within 15 days from the stipulated date of start of the work, sign the contract consisting of:-

(i) The Notice Inviting Bid, all the documents including additional conditions, specifications and drawings, if any, forming part of the bid as uploaded at the time of invitation of bid and the rates quoted online at the time of submission of bid and acceptance thereof together with any correspondence leading thereto.

(ii) Standard C.P.W.D. Form 7 or other Standard C.P.W.D. Form as applicable.

**20 For Composite Tenders**

20.1.1 The Executive Engineer in charge of the major component will call bids for the composite work. The cost of bid document and Earnest Money will be fixed with respect to the combined estimated cost put to tender for the composite bid.

20.1.2 The bid document will include following three components:

**Part A:-**CPWD-6, CPWD-7 including schedule A to F for the major component of the work, Standard General Conditions of contract Construction Works2023as amended/ modified up to last date of submission of tender.

**Part B:-** General terms and conditions, Particular specifications& Special Conditions, for major component and list of preferred makes applicable for major component(Civil) of the work.

**Part C:-**Schedule A to F for E&M component of the work, Particular Specifications, Special conditions, Technical Specifications for E&M Worksand list of preferred makes applicable for minor component(works).

**Part D-** Schedule of Quantities of Civil and E&M Works.

**Part E: -** Layout Drawing, Architectural drawings, drawings (Plans, Elevations and Sections)(Tender Indicative drawings).

20.1.3 The bidders must associate himself, with agencies as per NIT conditions

20.1.4 The eligible bidders shall quote rates for all items of major component as well as for all items of minor components of work.

20.1.5 After acceptance of the bid by competent authority, the EE in charge of major component of the work shall issue letter of award on behalf of the President of India. After the work is awarded, the main contractor will have to enter into one agreement with EE incharge of major component and has also to sign two or more copies of agreement depending upon number of EE's/DDH in charge of minor components. One such signed set of agreement shall be handed over to EE/DDH incharge of minor component(s).

20.1.6 Entire work under the scope of composite tender including major and all minor components shall be executed under one agreement.

20.1.7 Security Deposit will be worked out separately for each component corresponding to the estimated cost of the respective component of works.

20.1.8 The main contractor has to associate agencies for specialized components (s) conforming to eligibility criteria as defined in the bid document and has to submit detail of such agency(s) to Engineer-in-charge of relevant component(s). within prescribed time. Name of the agency(s) to be associated shall be approved by Engineer-in-charge of relevant component(s).

20.1.9 In case the main contractor intends to change any of the above agency/agencies during the operation of the contract, he shall obtain prior approval of Engineer-in-charge of relevant specialized component(s).

The new agency/agencies shall also have to satisfy the laid down eligibility criteria. In case Engineer-in-charge is not satisfied with the performance of any agency, he can direct the contractor to change the agency executing such items of work and this shall be binding on the contractor.

20.1.10 The main contractor has to enter into MoU with agencies contractor(s) associated by him. Copy of such MoU shall be submitted to EE/ DDH in charge of each relevant component as well as to EE in charge of major component. In case of change of associate contractor, the main contractor has to enter into MoU/agreement with the new contractor associated by him.

20.1.11 Running payment for the major component shall be made by EE of major discipline to the main contractor. Running payment for minor components shall be made by the Engineer-in-charge of the discipline of minor component directly to the main contractor. The CMB shall be maintained independently by the Engineer-in-Charge of major and minor components.

(A) The composite work shall be treated as complete when all the components of the work are complete. The completion certificate of the composite work shall be recorded by Engineer-in-charge of major component after record of completion certificate of all other components.

(B) Final bill of whole work shall be finalized and paid by the EE of major component. Engineer(s) in charge of minor component(s) will prepare and pass the final bill for their component of work and pass on the same to the EE of major component for including in the final bill for composite contract.

**Executive Engineer**
**CPWD Kannur**

**FORM 'K'**

**DECLARATION ABOUT SITE INSPECTION**

**To,**

**The Executive Engineer,**
**CPWD, Kannur.**

**Name of Work:- Providing Development and Bulk Services to RTC Peringome. SH: C/o 300 KLD Capacity of Rain water Harvesting System including Collection sump filtered water distribution lines, UG sump, Sludge Drying bed, and Plant room etc. RTC,Peringome, Kannur, Kerala.**

Dear Sir,

It is hereby declared that as per CPWD–6 FOR e-BIDDING, I/ We the bidder(s) inspected and examined the subject site and its surrounding and satisfy myself / ourselves as to the nature of the ground and sub-soil (so far as is practicable), the forms and nature of the site. Ourselves before submitting the bid, the accommodation which may require and all necessary information as to risks, contingencies and other circumstances which may influence or affect our bid have been obtained. I/We the bidder shall have full knowledge of the site and no extra charge consequent upon any misunderstanding or otherwise shall be claimed in later date.

I /We bidder shall be responsible for arranging and maintaining at own cost all materials, tools & plants, water, electricity, access, facilities for workers and all other services required for executing the work unless otherwise specifically provided for in the contract documents. Submission of a bid by me/us implies that I / We have read this notice and all other contract documents and has / have made myself /ourselves aware of the scope and specifications of the work to be done and local conditions and other factors having a bearing on the execution of the work.

**Yours faithfully**

**(Duly authorized signatory of the bidder)**

**Form 'F'**

**(Undertaking on structural stability and soundness of already completed buildings and infrastructure projects)**

**To,**

**The Executive Engineer,**
**CPWD, Kannur.**

**Name of Work: "Providing Development and Bulk Services to RTC Peringome. SH: C/o 300 KLD Capacity of Rain water Harvesting System including Collection sump filtered water distribution lines,UG sump, Sludge Drying bed, and Plant room etc. RTC,Peringome,Kannu Kerala."**

Sir,

I/we undertake and confirm that any building / infrastructure constructed by our firm /partnership firm/ company has not suffered any failure, making it unfit for intended use, either due to structural design and defects or due to use of sub-standard materials or execution of sub-standard work, poor workmanship or any other reason during the last 25 (twenty-five) years.

l/we, further, undertake that if such information comes to the notice of CPWD, then Engineer-in-Charge shall be free to terminate the bid/agreement and to forfeit the entire amount of earnest money deposit, performance guarantee, Additional Performance Guarantee (if applicable)and security deposits.

l/we, also undertake that in addition to above, the Engineer-in-Charge shall be free to debar us forever from tendering in CPWD.

The decision of Engineer-in-Charge or any higher authority shall be final and binding.

Signature of notary
with seal

Signature of bidder or
an authorized person of the firm with stamp

**Note: Affidavit to be furnished on a 'non-judicial' stamp paper of Rs. 200/- (scanned copy of the notarized affidavit to be uploaded at the time of submission of bid)**

## SECTION – I

## BRIEF PARTICULARS OF THE PROJECT

**CIVIL WORKS**

1. C/o Grit/Mud trap.
2. C/o Rain water collection storage well surrounded with necessary filter medias.
3. C/o UG sump consisting aeration tank, settling tank, ultra-filtration feed tank and treated water tank.
4. Concrete Haunching inside the UG sump.
5. C/o Sludge drying bed.
6. C/o Plant room above the UG sump laid with pre-coated GI roofing sheet above MS structural frame work all-round GI chain link fencing and 52mm thick CC flooring.
7. Providing and laying necessary CPVC pipe lines.

**ELECTRICAL WORKS**

1. SITC of all Electro-mechanical items necessary for 300KLD Rain Water Harvesting System including Ultra filtration and RO plant.
2. SITC of Internal Electrical Installations of Pump Room.
3. External Service connection for pump room.
4. Bore well Water Pumping system for operation RO plant during non-rainy seasons.
5. G.I. Pipe earthing has been considered.
6. Maintenance and Operation of Water Treatment Plant for 1 Year has been considered in this estimate.

**GENERAL CONDITIONS APPLICABLE FOR MAJOR AND MINOR COMPONENTS**

1. The contractor shall ensure compliance of all labour laws ,labour codes and its enactments which are applicable to their workmen.
2. The Contractor shall ensure Compliance of all statutory obligations and any other laws, in force from time to time, regarding employment or conditions of service of Contractors employees.
3. The Contractor shall ensure Compliance of the Works Contractors of all safety rules as required under various Statutes in India.
4. No liability to the RTC,Peringome and CPWD for any damage to the contractor and staff due to natural calamities such as earthquake, war, civil commotion and willful damage etc..
5. In case of reduction in scope of work, no claim on account of reduction in value of work, loss of expected profit, consequential overheads etc. shall be entertained.
6. Laboratory at site: The contractor shall establish a testing lab at site and provide testing equipment and materials for the field tests mentioned in the list of mandatory tests given in CPWD Specifications Vol. 1 & 2. Nothing extra shall be payable to him on this account. The representatives of the department shall be at liberty to inspect the testing facilities at site and conduct testing at random in consultation with Engineer in charge. The contractor shall provide all necessary facilities for the purpose.
   Not less than 90% tests for material be performed at site lab, however at least 10% testing of materials shall be got done from external laboratories. However, for the tests to be carried out by the external laboratories such as IIT/NIT/Govt .Engineering Colleges/Government Laboratories. The contractor shall supply free of charge all the materials required for testing, including transportation. All expenditure to be incurred for testing of samples i.e. collection, packaging, sealing, transportation, loading, unloading, etc. including testing charges shall be borne by the contractor. The cost of material used for testing shall also be borne by the contractor.
   If the tests which were to be conducted in the site laboratory are conducted in other laboratories for any the reasons the cost of such tests shall be borne by the contractor.

## 7. Conditions for Design, Technical Vetting, Approval and Execution of the Complete System

**i. Detailed Design and Execution Proposal**

The contractor shall prepare a comprehensive design and execution proposal for the complete system in accordance with the scope of work, technical specifications and performance requirements stipulated in the agreement. The proposal shall include treatment process design, design calculations, equipment selection and sizing, layout drawings, piping arrangements, interconnections, instrumentation and control systems, and all other technical details required for the efficient functioning of the system.

**ii Civil and Structural Design**

The contractor shall be responsible for preparing all necessary civil and structural designs, calculations and detailed drawings, including foundations, equipment foundations, support structures, platforms, pipe supports, structural steel frameworks, roof structures, trusses, tanks and tank-supporting structures, as applicable. The designs shall consider all relevant loading conditions, including dead loads, imposed loads, equipment loads, hydrostatic pressure, wind loads and seismic loads, in accordance with applicable codes and standards. Tank designs shall also address structural stability, durability, water-tightness and other relevant functional requirements.

**iii Technical Vetting and Approval**

The complete design and execution proposal, including process design, mechanical and electrical designs, civil and structural designs, truss and tank designs, drawings and supporting design calculations, shall be technically vetted by an Indian Institute of Technology (IIT), National Institute of Technology (NIT), or any other recognised Government institution having the requisite technical expertise in the relevant field. The contractor shall submit the duly vetted design documents, technical recommendations and detailed cost assessment to the Engineer-in-Charge for scrutiny and prior written approval before commencement of the relevant execution works.

**iv. Compliance with Sanctioned Amount and Contract Requirements**

The contractor shall ensure that the complete design and execution proposal can be implemented within the sanctioned amount and the financial provisions of the agreement. Necessary design optimization and appropriate selection of equipment and materials shall be undertaken without compromising the stipulated scope of work, treatment capacity, treated water quality, standby provisions, structural safety, durability or functional and performance requirements. No proposal involving expenditure beyond the sanctioned amount shall be implemented without prior approval of the competent authority and compliance with the applicable contractual and financial rules.

**v. Responsibility for Design and Performance**

The contractor shall remain fully responsible for the adequacy, correctness and completeness of all designs, calculations, drawings, equipment selection, structural stability, tank integrity, integration of components, execution, testing, commissioning and satisfactory performance of the complete system. Technical vetting by the recognized institution and approval by the Engineer-in-Charge shall not absolve the contractor of any contractual obligation or responsibility.

**vi. Modifications and Financial Implications**

Any modification to the indicative drawings, layout, treatment process or proposed design shall require prior written approval of the Engineer-in-Charge. Such modifications shall comply with the agreement and shall not compromise the specified performance requirements. No additional payment shall be admissible for design development, optimization or modifications required to meet the contractual requirements. Any additional expenditure or variation shall be considered only if admissible under the agreement, within the sanctioned amount and subject to approval by the competent authority.

**vii. Submission of Documents and Commencement of Work**

The contractor shall submit all necessary design calculations, process drawings, structural drawings, foundation and reinforcement details, tank drawings, truss and fabrication details, equipment specifications, piping layouts and other construction drawings sufficiently in advance. No work relating to the relevant components shall commence until the required documents have been technically vetted and approved in writing by the Engineer-in-Charge. The contractor shall incorporate any observations communicated during scrutiny and submit revised documents wherever required.

**FORM "C"**

## RECEIPT OF DEPOSITION OF ORIGINAL EMD

**(Receipt No…… dated ……)**

1. **Name of Work**: Providing Development and Bulk Services to RTC Peringome. SH: C/o 300 KLD Capacity of Rain Water Harvesting System including Collection sump filtered water distribution lines, UG sump, Sludge Drying bed, and Plant room etc. RTC, Peringome,Kannur, Kerala.
2. NIT No: 23/SE/EE-Knr/2026-27
3. Estimated Cost: **Rs. 2,14,04,864/-**
4. Amount of Earnest Money Deposit: **Rs. 4,28,097/-**
5. Last date of submission of bid: **09.11.2026**

**[To be filled by The EXECUTIVE ENGINEER receiving the EMD]**

1. Name of Contractor:
2. Form of EMD:
3. Amount of EMD:
4. Date of Submission of EMD:

**Signature, Name and Designation of EMD receiving Officer along with Office Stamp**

# CPWD-7

**GOVERNMENTOFINDIA**
**CENTRALPUBLIC WORKSDEPARTMENT**

**Percentage Rate Tender ~~/Item Rate~~Tender & Contract for Works**

(A) Tender for the work of:- "**Providing Development and Bulk Services to RTC Peringome. SH: C/o 300 KLD Capacity of Rain water Harvesting System including Collection sump filtered water distribution lines, UG sump, Sludge Drying bed, and Plant room etc. RTC, Peringome,Kannur, Kerala."**

(i) To be uploaded by **09.11.2026 up to 15.00 Hrs by the Executive Engineer, CPWD, Kannur.**

(ii) To be opened in presence of tenderers who may be present at **15.30 Hrs on 09.11.2026** in the office of **Executive Engineer, CPWD, Kannur**

**TENDER**

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

I/ We hereby tender for the execution of the work specified for the President of India within the time specified in Schedule 'F', viz., schedule of quantities and in accordance in all respects with the specifications, designs, drawings and instructions in writing referred to in Rule-1 of General Rules and Directions and in Clause 11 of the Conditions of contract and with such materials as are provided for, by, and in respects in accordance with, such conditions so far as applicable.

**I/ We agree to keep the tender open for Thirty (30) days from the date of opening of bid**. and not to make any modification in its terms and conditions.

I/We have deposited EMD for the prescribed amount in the office of concerned Executive Engineer as per the bid document.

A copy of earnest money in receipt of prescribed amount deposited in the form of Insurance Surety Bonds, Account Payee Demand Draft, Fixed Deposit Receipt, Banker's Cheque or Bank Guarantee (as prescribed) issued by a Commercial Bank, is scanned and uploaded (strike out as the case may be). If I/We, fail to furnish the prescribed performance guarantee and Additional Performance Guarantee (if applicable) within prescribed period, I/We agree that the said President of India or his successors, in office shall without prejudice to any other right or remedy, be at liberty to forfeit the said earnest money absolutely. Further, if I/We fail to commence work as specified, I/ We agree that President of India or the successors in office shall without prejudice to any other right or remedy available in law, be at liberty to forfeit the said performance guarantee and Additional Performance Guarantee (if applicable) absolutely. The said Performance Guarantee and Additional Performance Guarantee (if applicable) shall be a guarantee to execute all the works referred to in the tender documents upon the terms and conditions contained or referred to those in excess of that limit at the rates to be determined in accordance with the provision contained in Clause 12.2 and 12.3 of the tender form.

Further, I/We agree that in case of forfeiture of Earnest Money or Performance Guarantee and Additional Performance Guarantee (if applicable) as aforesaid, I/We shall be debarred for participation in the re-tendering process of the work.

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

I/We hereby declare that I/We shall treat the tender documents drawings and other records connected with the work as secret/confidential documents and shall not communicate information/derived there from to any person other than a person to whom I/We am/are authorized to communicate the same or use the information in any manner prejudicial to the safety of the State.

**Dated:**

**Witness:**

**Address:**

**Occupation:**

**Signature of Contractor**
**Postal Address**

**ACCEPTANCE**

The above tender (as modified by you as provided in the letters mentioned hereunder) is accepted by me for and on behalf of the President of India for a sum of
Rs……
(Rupees ……)

The letters referred to below shall form part of this contract Agreement: -

(a)
(b)
(c)

For & on behalf of President of India

**Signature……**

**Designation:**
**Executive Engineer,**
**CPWD Kannur**

**Dated:**

## PROFORMAOF SCHEDULES FOR MAJOR COMPONENT (CIVIL)

**SCHEDULE'A'**

| | | |
|---|---|---|
| Schedule of Quantities (Civil) | : | **Pages from 148 to 152** |

**SCHEDULE 'B'**

Schedule of materials to be issued to the contractor.

**SCHEDULE 'D'**

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

| | | |
|---|---|---|
| a. Special Conditions | : | **Pages from 29 to 48** |
| b. Additional Conditions | : | **Pages from 49 to 57** |
| c. Particular specifications | : | **Pages from 58 to 98** |
| d. Guarantee Bonds | : | **Pages No. 104 to 109** |

**SCHEDULE 'E'**

| | |
|---|---|
| Reference to General Conditions of contract | **General Conditions of contract Construction Works 2023as amended/modified up to last date of submission of tender.** |
| Name of Work: | **Providing Development and Bulk Services to RTC Peringome. SH: C/o 300 KLD Capacity of Rain water Harvesting System including Collection sump filtered water distribution lines, UG sump, Sludge Drying bed, and Plant room etc. RTC,Peringome, Kannur, Kerala.** |
| Estimated cost of work: | **Rs. 2,14,04,864 /-**<br>**(Civil – Rs. 1,28,54,942/- + *E&M: Rs.* 85,49,922/-)** |
| (i) Earnest money deposit: | **Rs. 4,28,097/-**<br>**(to be returned after receiving Performance Guarantee and Additional Performance Guarantee (if applicable))** |
| (ii)Performance Guarantee (PG): | **(a) 5%of tendered value or Estimated cost put to tender (ECPT) (whichever is higher)**<br>**(b) Where the tendered amount is less than eighty percent (80%) of the Estimated Cost Put to Tender (ECPT), the Performance Guarantee, in addition to the requirement under (a) above, shall be increased by an amount equal to the difference between eighty percent (80%) of the ECPT and the tendered amount.** |
| (iii) Security Deposit: | **2.5% of tendered value. SD shall be retained till CPWD/ RTC Peringome, Kannur confirms all the reported defects within defect liability period have been rectified and after completion of defect liability / maintenance period of 12 months after completion of work.** |

**SCHEDULE'F'**

**GENERAL RULES& DIRECTIONS:**

| | |
|---|---|
| Officer inviting tender | **Executive Engineer, CPWD, Kannur** |
| Maximum percentage for quantity of items of work to be executed beyond which rates are to be determined in accordance with Clauses 12.2 & 12.3 | **See below** |

**Definitions:**

| | | |
|---|---|---|
| 2(vi) | Engineer-in-Charge: | **Executive Engineer, CPWD, Kannur or his successor thereof** |
| 2(viii) | Accepting Authority: | **Superintending Engineer, CPWD, Calicut or his successor thereof** |
| 2(x) | Percentage on cost of materials and Labour to cover all overhead sand profits: | **15%(7.5% for Profits + 7.5% for overheads)** |
| 2(x)(a) | Standard Schedule of Rates: | **DSR 2023 as amended/ modified up to last date of submission of e-tender and Market Rates.** |
| 2(xi) | Department: | **Central Public Works Department** |
| 9(ii) | Standard CPWD Contract Form: | **General Conditions of contract Construction Works 2023& CPWD - 7 as amended/ modified up to last date of submission of e-tender** |

**Clause1**

| | | |
|---|---|---|
| (i) | Time allowed for submission of Performance Guarantee, Additional Performance Guarantee (if applicable), Programme Chart (Time and progress) and applicable labour licenses, registration with EPFO, ESIC and BOCW welfare board or proof of applying thereof from the date of issue of letter of acceptance | **7days** |
| (ii) | Maximum allowable extension with late fee @ 0.1% per day of Performance Guarantee plus Additional Performance Guarantee (if applicable) amount beyond the period provided in (i) above | **3days** |

**Clause2**

| | |
|---|---|
| Authority for fixing compensation under clause 2: | **Superintending Engineer, CPWD, Calicut or his successor thereof** |

**Clause5**

| | |
|---|---|
| Number of days from the date of issue of letter of acceptance for reckoning date of start of Mile stone(s) as per table given below: - | **10 days** |

**MILESTONE FOR CIVILCOMPONENT AS PER TABLE GIVEN BELOW**

| Sl. No. | Description of Milestone (From date of start) | Time Allowed | Amount to be withheld in case of non-achievement of milestone |
|---|---|---|---|
| 1 | Submission of complete design and execution proposal of rain water harvesting system, detailed scheme Architectural drawings and proof checked structural drawings, MEP design, submission of drawing to local body approval. | 01 month | 0.50% of tendered amount |
| 2 | Earth Work execution , PCC & Foundation (Bed Concrete) | 02 months | 0.50% of tendered amount |
| 3 | All RCC Work of tanks | 03 months | 1.00% of tendered amount |
| 4 | All Fabrication work including Sheet roofing. | 04 months | 1.00% of tendered amount |

| | | | |
|---|---|---|---|
| 5 | All finishing works including flooring, plastering, painting, water supply lines, & filter media & Fencing | 05 months | 1.00% of tendered amount |
| 6 | Testing, Commissioning | 06 months | 1.00% of tendered amount |

| | |
|---|---|
| Time allowed for execution of work: | **06 (Six) Months** |

**Authority to decide:**

| | | |
|---|---|---|
| (i) | to convey the decision of Extension of time & Rescheduling of milestones | **Executive Engineer, CPWD, Kannur or his successor thereof** |
| (ii) | Rescheduling of milestones & shifting of date of start for delay in site handing over | **Superintending Engineer, CPWD, Calicut or his successor thereof** |

**PROFORMA OF SCHEDULES Clause 5 - Schedule of handing over of site:**

| Part | Portion of site | Description | Time Period for handing over reckoned from date of issue of letter of intent. |
|---|---|---|---|
| Part A | Portion without any hindrance | **Entire Site** | **7 Days** |
| Part B | Portions with encumbrances | | |
| Part C | Portions dependent on work of other agencies | | |

Note : The Contractor shall, upon receipt of each part/portion of drawings as per the above schedule, immediately scrutinize the same and shall communicate in writing any clarification required, discrepancy, ambiguity, omission, or conflict noticed therein within seven (7) calendar days from the date of issue of the respective drawing.

**Clause 5.2**

| | |
|---|---|
| Documentation of Hindrances | **1.** The contractor has to first register himself through a registration form, available on CPWD website under 'Contractors Login' tab.After registration, User ID and password will be automatically generated and sent on his registered mobile and email ID. Using this User ID and Password he can access the module and view all the works which are being carried out by him in CPWD and he can register the hindrance against any particular work. After recording the hindrance by the contractor, it will be visible to all concerned officers (JE and above) of that work. An alert through text message and email will be sent to EE.<br>**2.** Executive Engineer will first assign the work to the JEs/AEs who will give their comments on the hindrance within 2 days. After that Executive Engineer of the work will have to take appropriate action on the hindrance within 2 days. The comments of JEs/AEs will not be visible to contractor, only the decision of the Executive Engineer on the hindrance will be visible to contractor under "Decision of the Engineer-in-charge." |

| | |
|---|---|
| **Clause 5.4**<br>Recovery per day for delay in submission of revised programme | **Rs. 2,000/- per each day** |

**Clause 6**

| | |
|---|---|
| Computerized Measure Book (CMB) / Electronic Measurement Book (EMB)<br>Mode of measurement: | **EMB**<br>**(If any technical problem in EMB then Engineer-in-charge can allow CMB)** |

**Clause 7**

| | |
|---|---|
| Gross work to be done together with net Payment/adjustment of advances for material collected, if any since the last such payment for being eligible to interim payment | **Rs. 21 Lakhs** |

**Clause 7A**

| | |
|---|---|
| Whether clause 7A shall be applicable | **Yes** |

**Clause 7B**

| | |
|---|---|
| Whether clause 7B shall be applicable | **Yes** |

**Clause 8**

| | |
|---|---|
| Compensation for non-submission of completion plans: | **Rs.1,00,000/-** |
| Authority to decide compensation for non-submission of completion plans: | **Superintending Engineer, CPWD, Calicut or his successor thereof** |

**Clause 8A**

| | |
|---|---|
| Contractor to keep site clean | **Applicable** |

**Clause10A**

| | |
|---|---|
| List of testing equipment to be provided by the contractor at site lab | **As per Page No.100 to 101** |

**Clause 10B(i), 10B(ii)**

| | |
|---|---|
| Whether Clause 10B(i)shall be applicable: | **Applicable** |
| Whether Clause 10 B (ii) shall be applicable: | **Not Applicable** |

| | |
|---|---|
| **Clause10C** | **Applicable** |
| Component of Labour expressed as percent of Total value of work | **25 %** |

| | |
|---|---|
| **Clause10CC** | **Not Applicable** |

**Clause11**

| | |
|---|---|
| Specifications to be followed for the execution of work: | **CPWD Specifications 2019Vol. - I & II as modified & corrected upto last date of submission of tender.** |

**Clause 12 -** Type of work : **Construction Work**

| | | |
|---|---|---|
| Clause 12.2, 12.3 | Deviation limit beyond which clause 12.2 & 12.3 shall apply for all items. | **100% (Hundred percent)** |
| Clause 12.4 | Cost index : Latest available cost index at the time of beginning of execution of extra item and deviation shall be used in sub-clauses 12.2(a),12.2(b) and 12.2 (c) for calculation of rates of extra items. | |
| Clause 12.5 | Labour Rates : Labour Rates will be based on latest available circular issued by central govt. or state govt. whichever are higher applicable for the work. | |

**Note**: The rates so determined under clause 12 by the Engineer in Charge shall be final and binding on the contractor and shall not be arbitrable.

**Clause16**

| | |
|---|---|
| Competent authority for deciding the reduced rates | **Superintending Engineer, CPWD, Calicut or his successor thereof** |

**Clause17**

| | |
|---|---|
| Contractor Liable for Damages, defects during defect liability Period | **The defect liability / maintenance period shall be 12 months after the date of completion of work for this contract agreement.** |

**Clause18**

| | |
|---|---|
| List of mandatory machinery, tools & plants to be deployed by the contractor at site:- | **As required at site and as decided by the E-in Charge** |

**Clause19**

| | | |
|---|---|---|
| **Clause 19 C** | Rs. 500/- for each default | **Authority to decide penalty for each default -Engineer in charge** |
| **Clause 19 D** | Rs. 500/- for each default | |
| **Clause 19 G** | Rs. 500/- for each default | |
| **Clause 19 K** | Rs. 1000/- per tradesman per day | |

**Clause 25**

| | |
|---|---|
| Conciliator: | **ADG Kochi, CPWD or his successor thereof** |
| Arbitrator Appointing Authority: | **Superintending Engineer, CPWD, Calicut or his successor thereof** |
| Place of Arbitration | **Kannur or as decided by the Arbitrator in consultation with both the parties** |

**Clause32:** *Requirement of Technical Representative (s) and recovery rate*

| **Sl. No.** | **Requirement of Technical Staff** | | **Minimum experience (Years)** | **Designation of technical staff** | **Rate at which recovery shall be made from the contractor in the event of not fulfilling** |
|---|---|---|---|---|---|
| | **Qualification** | **Number (Of Major/ Minor Component)** | | | |
| 1 | Graduate Engineer Or Diploma Engineer | **1+1** | 2 or 5 respectively | Project Manager cum Planning / quality /site/ billing Engineer | Rs. 15,000/- per month per person. |

Assistant Engineers retired from government service who are holding Diploma will be treated at par with graduate engineers.
Diploma holder with minimum 10-year relevant experience with a reputed construction co. can be treated at par with Graduate Engineers for the purpose of such deployment subject to the condition that such diploma holders should not exceed 50% of requirement of degree engineers.

**Clause38**

| | | |
|---|---|---|
| (i)(a) | Schedule/statement for determining theoretical quantity of cement & bitumen on the basis of Delhi Schedule of Rates ..... printed by C.P.W.D. | **On the basis of Delhi Schedule of Rates 2023 printed by C.P.W.D.** |

(ii) Variations permissible on theoretical Quantities:

| | | |
|---|---|---|
| (a) | Cement | |
| | For works with estimated cost put to tender more than Rs.25 lakh. | **2% plus/minus.** |
| (b) | Bitumen All Works | **2.5%plus &only nil on minus side.** |
| (c) | Steel Reinforcement and structural steel sections for each diameter, section and category | **2%plus/minus** |
| (d) | All other materials. | **Nil** |

**Executive Engineer,**
**CPWD, Kannur**

**FORM OF BANK GUARANTEE FOR EARNEST MONEY DEPOSIT/ PERFORMANCE GUARANTEE/ADDITIONAL PERFORMANCE GUARANTEE/SECURITY DEPOSIT/ MOBILISATION ADVANCE**

*(On non-judicial stamp paper of minimum Rs. 100)*

1. Whereas the Executive Engineer- CPWD, Kannur-670 001, on behalf of the President of India (hereinafter called "The Government") has invited bids under NIT No.23/SE/EE-Knr/2026-27 dated 30.10.2026 for "**Providing Development and Bulk Services to RTC Peringome. SH: C/o 300 KLD Capacity of Rain Water Harvesting System including Collection sump filtered water distribution lines,UG sump, Sludge Drying bed, and Plant room etc. RTC,Peringome,Kannur**, Kerala**.**" The Government has further agreed to accept irrevocable Bank Guarantee for Rs ..... (Rupees ..... Only) valid upto ..... (date)* ..... as Earnest Money Deposit from ..... (name and address of contractor) ..... (hereinafter called "the Contractor") drawn in favour of The Executive Engineer - CPWD, Kannur , CPWD for compliance of his obligations in accordance with the terms and conditions of the said NIT.

**OR ****

2. Whereas the Executive Engineer, CPWD, Kannur - 670 001, on behalf of the President of India (hereinafter called "The Government") has entered into an agreement bearing number ..... with ..... (name and address of contractor) ..... (hereinafter called "the Contractor") for execution of the work "**Providing Development and Bulk Services to RTC Peringome. SH: C/o 300 KLD Capacity of Rain water Harvesting System including Collection sump filtered water distribution lines,UG sump, Sludge Drying bed, and Plant room etc. RTC,Peringome,Kannur**, Kerala. The Government has further agreed to accept irrevocable Bank Guarantee for Rs ..... (Rupees ..... Only) valid upto ..... (date)* ..... as Performance Guarantee/Additional Performance Guarantee (if applicable)/ Security Deposit/ Mobilisation Advance from the said contractor drawn in favour of The Executive Engineer - CPWD , Kannur, CPWD for compliance of his obligations in accordance with the terms and conditions of the agreement.

3. We ..... (indicate the name of the bank) ....., (hereinafter referred to as "the Bank") hereby undertake to pay to the Government an amount not exceeding Rs ..... (Rupees ..... only) on demand by the Government within 10 days of demand.

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

5. We, ..... (Indicate the name of the Bank) ....., further undertake to pay the Government any money so demanded no withstanding any dispute or disputes raised by the Contractor in any suit or proceeding pending before any Court or Tribunal, our liability under this Bank Guarantee being absolute and unequivocal. The payment so made by us under this Bank Guarantee shall be a valid discharge of our liability for payment there under and the Contractor shall have no claim against us for making such payment.

6. We, ..... (Indicate the name of the Bank) ....., further agree that the Government shall have the fullest liberty without our consent and without affecting in any manner our obligation hereunder to vary any of the terms and conditions of the said agreement or to extent time of performance by the said Contractor from time to time or to postpone for any time or from time to time any the powers exercisable by the Government against the said Contractor and to forbear or enforce any of the terms and conditions relating to the said agreement and we shall not be relieved from our liability by reason of any such variation or extension being granted to the said Contractor or for any forbearance, act of omission on the part of the Government or any indulgence by the Government to the said Contractor or by any such matter or thing whatsoever

which under the law relating to sureties would, but for this provision, have effect of so relieving us.

7. We, ..... (Indicate the name of the Bank) ..... further agree that the Government at its option shall be entitled to enforce this Guarantee against the Bank as a principle debtor at the first instance without proceeding against the contractor and not withstanding any security or other guarantee the Government may have in relation to the Contractors liabilities.
8. This guarantee will not be discharged due to change in constitution of the Bank or the Contractor.
9. We, ..... (Indicate the name of the Bank) ..... undertake not to revoke this Guarantee except with the previous consent of the Government in writing.
10. This Bank guarantee shall be valid up to ..... unless extended on demand by the Government. Notwithstanding anything mentioned above, our liability against this guarantee is restricted to Rs ..... (Rupees ..... only) and unless a claim in writing is lodged with us within the date of expiry or the extended date of expiry of this guarantee, all our liabilities under this guarantee shall stand discharged.

Date .....

Witnesses:

1. Signature .....
   Name and address

2. Signature .....
   Name and address

Authorised signatory
Name
Designation
Staff code no.
Bank seal

* Date to be worked out on the basis of validity period of 90 days where only financial bids are invited and 180 days for two/ three bid system from the date of submission of tender.

** In paragraph 1, strike out the portion not applicable. Bank Guarantee will be made either for earnest money or for performance guarantee/Additional Performance Guarantee (if applicable)/ security deposit/ mobilization advance, as the case may be.

# PART – B
## FOR CIVIL WORKS
## (MAJOR COMPONENTS)

| | |
|---|---|
| ***Name of Work :*** | ***Providing Development and Bulk Services to RTC Peringome. SH : C/o 300 KLD Capacity of Water Harvesting System including Collection sump filtered water distribution lines,UG sump, Sludge Drying bed, and Plant room etc. RTC,Peringome,Kannur, Kerala.*** |

# SPECIAL CONDITIONS FOR CIVIL WORKS

## 1.0 General

1.1 **Specifications & Order of preference**:

1.1.1 Except for the items, for which Particular Specifications are given or where it is specifically mentioned otherwise in the description of the items in the schedule of quantities, the work shall generally be carried out in accordance with the "CPWD Specifications 2019 Vol. I & II" with up-to-date correction slips, additional / Particular Specifications, Architectural / structural drawings and as per instructions of Engineer-in-Charge.

1.1.2 The several documents forming the tender are to be taken as mutually complementary to one another. Detailed drawings shall be followed in preference to small scale drawings and figured dimensions in preference to scaled dimensions.

1.1.3 If there is any difference or discrepancy between the description of items as given in the schedule of quantities, particular specifications for individual items of work (including special conditions) and I.S. Codes etc., the following order of preference shall be observed

**(i) Description of items as given in Schedule of Quantities.**

**(ii) Particular Specifications, Special Conditions and Additional conditions, if any.**

**(iii) Drawings.**

**(iv) CPWD Specifications.**

**(v) General conditions of contract for CPWD works.**

**(vi) Indian Standard Specifications of B.I.S.**

**(vii) Manufacturers' specifications & as decided by Engineer-in-charge.**

**(viii) Sound Engineering practices.**

"In the event of any variation/ discrepancy in the drawings, specifications and tender documents etc. the decision of the Engineer-in-charge shall be final binding and conclusive on the contractor and in the case the contractor have any doubt and the same should be got clarified immediately from the Engineer-in-charge and no claim of the contractor shall be entertained thereafter. Moreover, the agency is not allowed to take benefit out of any clerical/ grammatical mistake in the standard clauses/Schedule of Quantities/Specifications etc. being used in the agreement".

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

**1.2 Scope:**

1.2.1 The works to be governed by this contract shall cover delivery and transportation up to destination, safe custody at site, insurance, erection, testing and commissioning of the entire works.

1.2.2 The works to be under taken by the contractor shall inter alia include the following at Contractors own cost:

i. Preparation of detailed SHOP drawings and AS BUILT drawings wherever applicable.
ii. Obtaining of Statutory permissions wherever applicable and required.
iii. Pre-commissioning tests as per relevant standard specifications, code of practice, Acts and Rules wherever required.
iv. Warranty obligation for the equipment and/or fittings/fixtures/materials supplied by the contractor.

1.2.3 Contractor shall provide all the shop drawings or layout drawings at his own cost for all the coordinated services before starting any work or placing any order for any of the services etc. These shop drawings/layout drawings shall be got approved from Engineer-in-charge before implementation and this shall be binding on the contractor. The contractor shall submit material submittals along with material sample for approval of Engineer-in-charge prior to delivery of material at site.

1.2.4 All the hidden items such as water supply lines, drainage pipes, conduits, sewers etc. are to be properly tested as per the design conditions before covering and their measurements in computerized measurement book duly test checked shall be deposited with Engineer in charge or his authorized representative, prior to hiding these items.

**1.3 Deployment of Technical staff & skilled labour:**

1.3.1 The quality of work is of paramount importance. Contractor shall have to engage well experienced skilled labour and deploy modern T&P and other equipment to execute the work to provide the desired quality.

The Contractor shall depute Site Engineer & skilled workers as required for the work. He shall submit organization chart along with details of Engineers and supervisory staff. It shall be ensured that all decision-making powers shall be available to the representatives of the contractor at site itself to avoid any likely delays on this account. The contractor shall also furnish list of persons for specialized works to be executed for various items of work. The Contractor shall identify and deploy key persons having qualifications and experience in the similar and other major works, as per the field of their expertise. If during the course of execution of work, the Engineer-in-Charge is of the opinion that the deployed staff is not sufficient or not well experienced; the Contractor shall deploy more staff or better-experienced staff at site to complete the work with quality and in stipulated time limit.

**1.4 Removal of Machinery, Tools & Equipment:**

1.4.1 Removal of machinery, tools & equipment shall be allowed to be moved away from the site only when, in written opinion of Engineer-in-Charge, the same are no longer required at site of work.

**1.5 Site condition**:

1.5.1 The tenderer shall acquaint himself with the site of work and see the approaches to the site. The soil investigation report will be available with Executive Engineer, Kannur. In case any approach from main road is required at site or existing approach is to be improved and maintained for cartage of materials by the contractor, the same shall be provided, improved and maintained by the contractor at his own cost.

**1.6 Precautionary measures:**

1.6.1 Temporary barricading shall be provided at Site by the contractor at their own cost. The barricading physically define the boundaries of the plot for restricted entry to only those involved in the work and also to prevent any accident and also not causing any inconvenience to the traffic. The barricading panels shall be painted and "CPWD" mark should be made in suitable size, shapes and number as directed by Engineer-in-charge without any extra cost. It shall be dismantled and taken away by the contractor after completion of the work at his own cost with the permission of Engineer-in-charge.

1.6.2 Contractor shall take all precautionary measures to avoid any damage to adjoining property. All necessary arrangement shall be made at his own cost. The contractor shall take all precautions to prevent his workmen and employees from removing and damaging any Flora (plant/vegetation) from the campus/site.

1.6.3 The contractor shall take all precautions to avoid accidents by exhibiting necessary caution boards day and night, speed limit boards, red flags, red lights and providing

barriers. He shall be responsible for all damages and accidents caused to work due to negligence on his part. No hindrances shall be caused to traffic, during the execution of the work. In case of any accident of the labourers/ contractual staff, the entire responsibility will rest on the contractor and any compensation under such circumstances, if becomes payable, shall be entirely borne by the contractor.

1.6.4 The contractor, his authorized representative, workmen etc. shall strictly observe orders pertaining to fire precautions prevailing in the area.

1.6.5 The Contractor shall take all necessary precautions to prevent any nuisance or inconvenience to the owners, tenants or occupants of the adjacent properties and to the public in general. The Contractor shall take all care, as not to damage any other adjacent property or other services running adjacent to the plot. If any damage is done, the same shall be made good by the Contractor at his own cost and to the entire satisfaction of the Engineer-in-Charge. The Contractor shall use such methodology and equipments for execution of the work, so as to cause minimum environmental pollution of any kind during construction, to have minimum construction time and minimum inconvenience to road users and to the occupants of the buildings on the adjacent plot and public in general, etc. He shall make good at his own cost and to the entire satisfaction of the Engineer in Charge any damage to roads, paths, cross drainage works or public or private property whatsoever caused, due to the execution of the work or by traffic brought thereon, by the Contractor. Further, the Contractor shall take all precautions to prevent any pollution of streams and waterways. All waste or superfluous materials shall be carted away by the Contractor, entirely to the satisfaction of the Engineer-in-Charge. Utmost care shall be taken to keep the noise level to the barest minimum so that no disturbance as far as possible is caused to the occupants / users of adjoining buildings. No claim what so ever on account of site constraints mentioned above or any other site constraints not specifically stated here, shall be entertained from the Contractor. Therefore, the Contractors are advised to visit site and get firsthand information of site constraints. Accordingly, they should quote their tenders. Nothing extra shall be payable on this account.

**1.7 General cleanliness of the site and Stacking & Storage of Materials:**

1.7.1 The site of work shall be always kept clean in general strictly adhering to approved job layout and green building parameters. The Contractor shall take all care to prevent any water- logging at site. The waste water shall not be allowed to be collected at site. It may be directly pumped into the public drainage system with prior approval of the concerned authorities. For discharge into public drainage system, necessary permission shall be obtained from concerned authorities after paying the necessary charges, if any, directly to the authorities. The work shall be carried out in such a way that the area is kept clean and tidy. All the fees/charges in this regard shall be borne by the Contractor. Nothing extra shall be payable on this account.

1.7.2 The contractor shall take instructions from the Engineer-in-Charge regarding collection and stacking of materials at any place. No excavated earth or building rubbish shall be stacked on areas where other buildings, roads, compound wall, services etc. are to be constructed.

1.7.3 For construction works which are likely to generate malba / rubbish, contractor shall dispose of malba, rubbish & other unserviceable materials and wastes at his own cost to the notified/specified dumping ground and under no circumstances these shall be stacked / dumped even temporarily, outside the construction premises.

1.7.4 The contractor shall construct suitable godowns, yard at the site of work for storing all other materials so as to be safe against damage by sun, rain, damages, fire, theft etc. at his own cost and also employ necessary watch and ward establishment for the purpose at his cost.

**1.8 Lab Equipment:**

The contractor shall provide at his own cost suitable weighing, surveying and levelling and measuring arrangements as may be necessary at site for checking. All such equipment shall be got calibrated in advance from laboratory, approved by the Engineer-in-Charge. Nothing extra shall be payable on this account. A site laboratory with the minimum equipment as specified in NIT shall be established, made functional and maintained within 21 days from the award of the work without any extra cost to the department.

**1.9 Setting Out**

1.9.1 The contractor shall establish, maintain and assume responsibility for grades, lines, levels and bench marks. He shall report any errors or inconsistencies regarding grades, lines, levels, dimensions to the Engineer-in-Charge before commencing work. Commencement of work shall be regarded as the contractor's acceptance of such grades, lines, levels and dimensions and no claim shall be entertained at a later date for any errors found.

1.9.2 In order to set the alignment of buildings / foundations and to mark the same on the ground, the agency is to adopt "total station" surveying method. The agency is to engage a well versed and well experienced surveyor in "total station" survey. Nothing extra for this total station survey is payable.

If at any time, any error in the respect of setting out appears during the progress of the work, the contractor shall, at his own expense rectify such error if so required, to the satisfaction of the Engineer-in-Charge.

(i) The contractor shall ascertain himself and confirm the site levels with respect to GTS bench mark from the concerned authorities. The contractor shall protect and maintain temporary/ permanent benchmarks at the site of work throughout the execution of the work. These bench marks shall be got checked by the Engineer-in-Charge or his authorized representatives. The work at different stages shall be checked with reference to bench marks maintained for the said purpose. Nothing extra shall be payable on this account.

(ii)The approval by the Engineer-in-Charge, of the setting out by the contractor, shall not relieve the contractor of any of his responsibilities and obligation to rectify the errors/defects, if any, which may be found at any stage during the progress of the work or after the completion of the work.

1.9.3 The contractor shall be entirely and exclusively responsible for the horizontal, vertical and other alignments, the level and correctness of every part of the work and shall rectify effectively any errors or imperfections therein. Such rectifications shall be carried out by the contractor at his own cost to the instructions and satisfaction of the Engineer-in-Charge.

1.9.4 The Contractor shall carry out survey of the work area, at his own cost, setting out the layout of building in consultation with the Engineer-in-Charge & proceed further. Any discrepancy between the architectural drawings and actual layout at site shall be brought to the notice of the Engineer-in-charge. It shall be responsibility of the Contractor to ensure correct setting out of alignment. Total station survey instruments only shall be used for layout, fixing boundaries, and center lines, etc., along with the theodolites. Nothing extra shall be payable on this account.

1.9.5 Contractor shall provide permanent bench marks, flag tops and other reference points for the proper execution of work and these shall be preserved till the end of work. All such reference points shall be in relation to the levels and locations, given in the Architectural and plumbing drawings.

**1.10 Temporary Water, Electricity & Telephone Connections:**

1.10.1 The contractor shall make his own arrangements for water including boring of tube wells etc. if necessary and for electricity by obtaining electric connections and by providing diesel generators of adequate capacity if required and make necessary

payments directly to the State Govt. departments concerned. Necessary approval shall be taken by the contractor from the ground water department for boring of tube wells. Nothing extra shall be paid on these accounts. Contractor shall get the water tested from laboratory approved by the Engineer-in-charge at regular interval as per the CPWD Specifications 2019. All expenses towards collection of samples, packing, transportation and testing charges etc. shall be borne by the contractor. The contractor shall obtain environmental and pollution clearance for the diesel generators. Nothing extra shall be paid on this account.

1.10.2 The Contractor shall arrange electricity at his own cost for testing of the various electrical installations as directed by Engineer-in-Charge and for the consumption by the contractor for executing the work. Also all the water required for testing various electrical installations, fire pumps, wet riser / firefighting equipment, fire sprinklers etc. and also testing water supply, sanitary and drainage lines, water proofing of underground sump, overhead tanks, water proofing treatment etc. shall be arranged by the contractor at his own cost. Nothing extra shall be payable on this account.

1.10.3 Arrangement of temporary telephone connection, water and electricity required by Contractor, shall be made by him at his own cost and also necessary permissions shall be obtained by him directly from concerned authorities, under intimation to the Department. Also, all initial cost and running charges, and security deposit, if any, in this regard shall be borne by him. The Contractor shall abide by all the rules/ bye laws applicable in this regard and he shall be solely responsible for any penalty on account of violation of any of the rules / byelaws in this regard. Nothing extra shall be payable on this account.

1.10.4 The Contractor shall be responsible for maintenance and watch and ward of the complete installation and water / electricity meter and shall also be responsible for any pilferage, theft, damage, penalty etc. in this regard. The Contractor shall indemnify the Department against any claim arising out of pilferage, theft, damage, penalty etc. whatsoever on this account. Security deposit for the work shall be released only after **No Dues Certificates** are obtained from the local Authorities from whom temporary electric/ water / telephone connection have been obtained by the Contractor. Nothing extra shall be payable on this account.

1.10.5 The Department shall in no way be responsible for either any delay in getting electric and/or water and/or telephone connections for carrying out the work or not getting connections at all. No claim of delay or any other kind, whatsoever, on this account shall be entertained from the Contractor. Also contingency arrangement of stand-by water & electrical supply shall be made by the Contractor commencement and smooth progress of the work so that work does not suffer on account of power failure or disconnection or not getting connection at all. No claim of any kind whatsoever shall be entertained on this account from the Contractor. Nothing extra shall be payable on this account.

**1.11 Architectural and structural Drawings:**

1.11.1 The Indicative Tender Drawings are uploaded along with tender document and also made available in the office of Executive Engineer, CPWD, Kannur.

1.11.2 The work shall be carried out in accordance with the Architectural drawings and Structural drawings submitted by the agency and approved by the engineer in charge. Before commencement of any item of work, the contractor shall correlate all the relevant architectural and structural drawings for the work, nomenclature of items, specifications etc. and satisfy himself that the information available there from is complete and unambiguous. The figures & the written dimensions of the drawing shall supersede the measurement by scale. The discrepancy, if any, shall be brought to the notice of the Engineer-in-Charge for immediate decision before execution of the work. The contractor alone shall be responsible for any loss or damage occurring by the commencement of work on the basis of any erroneous and/ or incomplete information and no claim, whatsoever shall be entertained on this account. The delay caused on account of non-timely action by the contractor in resolution of the differences whatsoever shall not be considered as valid ground for extension of time unless otherwise accepted by Engineer-In-Charge.

1.11.3. The information and site data shown in the drawings and mentioned herein and also elsewhere in the tender documents are being furnished for general information and guidance only. The department shall not bear responsibility for lack of such knowledge and also the consequences thereof. The Engineer-in-charge in no case shall be held responsible for the accuracy thereof or any interpretation/ or conclusions drawn there from by the contractor.

1.12 **Scaffolding &Staging:**

1.12.1 Wherever required for the execution of work, all the scaffolding shall be provided and suitably fixed, by the contractor. The scaffolding shall be provided strictly with steel double scaffolding system, suitably braced for stability, with all the accessories, gangways, etc. with adjustable suitable working platforms to access the areas with ease for working and inspection. Single scaffolding system is strictly prohibited and shall invite necessary action. It shall be designed to take all incidental loads. It should cater to the safety features for workmen. Nothing extra shall be payable on this account. It shall be ensured that no damage is caused to any structure due to the scaffolding.

1.12.2 The contractor should submit the shop drawings of staging and shuttering for approval of Engineer-in-Charge before actually commencing the execution of work under the item. Nothing extra shall be payable on this account.

**1.13 Co-ordination with other agencies:**

1.13.1 The Contractor shall conduct his work so as not to interfere with or hinder the progress of the work being performed by other Contractors or by the Engineer-in-Charge. As far as possible, he shall arrange his work and place, so as not to interfere with the operations of other Contractors or shall arrange his work with that of the others, in an acceptable and coordinated manner and shall perform it in proper sequence.

1.13.2 Other agencies may also simultaneously execute and install the works and the contractor shall afford necessary facilities for the same. The contractor shall leave such recesses, holes, openings, trenches etc. as may be required for such related works (for which inserts, sleeves, brackets, conduits, base plates, clamps etc. shall be available as specified elsewhere in the contract) and the contractor shall fix the same at the time of casting of concrete, stone work and brick work, if required, and nothing extra shall be payable on this account.

1.13.3 The Contractor shall cooperate with and provide the facilities to the associate-Contractors and other agencies working at site for smooth execution of the work. The Contractor shall –

(i) Allow use of scaffolding already erected, toilets, sheds etc.

(ii) Properly co-ordinate their work with the work of other Contractors.

(iii) Provide control lines and benchmarks to his associate-Contractors and the other Contractors.

(iv) Provide electricity and water at mutually agreed rates.

(v) Provide hoist and crane facilities for lifting material at mutually agreed rates.

(vi) Co-ordinate with other Contractors for leaving inserts, making chases, alignment of services etc. at site.

(vii) Adjust work schedule and site activities in consultation with the Engineer-in-Charge and other Contractors to suit the overall schedule completion.

(viii) Resolve the disputes with other Contractor amicably and the Engineer-in-Charge shall not be made intermediary or arbitrator. The department shall not be responsible for the disputes between the subject work contractor and associate contractor / other agencies working at site. No claim shall be allowed by the department.

1.14 **Procurement of materials:**

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

1.14.2 The contractor shall procure the required materials in advance so that there is sufficient time for testing of the materials and approval of the same before use in the work.

1.15 **Protection of Existing Services & buildings and Materials:**

1.15.1 Existing drains, pipes, cables, over-head wires, sewer lines, water lines and similar services encountered in the course of the execution of work shall be protected against the damage by the contractor at his own expense. The contractor shall not store materials or otherwise occupy any part of the site in a manner likely to hinder the operation of such services. In case temporary supporting of such services is required to facilitate the work, the same shall be done by the contractor at no extra cost.

1.15.2 In case the existing services are to be shifted permanently, then before dismantling the existing services, alternate/diversion of service lines has to be laid by the contractor so that there is no interruption in use of existing services. The contractor has to plan the alternate suitable route for diversion/shifting of service lines and get the same approved from the Engineer-in-Charge before starting shifting of services. Nothing extra shall be paid except the payment of dismantling and laying of new service lines as per conditions of contract.

1.15.3 All fossils, coins, articles of value of antiquity, structures and other remains or things of geological or archaeological interest discovered on project location during excavation/construction shall be the property of the Government, and shall be dealt with as per provisions of the relevant legislation. The contractor will take reasonable precaution to prevent his workmen or any other persons from removing and damaging any such article or thing. He will, immediately upon discovery thereof and before removal acquaint the Engineer-in-charge of such discovery and carry out the official instructions of Engineer-in-charge for dealing with the same, till then all work shall be carried out in a way so as not to disturb/ damage such article or thing.

1.15.4 The contractor shall be responsible for the watch and ward / guard of the buildings, safety of all fittings and fixtures including sanitary and water supply fittings and fixtures provided by him against pilferage and breakage during the period of installations and thereafter till the building is physically handed over to the client department. No extra payment shall be made on this account.

1.15.5 The contractor shall be fully responsible for the safe custody of materials brought by him/ issued to him even though the materials may be under double lock key system.

**1.16 Rates and other conditions for payment:**

The rates quoted by the Contractor are deemed to be inclusive of the following-

1.16.1 Site clearance, setting out work, profile, establishment of reference bench mark(s), taking spot levels, construction of all safety and protection devices, barriers, barricading, signage, labour safety, welfare & training measures, preparatory works, working during monsoon, working at all depths, height, lead, lift and location etc. until / unless specified otherwise, implementation of green building norms to achieve desired GRIHA ( 3 star) Rating etc. and any other incidental works required to complete this work. Nothing extra shall be payable on this account. Payment for centering & shuttering, however, if required to be done for floor heights greater than 3.50m shall be admissible at rates arrived in accordance with clause 12 of the agreement if not already specified.

1.16.2 For works below ground level the contractor shall keep that area free from water. If dewatering or bailing out of water is required the contractor shall do it and nothing extra shall be paid except otherwise provided in the items of schedule of quantities.

1.16.3 Any legal or financial implications resulting out of disposal of earth shall be sole responsibility of the contractor. Nothing extra over the schedule shall be paid on this account.

1.16.4 All labour, material, tools and plants and other inputs involved in the execution of the item.

1.16.5 Providing sunk flooring in bath-rooms, kitchen, etc.

1.16.6 Performance test of the entire installation(s) before the work is finally accepted.

1.16.7 Any cement slurry added over base surface (or) for continuation of concreting for better bond is deemed to have been built in the items.

1.16.8 The rates quoted by the tenderer, shall be inclusive of all taxes including GST and levies applicable in respect of this contract shall be payable by the contractor and Government will not entertain any claim whatsoever in respect of the same.

1.16.9 For completing the work in time, the Contractor might be required to work in two or more shifts (including night shifts). No claim whatsoever shall be entertained on this account, not with-standing the fact that the Contractor may have to pay extra amounts for any reason, to the labourers and other staff engaged directly or indirectly on the work according to the provisions of the labour and other statutory bodies regulations and the agreement entered upon by the Contractor with them.

1.16.10 The Contractor shall keep himself fully informed of all acts and laws of the Central & State Governments, all orders, decrees of statutory bodies, tribunals having any jurisdiction or authority, which in any manner may affect those engaged or employed and anything related to carrying out the work. All the rules & regulations and bye-laws laid down by Collector / MC etc. and any other statutory bodies shall be adhered to, by the contractor, during the execution of work. The Contractor shall also adhere to all traffic restrictions notified by the local authorities. It is clarified that the extra sewerage charges (one time charges for commencement of work) required to be paid to the Municipal Corporation / other statutory bodies shall be paid by the department and need not be considered by the contractor. The water charges (for municipal water connection as well as tanker water) shall be borne by the contractor. Also, if the contractor obtains water connection for the drinking purposes from the municipal authorities or any other statutory body, the consequent sewerage charges shall be borne by the contractor. All statutory taxes, levies, charges (including GST, water and sewerage charges, charges for temporary service connections and / or any other charges) payable to such authorities for carrying out the work, shall be borne by the Contractor. The Contractor shall arrange to give all notices as required by any statutory / regulatory authority and obtain all requisite licenses wherever required and shall pay to such authority all the fees that are required to be paid for the execution of work. He shall protect and indemnify the Department and its officials & employees against any claim and /or liability arising out of violations of any such laws, ordinances, orders, decrees, by himself or by his employees or his authorized representatives. Nothing extra shall be payable on these accounts. The fee payable to statutory authorities for obtaining the various permanent service connections and Occupancy Certificate for the building shall be borne by the Department.

1.16.11 **Royalty**/Seignior age fee at the prevalent rates if any shall have to be paid by the contractor and no claims shall be entertained on account of this on all the boulders, stone aggregate, brick aggregate, shingle, coarse or fine sand, earth, gravel, bajri or any other material etc. collected by him for the execution of the work, directly to the Revenue Authority or authorized agent of the State Government concerned or Central Government. Nothing extra shall be payable on this account.

1.16.12 All ancillary and incidental facilities required for execution of work like labour camp, stores, fabrication yard, offices for Contractor, watch and ward, temporary

ramp required to be made for working at the basement level, temporary structure for plants and machineries, water storage tanks, installation and consumption charges of temporary electricity, telephone, water etc. required for execution of the work, liaison and pursuing for obtaining various No Objection Certificates, completion certificates from local bodies etc., protection works, barricading, testing facilities / laboratory at site of work, facilities for all field tests and for taking samples etc. during execution or any other activity which is necessary (for execution of work and as directed by Engineer-in-Charge), shall be deemed to be included in rates quoted by the Contractor, for various items in the schedule of quantities. Nothing extra shall be payable on these accounts. Before start of the work, the Contractor shall submit to the Engineer-in-Charge, a site / construction yard layout, specifying areas for construction, site office, positioning of machinery, material yard, cement and other storage, steel fabrication yard, site laboratory, water tank, etc.

1.16.13 The Contractor shall assume all liability, financial or otherwise in connection with this contract and shall protect and indemnify the Department from any and all damages and claims that may arise on any account. The Contractor shall indemnify the Department against all claims in respect of patent rights, royalties, design, trademarks of name or other protected rights, damages to adjacent buildings, roads or members of public, in course of execution of work or any other reasons whatsoever, and shall himself defend all actions arising from such claims and shall indemnify the Department in all respect from such actions, costs and expenses. Nothing extra shall be payable on this account.

1.16.14 The Contractor shall make all necessary arrangements for protecting from rain or likewise extreme weather conditions, the work already executed and for carrying out the further work, during monsoon including providing and fixing temporary shelters, protections etc. Nothing extra shall be payable on this account. Also, no claims for hindrance shall be entertained on this account.

1.16.15 In case of flooding of site on account of rain or any other cause and any consequent damage, whatsoever, no claim financially or otherwise shall be entertained not withstanding any other provisions elsewhere in the contract agreement. Also, the Contractor shall make good, at his own cost, the damages caused, if any. Further, no claims for hindrance shall be entertained on this account.

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

1.16.17 In case the same item appears more than once in the schedule of work under the same sub head or among the different sub heads of works, the lowest rate quoted for that item shall be taken for other items also and tender will be evaluated accordingly.

1.16.18 The ESI and EPF contribution on the part of employer in respect of this contract shall be paid by the contractor. These contributions on the part of employer paid by the contractor shall be reimbursed by the Engineer in charge to the contractor on actual basis. The applicable and eligible amount of EPF& ESI shall be reimbursed preferably within 7 days but not later than 30 days of submission of documentary proof of payment which are in order.

1.17 **Foreign Exchange:**

1.17.1 No foreign exchange shall be made available by the Department for importing (purchase) of equipment, plants, machinery, materials of any kind or any other items if required to be carried out during execution of the work. No delay and no claim of any kind shall be entertained from the Contractor, on account of variation in the foreign exchange rate.

1.17.2 The contractors have to quote the corresponding imported items in "Indian Rupees" in the Schedule of Quantities which shall include all incidental charges including freight, taxes including GST, import duties, fluctuations in currency rates. No extra payment will be made over and above the quoted rates.

**1.18 Tools & Plant:**

1.18.1 No tools and plants including any special T&P etc. shall be supplied by the Department and the Contractor shall have to make his own arrangements at his own cost. No claim of hindrance (or any other claim) shall be entertained on this account.

1.19 **As Built & Service Drawings**:

1.19.1 The contractor shall submit as built architectural drawings and also completion plan of services (4 sets) as required vide General Specifications for Electrical works (Part-I internal) 2023 and (Part-II External) 2023 as applicable within thirty days of the completion of the work.

In case, the contractor fails to submit the completion plans as aforesaid, he shall be liable to pay a maximum amount of **Rs. 1,00,000/-** as may be fixed by the Superintending Engineer concerned on report of Executive Engineer and in this respect the decision of the Superintending Engineer shall be final and binding on the contractor.

The contractor shall submit as built plans and also completion plan of services for **Internal and External Civil, Electrical and Mechanical Services** within thirty days of the completion of the work, **provided that the service plans having been issued for execution by the Engineer-in-Charge, unless the contractor, by virtue of any other provision in the contract, is required to prepare such plans.**

1.20 **Computerized MBs & SMBs:**

~~1.20.1 The contractor shall make available four (04) sets of computerized Standard Measurement Books (SMBs) having measurement of all the permanent standing in a building.~~

1.20.2. The contractor will submit computerized bill with measurement sheet for the work carried out by him for making payment as per Clause – '6' of the CPWD General Conditions of Contract 2023 for Construction Works (with correction slips up to the last date of submission of tender). For casting of RCC members and other hidden items the corrected and duly test checked measurement sheets of reinforcement or that of other hidden items shall be deposited with Engineer in charge or his authorized representative, before casting of RCC or other hidden items. The delay in submission of corrected and duly checked measurement sheet may, therefore, delay casting of RCC or execution of hidden item for which no hindrance shall be recorded.

1.20.3. Electronic measurement book is introduced. The contractor shall comply with the same as per the direction of Engineer-in-charge.

**1.21 Water Supply & Sanitary Installations & Testing:**

1.21.1 Water tanks, taps, sanitary, water supply and drainage pipes, fittings and accessories should conform to approved manufacturers specifications where CPWD Specifications are not applicable. The contractor should get the materials (fixtures/fittings) tested from approved labs wherever required at his own cost. The contractor shall submit for the approval of the Engineer-in-Charge, the name of the plumbing agency (along with their working experience in recent past) proposed to be engaged by him.

1.21.2 The contractor shall give performance test of the entire installation(s) as per the standing specifications before the work is finally accepted and nothing extra whatsoever shall be payable to the contractor for the test.

**2.0 SECRECY**

2.1 The contractor shall take all steps necessary that all persons employed on any work in connection with the contract have noticed that the Indian Official Secrets Act 1923 applies to them & will continue so to apply even after the execution of such works under the contract.

2.2 The contract is confidential and must be strictly confined to the contractor's own use (except so far as confidential disclosure to sub-contractors or suppliers as necessary) and to the purpose of the contract.

2.3 All documents, copies thereof & extracts there from furnished to the contractor shall be returned to the Engineer-in-Charge on the completion of the work / works or the earlier determination of the contract.

**3.0 LABOUR AND SECURITY**

3.1 In the event of the contractor(s) committing a default or breach of any of the provisions of the Central Public Works Department, Contractor's Labour Regulations and Model Rules for the protection of health and sanitary arrangements for the workers as amended from time to time or furnishing any information or submitting or filing any statement under the provisions of the above Regulations and' Rules which is materially incorrect, he/they shall, without prejudice to any other liability, pay to the Government a sum not exceedingRs.500/- for every default, breach or furnishing, making, submitting, filing such materially incorrect statements and in the event of the contractor(s) defaulting continuously in this respect, the penalty may be enhanced to Rs.1000/- per day for each day of default subject to a maximum of 5 per cent of the estimated cost of the work put to tender. The decision of the Engineer-in-Charge shall be final and binding on the parties.

***No payment shall be made for construction of labour housing.***

3.2 The Contractor shall display all permissions, licenses, registration certificates, bar charts, other statements etc. under various labour laws and other regulations applicable to the works, at his site office.

3.3 If as per the rules of the local authority, the huts for labour are not to be erected at the site of work by the contractors, the contractors are required to provide such accommodation as is acceptable to local bodies and nothing extra shall be paid on this account.

3.4 Contractor has to follow the security requirement of the campus and obtain necessary entry passes for the labour and vehicles and follow security checks at entry / exit gates, restriction on movement of vehicle, restricted timings of working etc. The Department however shall assist the contractor in obtaining such passes for movement of vehicles and labour. No claim whatsoever shall be entertained on account of delay in entry of vehicles and labour including restrictions in working hours, if there is any.

3.5 The contractor shall employ only Indian Nationals after verifying their antecedents and loyalty. The contractor shall, on demand submit list of his agents, employees and work people concerned & shall satisfy as to the bonafides of such people.

3.6 The contractor & his work people shall observe all relevant rules regarding security promulgated in which work is to be carried out by the Controlling Administrative Authority of the campus/area (hereinafter referred to as "Administrator").

3.7 The contractor, his representative, workman shall be allowed to enter through specified gates & timing as laid down by the controlling authority. They shall be issued an identity card or an individual pass in accordance with the standing rules & regulations & they should possess the same while working. The contractor shall be responsible for the conduct & actions of his workmen, agents/ representatives.

3.8 Normally contractor shall be allowed to carry out work between 7 AM to 6 PM. However, he may also be allowed to carry out the work beyond 6 PM &up to 7 AM, if the site conditions / circumstances so demand with prior written permission

from the "Administrator". However, if the work is carried out in more than one shift or at night, no claim on this account shall be entertained.

3.9 Normally contractor's material / vehicles etc. shall be allowed to move in / go-out between 7 AM to 7 PM only & no movement of material / vehicles out of the site of work shall be allowed during night hours unless specific permission is obtained from the "Administrator".

3.10 In case if a separate entry has been allowed, the contractor has to make all arrangement for making a separate entry gate and barricading of the working area to segregate/separate the same from other areas. All these have to be done by the contractor at his own cost including safeguarding any untoward incident in the restricted area due to separate entry gate and barricading arranged by the contractor. No extra amount on this account shall be payable by the department.

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

**4.0 OFFICE INFRASTRUCTURE**:

4.1 The Contractor shall construct / provide one site office at his own cost on the construction site consisting of One (1) room including one (1) attached toilet with total built up area not less than 30 Sqm for CPWD staff. The location and plan shall be got approved from Engineer-in-Charge.

4.2 The contractor shall make arrangement for Helmets and leather shoes (meant of construction work at sites) for all field staff of the department during the entire period of construction for safety reasons. One helmet and two pairs of shoes per staff member (maximum twelve members) of the departments per year shall be arranged by the contractor at his own cost.

**5.0 DOCUMENTATION**

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

6.0 **PROGRESS CHART: -**

6.1 The contractor shall submit a Time and Progress Chart for each mile stone. The Engineer-in-charge may within 10 days thereafter, if required modify, and communicate the program approved to the contractor failing which the program submitted by the contractor shall be deemed to be approved by the Engineer-in-charge. The work programme shall include all details of balance drawings and decisions required to complete the contract with specific dates by which these details are required by contractor without causing any delay in execution of the work. The chart shall be prepared in direct relation to the time stated in the Contract documents for completion of items of the works. It shall indicate the forecast of the dates of commencement and completion of various trades of sections of the work and may be amended as necessary by agreement between the Engineer-in-charge and the Contractor within the limitations of time imposed in the Contract documents, and further to ensure good progress during the execution of the work, the contractor shall in all cases in which the time allowed for any work, exceeds one month (save for special jobs for which a separate programme has been agreed upon) complete the work as per mile stones given in Schedule 'F'.

6.2 In case of non-submission of construction programme by the contractor the Program approved by the Engineer-in-charge shall be deemed to be final.

6.3 The approval by the Engineer-in-charge of such programme shall not relieve the contractor of any of the **obligations** under the contract.

6.4 The contractor shall submit the Time and Progress Chart and progress report using the mutually agreed software or in other format decided by Engineer-in-chargefor the work done during previous month to the Engineer-in-charge on or before 5th day of each month failing which a recovery Rs. 5000/- shall be made on per week or part basis in case of delay in submission of the monthly progress report.

6.5 The program chart should include the following: -

a) Descriptive note explaining sequence of various activities.

b) BAR CHARTS prepared in mutually agreed software or in other format decided by Engineer-in-charge which will indicate resources in financial terms, manpower and specialized equipment for every important stage.

c) Program for procurement of materials by the contractor.

d) Program for arranging and deployment of manpower both skilled and unskilled so as to achieve targeted progress.

e) Program of procurement of machinery / equipment having adequate capacity, commensurate with the quantum of work to be done within the stipulated period, by the contractor. In addition, to the above to achieve the progress of work as per programme, the contractor must bring at site adequate shuttering material required for cement concrete and RCC works etc. The contractor shall submit shuttering schedule adequate to complete the structure work within the laid down physical milestones.

f) Programme for achieving milestones.

6.6 The submission for approval by the Engineer-in-charge of such programme or such particulars shall not relieve the contractor of any of the duties or responsibilities under the contract. This is without prejudice to the right of Engineer-in-charge to take action against the contractor as per terms and conditions of the agreement.

**7.0 PROGRESS AND MONITORING OF WORK**:

7.1 The progress report shall contain the following, apart from whatever else may be required as specified: -

(i) Construction schedule of the various components of the work through a bar chart for the next three months (or as may be specified), showing the micro milestones, targeted tasks and up to date progress. At least 10 digital photographs showing all the parts of construction site along with at least 5 minutes video of executions of different items in soft copy has to be submitted in every monthly progress report.

(ii) Progress chart of the various components of the work that are planned and achieved, for the month as well as cumulative up to the month, with reason for deviations, if any in a tabular format.

(iii) Plant and machinery statement, indicating those deployed in the work.

(iv) Man-power statement, indicating individually the names of all the staff deployed on the work, along with their designations. Number of skilled workers and unskilled workers deployed on the work and their location of deployment.

(v) Financial statement, indicating the broad details of all the running account payment received up to date, such as gross value of work done, advances taken, recoveries effected, amount withheld, net payments details of Cheque payment received, extra /substituted /deviations items if any, etc.

7.2 For completing the work in time, the Contractor might be required to work in two or more shifts (including night shifts). No claim whatsoever shall be entertained on this account, not with-standing the fact that the Contractor may have to pay extra amounts for any reason, to the labourers and other staff engaged directly or indirectly on the work according to the provisions of the labour and other statutory bodies regulations and the agreement entered upon by the Contractor with them.

7.3 The work should be planned in a systematic manner so that chase cuttings in the walls, ceilings and floors is minimized. Wherever absolutely essential, the chase shall be cut using chase cutting machines. Chases will not be allowed to be cut using hammer / chisel. The electrical boxes should be fixed in walls simultaneously while raising the brick work. The contractor shall ensure proper co-ordination of various disciplines viz. building works, sanitary & water supply & electrical installations etc.

7.4 The contractor shall conduct his work, so as not to interfere with or hinder the progress or completion of the work being performed by other contractor(s) or by the Engineer-in-Charge and shall as far as possible arrange his work and shall place and dispose of the materials being used or removed so as not to interfere with the operations of other contractor or he shall arrange his work with that of the others in an acceptable and coordinated manner and shall perform it in proper sequence to the complete satisfaction of Engineer-in-charge.

7.5 The Contractor shall do proper sequencing of the various activities by suitably staggering the activities within various pockets in the plot so as to achieve early completion. The agency may deploy adequate equipment, machinery and labour as required for the completion of the entire work within the stipulated period specified. Also, ancillary facilities shall be provided commensurate with requirement to complete the entire work within the stipulated period. Nothing extra shall be payable on this account. Adequate number/sets of equipment in working condition, along with adequate stand-by arrangements, shall be deployed during entire construction period. It shall be ensured by the Contractor that all the equipment, Tools & Plants, machineries etc. provided by him are maintained in proper working conditions at all times during the progress of the work and till the completion of the work. Further, all the constructional tools, plants, equipment and machineries provided by the Contractor, on site of work or his work shop for this work, shall be exclusively intended for use in the construction of this work and they shall not be shifted / removed from site without the permission of the Engineer-in-Charge.

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

**8.0 PROJECT REVIEW MEETINGS:**

The contractor, immediately on award of work shall submit details of his key personnel to be engaged for the work at site. In addition, he shall furnish the Engineer-in-charge detailed organization involved with the work.

The contractor shall present the programme and status at various review meetings as required.

**Monthly Review Meetings:** Shall be attended by Project - in - charge and the Management Representative who can take independent decisions along with CPWD, client's representatives.

**Agenda**

a) Progress Status/Statistics.

b) Completion Outlook.

c) Major holdups/slippages.

d) Assistance required.

e) Critical issues.

f) Any decision on queries raised either by Contractor/PMC.

g) Anticipated cash flow requirement for next two months.

**9.0 ENGAGING SPECIALISED AGENCIES FOR WORKS**: -

9.1 The Contractor shall engage specialized agencies having adequate technical capability and experience of having executed at least one work of similar items for executing the following items of the work and/or any other items of work where specialized firm is required to be engaged as per contract conditions.

**As mentioned in Para 1.1.3 of CPWD-6 for e-Tendering in PART – A of this NIT for Specialized works.**

9.2 The Specialized agency for the work shall be got approved from the Engineer-in-Charge well before actual commencement of the item of work. The contractor shall submit the list of specialized agencies proposed to be engaged by him along with their technical capability and necessary performance certificates, within 30 days of the stipulated date of start to substantiate technical capability and experience of the agency for prior approval of the Engineer-in-Charge.

9.3 It shall be the responsibility of main contractor to sort out any dispute / litigation with the Specialized Agencies without any time & cost overrun to the Department. The main contractor shall be solely responsible for settling any dispute / litigation arising out of his agreement with the Specialized Agencies. The contractor shall ensure that the work shall not suffer on account of litigation/ dispute between him and the specialized agencies / sub-contractor(s). No claim of hindrance in the work shall be entertained from the Contractor on this account. No extension of time shall be granted and no claim what so ever, of any kind, shall be entertained from the Contractor on account of delay attributable to the selection/rejection of the Specialized Agencies.

**10.0 DEFECT LIABILITY PERIOD (REFUND OF SECURITY DEPOSIT):**

10.1 The defect liability / maintenance period shall be 24 months after the date of completion of work for this contract agreement. The Security Deposit shall be released after the defect liability period of 24 months after completion of work and for this, the contractor shall have to produce a certificate stating that no defects are pending for rectification from the Engineer-in-charge, but subject to other provisions specified elsewhere in the contract agreement.

**11.0 SAFETY MEASURES**

11.1 The issue of construction safety & standards has gained utmost importance in recent times. This subject is to be dealt with in an integrated manner with an approach to developing and establishing a safety culture at work sites. Broadly, its components are:

(i) Creating awareness.

(ii) Education.

(iii) Training.

(iv) Implementation.

(v) Enforcement measures.

*All workers of contractor and associate agencies, invariably and at all the times, must follow all safety norms, adopt safe construction practices and use all required safety gadgets in their working throughout the project duration.*

11.2 The contractor shall issue ***Photo Identity Cards*** with unique numbers containing salient information of workers for the labor& his staff.

11.3 The Contractor shall monitor and achieve the objectives of construction safety continuously, progressively and through affirmative action, and shall oversee implementation of safety program over the entire construction period.

**11.4 Warning / Caution Boards**

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

**11.5 Sign Boards**

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

11.5.2 A display board shall be kept at site which would list the names of workers, teams and agencies following safety program in the best manner. This would be updated weekly.

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

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

**12.0 SPECIAL CONDITION FOR HARDWARE AND SANITARY WARES:**

12.1 Engineer-in-Charge will take a decision regarding model numbers of equivalent Door/window hard ware/ sanitary ware at the time of execution, in case the material, from the manufacturer whose model number is mentioned, is not available. However, in case, the equivalent model so approved, is cheaper than the model already mentioned in item/approved makes list, the price adjustment will be made based on the difference in market rate. In case, the rate of subsequently approved model is more, no extra payment will be made on this account."

12.2 The following procedure should be followed in case of removal of rejected/sub-standard materials from the site of work.

i) Whenever any material brought by the contractor to the site of work is rejected, entry thereof should invariably be made in the site order book under the signature of the AE/AEE giving approximate quantity of such materials.

ii) As soon as the material is removed, a certificate to that effect may be recorded by the AE/AEE against the original entry, giving the date of removal, mode of removal i.e. whether by truck, carts or by manual labour. If removal is by truck, the registration number of the truck should be recorded.

**13.0. INSPECTION OF WORKS:**

13.1 In addition to the provisions of relevant clauses of the contract, the work shall also be open to inspection by the **Superintending Engineer, CPWD, Calicut** and other senior officers of CPWD in addition of the Engineer-in-charge, his authorized representatives, Authorities and Team of Third-Party Quality Assurance engaged for the work. The contractor shall at times during the usual working hours and at all times at which reasonable notices of the intention of the Engineer-in-charge or other officers as stated above to visit the works shall have been given to the contractor, either himself be present to receive the orders and instructions or have a responsible representative duly accredited in writing, to be present for that purpose.

13.2 The committee/consultant appointed by CPWD, shall be inspecting the works including workshops and fabrication factory to ensure that the works in general being executed according to the design, drawings and specifications laid down in the contract. Their observations shall be communicated by CPWD engineering staff and compliance is to be reported to CPWD. The committee/consultant appointed by CPWD shall certify on completion of particular building that it has been constructed according to the approved drawings design and specifications.

13.3 Senior Officers of CPWD, Dignitaries from Central Ministry / Department, State Government and Client Department Authorities shall be inspecting the on-going work at site at any time with or without prior intimation. The contractor shall, therefore, keep updated the following requirements and detailing: -

(i) Display Board showing detail of work, weekly progress achieved with respect to targets, reason of shortfall, status of manpower, wages being paid for different categories of workers.

(ii) Entrance and area surrounding to be kept cleaned.

(iii) Display layout plan key plan, building drawings including plans, elevations and sections.

(iv) Upto date displays of programme chart (Bar charts).

(v) Keep details of quantities executed, balance quantities, deviations, possible Extra item, substituted Item etc.

(vi) Keep plastic / cloth mounted one sets of building drawings.

(vii) Set of Helmets and safety shoes for safety.

**14.0 INSURANCE POLICIES:**

Before commencing the execution of work, the Contractor shall, without in any way limiting his obligations and liabilities, insure at his own cost and expense against any damage or loss or injury, which may be caused to any person or property, at site of work. The Contractor shall obtain and submit to the Engineer-in-Charge proper Contractor All Risk Insurance Policy for an amount equivalent to 110 % of the contract amount for this work, with Engineer-in-Charge as the first beneficiary. The insurance shall be obtained in joint names of Engineer-in-Charge and the Contractor (who shall be second beneficiary). Also, he shall indemnify the Department from any liability during the execution of the work. Further, he shall obtain and submit to the Engineer-in- Charge, **a third-party insurance policy for maximum Rs.20 lakh for each accident or any other incident or act of God or health hazard or Biological attack, with the Engineer-in - Charge as the first beneficiary.** The insurance shall be obtained in joint names of Engineer-in-Charge and the Contractor (who shall be second beneficiary). The Contractor shall, from time to time, provide documentary evidence as regards payment of premium for all the Insurance Policies for keeping them valid till the completion of the work. The Contractor shall ensure that Insurance Policies are also taken for the workers of his Sub-Contractors / specialized agencies also. The contractor including subcontractors shall provide comprehensive group insurance cover for all the workers and their supervisory staff deployed at site. The details of insurance cover to be provided shall be submitted by the contractor / associate agencies within 20

days of date of start. In case of a default, appropriate policy shall be got done by the safety monitoring committee and double the fee of the policy shall be recovered from the next bill of the contractor. Without prejudice to any of its obligations and responsibilities specified above, the Contractor shall within 15 days from the date of letter of acceptance of the tender and thereafter at the end of each quarter submit a report to the Department giving details of the Insurance Policies along with Certificate of these insurance policies being valid, along with documentary evidences as required by the Engineer-in-Charge. No work shall be commenced by the Contractor unless he obtains the Insurance Policies as mentioned above. Also, no payment shall be made to the Contractor on expiry of insurance policies unless renewed by the Contractor. Nothing extra shall be payable on this account. No claim of hindrance (or any other claim) shall be entertained from the contractor on these accounts.

**15.0. APPLICABLE PERMITS:**

15.1 The contractor(s) shall give to the Municipality, police and other authorities all necessary notices etc. that may be required by law and obtain all requisite licenses for temporary obstructions, enclosures etc. and pay all fee, taxes including GST and charges which may be levied on account of these operations in executing the contract. He shall make good any damage to the adjoining property whether public or private and shall supply and maintain lights either for illumination or for cautioning the public at night.

15.2 The contractor shall ensure that applicable permits mandated by the local bodies and in case warranted for this work are obtained as required under the Applicable Laws.

**16.0 LOCAL BYE-LAWS:**

16.1 The building work shall be carried out in the manner complying in all respects with the requirements of relevant bye-laws of the local body under the jurisdiction of which the work is to be executed or as directed by the Engineer-in-Charge and nothing extra shall be paid on this account.

16.2 Some restrictions may be imposed by the local police etc. on the working time and for movement of labour, materials etc. the contractor shall be bound to follow all such restrictions/instructions and nothing extra shall be payable on this account.

16.3 The contractor shall not stack building material/ malba on the road or on the land owned by any other authority, as the case may be. In case, the Contractor is found stacking the building material/ malba as stated above, he shall be liable to pay the stacking charges as may be levied by local body or authority and also to face penal action as per the rules, regulations and bye-laws of the said body or authority. The Engineer-in-Charge shall be at liberty to recover the sums due but not paid to the concerned authorities on the above counts from any sums due to the contractor including amount of the Security Deposit or Retention Money in respect of this contract or any other contract.

**17.0 FINAL TESTING OF THE INSTALLATION:**

The Contractor shall demonstrate trouble free functioning of all the Civil and E & M installations and services. The Engineer-in-Charge or his authorized representatives shall carry out final inspection of the various Civil and E & M services and installations. Any defect(s) noticed during demonstration shall be rectified by the Contractor at his own cost to the entire satisfaction of the Engineer-in-Charge. Nothing extra shall be payable on this account.

**18.0 LOCAL BODY APPROVALS/OCCUPATION CERTIFICATE:**

i) Obtaining mandatory pre and post construction approvals from local bodies /statutory authorities required for commencing the work including occupancy certificate from the local bodies/ authorities is lies with contractor.

ii) The bidder has to include cost of services of engaging consultant(s) if required towards obtaining mandatory pre and post construction approvals from local bodies /authorities required for commencing the work including occupancy certificate from the local bodies / authorities and nothing extra shall be payable on this account. The statutory fee required to be paid to authorities concerned shall be borne by the Department but all other expenses towards obtaining the pre and post-construction permissions shall rest with the contractor.The agency has to prepare the final completion drawings and to submit to the local bodies/authorities.

iii) On Completion of Work, the Contractor shall get required post-construction permissions from the Local body, Fire office and other statutory authorities whose permission is required after completion of the construction including completion/ occupancy certificate required for completing the building in all respects to make it habitable and ready for occupation and submit a copy of such approvals/certificates to the Engineer in charge.

iv) It is the sole responsibility of the contractor to obtain occupancy certificate and Fire clearance certificate from local bodies after completion of work, falling to which the final payment will not be released.

v) Statutory fees, if any, shall be paid by the contractor and the same shall be reimbursed by CPWD on production of documentary proof of the statutory payment.

**19.0 De-watering**

(i) De-watering required, if any, shall be done conforming to BIS Code IS: 9759 (guide lines for de-watering during construction) and / or as per the specifications approved by the Engineer-in-Charge. Design of an appropriate and suitable dewatering system shall be the Contractor's responsibility. Such scheme shall be modified / augmented as the work proceeds based on fresh information discovered during the progress of work, at no extra cost. At all times during the construction work, efficient drainage of the site shall be carried out by the Contractor and especially during the laying of plain cement concrete, taking levels etc. The Contractor shall also ensure that there is no danger to the nearby properties and installations on account of such lowering of water table. If needed, suitable precautionary measures shall be taken by the Contractor. Also the scheme of dewatering adopted shall have adequate built in arrangement to serve as stand-bye to attend to repair of pumps etc. and disruption of power / fuel supply. Nothing extra shall be payable for all the operations described in this para.

(ii) In trenches where surface water is likely to get into cut / trench during monsoons, a ring bund of puddle clay or by any other means shall be formed outside, to the required height, and maintained by the Contractor. Also, suitable steps shall be taken by the Contractor to prevent back flow of pumped water into the trench. Nothing extra shall be payable on this account.

a. For works below ground level the contractor shall keep that area free from water. If dewatering or bailing out of water is required the contractor shall do the same at his own cost and nothing extra shall be paid except otherwise provided in the items of Schedule of Quantities.

b. The Contractor shall make all necessary arrangements for protecting from rains, fog or likewise extreme weather conditions, the work already executed and for carrying out further work, during monsoon including providing and fixing temporary shelters, protections etc. Nothing extra shall be payable on this account and also no claims for hindrance shall be entertained on this account.

c. In case of flooding of site on account of rain or any other cause and any consequent damage, whatsoever, no claim financially or otherwise shall be entertained notwithstanding any other provisions elsewhere in the contract agreement. Also, the Contractor shall make good, at his own cost, the damages caused, if any. Further, no claims for hindrance shall be entertained on this account.

d. The contractor will take reasonable precautions to prevent his workman and employees from removing and damaging any flora (plant/vegetation) from the project area.

**20. ROAD**

a. The contractor shall at his own expense and risk arrange land for accommodation of labour, setting up of office, the storage of materials, erection of temporary workshops, construction of approach roads to the site of the work including land required for carrying out of all jobs connected with the execution &completion of the work. However, the departmental land, to the extent available may be allowed to be used for the purpose free of rent without accepting any responsibility for the delay, if any, on this account. The contractor shall have to abide by the regulations of the authorities concerned and the directions of the Officer - in-charge for the use of the land available at the site of work. If during construction, it becomes necessary to remove or shift the stored materials shed, workshop, access roads, etc., to facilitate execution of any other work by any other agency, the contractor shall carry out the removal of shifting as directed by the Officer – in – charge and no claim whatsoever, shall be entertained on this account.

b. It shall be deemed that the contractor has satisfied himself as to the nature and location of the work, transport facilities, availability of land for setting up of camp, etc. the department will bear no responsibility for lack of such knowledge & the consequences thereof.

c. **The site may be rough terrain. It is the contractor's responsibility to construct an all-weather road if required to enable him to access the site in all seasons for ensuring smooth progress of work to achieve completion of work within Contract period and nothing extra shall be paid. No Claim for EOT will also be entertained**

# ADDITIONAL CONDITIONS (Civil Component)

## 1.1 QUALITY ASSURANCE/TESTING OF MATERIALS: -

1.1.1 Water tanks, taps, sanitary, water supply & drainage pipes, fittings & accessories should conform to bye-laws of local body/corporation, where CPWD specifications are not available. The Contractor (s) should engage approved, licensed plumbers for the work and get the materials (fixtures/fittings) tested, by the municipal Body/Corporation authorities wherever required at his own cost. The Contractor shall submit for the approval of the Engineer-in-Charge, the name of the plumbing agency (along with their working experience in recent past) proposed to be engaged by him.

1.1.2 With each Running Bill, the details of test carried out shall be submitted by the contractor as per Performa given in the tender document.

1.1.3 **Testing charges to be borne by Contractor.**

Samples of materials required for testing shall be provided free of charge by the contractor. The contractor shall provide at his own cost suitable weighing and measuring arrangements at site for checking the weight / dimension as may be necessary. **All expenditure to be incurred for testing of samples i.e. packing, sealing, transportation, loading, unloading etc., including testing charges shall be borne by the Contractor.**

1.1.4 The Contractor shall at his own risk and cost make all arrangements and shall provide all such facilities including material and labour, the Engineer-in-Charge may require for collecting, preparing, forwarding the required number of samples for testing as per the frequency of test stipulated in the contract specifications or as considered necessary by the Engineer-in-Charge, at such time and to such places, as directed by the Engineer-in-Charge. Nothing extra shall be payable for the above.

1.1.5 The Contractor or his authorized representative shall associate in collection, preparation, forwarding and testing of such samples. In case he or his authorized representative is not present or does not associate him, the result of such tests and consequences thereon shall be binding on the Contractor. The Contractor or his authorized representative shall remain in contact with the Engineer-in–Charge or his authorized representative associated for all such operations. No claim of payment or claim of any other kind, whatsoever, shall be entertained from the Contractor.

1.1.6 **Maintenance of Register of Tests**: -

(i) All the registers of tests carried out a Construction Site or in outside laboratories shall be maintained by the contractor which shall be issued to the contractor by Engineer-in-Charge.

(ii) All Samples of materials including Cement Concrete Cubes shall be taken jointly with Contractor by representative of the Engineer in Charge. All the assistance shall be provided by the contractor. Cost of sample materials is to be borne by the contractor and he shall be responsible for safe custody of samples to be tested at site.

(iii) All the test in field lab setup at Construction Site shall be carried out by the Engineering Staff deployed by the contractor which shall be 100% witnessed by representative of the Engineer in Charge.

(iv) All the entries in the registers will be made by the designated Engineering Staff of the contractor and same should be regularly reviewed by Engineer in Charge or his representative.

(v) Contractor shall be responsible for safe custody of all the test registers.

1.1.7 Extensive testing of the materials used for construction is a pre-requisite for attaining high quality of the work. This shall also require specialized tests, physical, chemical, ultrasonic, x-ray and various other types of tests which cannot possibly be carried out in a site laboratory. These tests also require specialized personnel who regularly deal in such testing.

1.1.8 Ultrasonic pulse velocity test for the works executed by the agency shall be conducted on at least 5% of the total number of RCC members in each category i.e., beam, column, slab and footing for ensuring quality of concrete as per directions of Engineer- in charge. The cost of the same shall be borne by the contractor.

1.1.9 In case there is any discrepancy in frequency of testing as given in list of mandatory tests and that in individual sub-heads of work as per CPWD Specifications higher of the two frequencies of testing shall be followed and nothing extra shall be payable on this account.

1.1.10. The contractor shall ensure quality construction in a planned and time bound manner. Any sub-standard material / work beyond set out tolerance limit shall be summarily rejected by the Engineer-in-charge & contractor shall be bound to replace / remove such sub-standard / defective work immediately. If any material, even though approved by Engineer-In-Charge is found defective or not conforming to specifications shall be replaced / removed by the contractor at his own risk & cost.

1.1.11 In addition to the supervision of work by CPWD engineers, the Architects deployed by the Client/CPWD, CPWD Quality Control/ Assurance Team and Third party Quality Control/ Assurance Team shall also be carrying out regular and periodic inspection of the ongoing activities in the work and deficiencies, shortcomings, inferior workmanship pointed out by them shall be communicated by CPWD engineers to the contractor. Upon receipt of instructions from Engineer in Charge these are also to be made good by necessary improvement, rectification, replacement upto his complete satisfaction. Special attention shall be paid towards line and level of internal and external plastering, exposed smooth surface of RCC members by providing fresh shuttering plates, rubberized linings to all the shuttering joints, accurate joinery work in wooden doors and windows, thinnest joints in stone/ tiling / cladding work, non-hollowness in floor and dado tiles work, protection of scratches over flooring by impounding layer of plaster of Paris, water tight pipe linings, absence of hollow vertical joints in brick masonry, proper compaction of filled up earth etc. to achieve an Institution of International standards and up keeping of quality assurance shall be of paramount importance, as such.

1.1.12 The Contractor shall submit, within 15 days after the date of award of work, a detailed and complete method statement for the execution, testing and Quality Assurance, of such items of works, as directed by the Engineer-in-Charge. All the materials to be used in the work, to give the finished work complete in all respects, shall comply with the requirements of the specifications and shall pass all the tests required as per specifications as applicable or such specifications / standards as directed by the Engineer-in-Charge. However, keeping the Quality Assurance in mind, the Contractor shall submit, on request from the Engineer-in-Charge, his own Quality Assurance procedures for basic materials and such items, to be followed during the execution of the work, for approval of the Engineer-in-Charge.

## 1.2 FIELD LABORATORY

The contractor has to establish within 21 days from the award of work a field laboratory at site including all necessary equipments and skilled manpower for the **Field Tests as indicated in the tender document at his own cost to have proper quality controlRs.5,000/-per day shall be recovered from the contractor for any delay beyond the specified period.** If contractor fails to establish lab within additional period of 15 days, the Engineer in charge shall initiate action as deemed fit under relevant clauses of the agreement.

For performing the above tests, the **Field Testing Equipments and Instruments as indicated in the tender document** are to be arranged and maintained by the contractor at his own cost.

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

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

**1.3 SAMPLE OF MATERIALS: -**

1.3.1 **Submission of samples**

**Contractor shall submit three or more samples of all finishing items such as flooring items, Dado items,laminates, door and window fittings, water supply and sanitary fittings, paint colour etc., for approval from Engineer-in-charge and client department within 15 days from the date of start of work.**

All materials and fittings brought by the contractor to the site for use shall conform to the samples approved by the Engineer-in-Charge which shall be preserved till the completion of the work. If a particular brand of material is specified in the item of work in Schedule of Quantity, the same shall be used after getting the same approved from Engineer-in-Charge. Wherever brand / quality of material is not specified in the item of work, the contractor shall submit the samples as per **List of Approved Makes given in the tender document** for approval of Engineer-in-Charge. For all other items, ISI Marked materials and fittings shall be used with the approval of Engineer-in-Charge. Wherever ISI Marked material / fittings are not available, the contractor shall submit samples of materials / fittings manufactured by firms of repute conforming to relevant Specifications or IS codes for the approval of Engineer-in-Charge.

1.3.2 The Contractor shall procure and provide all the materials from the manufacturers / suppliers as per the list attached with the tender documents, as per the item description and particular specifications for the work. The equivalent brand for any item shall be permitted to be used in the work, only when the specified make is not available. This is, however, subject to documentary evidence produced by the contactor for non-availability of the brand specified and also subject to independent verification by the Engineer-in-Charge. In exceptional cases, where such approval is required, the decision of Engineer-in-Charge as regards equivalent make of the material shall be final and binding on the Contractor. No claim, whatsoever, of any kind shall be entertained from the Contractor on this account. Nothing extra shall be payable on this account. Also, the material shall be procured only after written approval of the Engineer-in-Charge.

1.3.3 To avoid delay, contractor should submit samples / as stated above well in advance so as to give timely orders for procurement. If any material, even though approved by Engineer-in-Charge is found defective or not conforming to specifications shall be replaced / removed by the contractor at his own risk &cost. Samples including brand / quality of materials and fittings to be used in the work shall be got approved from the Engineer-in-Charge, well in advance of actual execution and shall be preserved till the completion of the work.

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

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

1.3.5 For certain items, if frequency of tests is neither mentioned in the CPWD Specifications nor BIS, then tests shall be carried out as per directions of Engineer-in-Charge.

**2.0 CEMENT & STEEL REINFORCEMENT**

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

**2.2 CEMENT: -**

2.2.1 The contractor shall procure 43 grade ordinary Portland Cement (OPC) conforming to IS: 8112 / Portland Pozzolana Cement (PPC) conforming to IS: 1489 (Part-1) as required in the work as per specifications/particular specifications of buildings from reputed manufacturers of cement as mentioned in **"List showing preferred brands / Manufacturers / Makes**" or from any other reputed cement manufacture having a production capacity not less than 1 million Ton per annum as approved by the **Competent Authority.** The cement of approved make as aforesaid in 50 kg bags bearing manufacturer's name and ISI marking, along with manufacturers test certificate for each lot shall be procured by the contractor. Portland Pozzolana Cement is to be used for RCC works only subject to fulfillment of conditions of circular No. CDO/SE (RR)/Fly ash (MAN) 02 dated 09.04.09. However, if the contractor uses higher grade of cement or uses OPC only nothing extra shall be paid. The use of PPC shall be regulated as per the following conditions stipulated in the circular dated 09.04.2009: -

a. IS:456-2000 Code of Practice for Plain and Reinforced Concrete (as amended upto date) shall be followed in regard to Concrete Mix Portion and its production as under:

   i) The concrete mix design shall be done as "Design Mix Concrete" as prescribed in clause-9 of IS 456 mentioned above.

   ii Concrete shall be manufactured in accordance with clause 10 of above mentioned IS:456 covering quality assurance measures both technical and organizational, which shall also necessarily require a qualified Concrete Technologist to be available during manufacture of concrete for certification of quality of concrete.

b. Minimum M-30 grade of concrete shall be used in all structural elements of RCC, both in load bearing and framed structure.

c. The mechanical properties such as modulus of elasticity, tensile strength, creep and shrinkage of fly ash mixed concrete or concrete using fly ash blended cements (PPCs) are not likely to be significantly different and their values are to be taken same as those used for concrete made with OPC.

d. To control higher rate of carbonation in early ages of concrete both in fly ash admixed as well as PPC based concrete, water/binder ratio shall be kept as low as possible, which shall be closely monitored during concrete manufacture.

   If necessitated due to low water / binder ratio, required workability shall be achieved by use of Chloride free chemical admixtures conforming to IS : 9103. The compatibility of chemical admixtures and super plasticizers with each set of OPC, fly ash and / or PPC received from different sources shall be ensured by trails.

e. In environment subjected to aggressive chloride or sulphate attack in particular, use of fly ash admixed or PPC based concrete is recommended. In case, where structural concrete is exposed to excessive magnesium sulphate, fly ash substitution/content shall be limited to 18% by weight. Special type of cement with low $C_3A$ content may also be alternatively used. Durability criteria like minimum binder content and maximum water/binder ratio also need to be given due consideration in such environment.

f. Wet curing period shall be enhanced to a minimum of 10 days or its equivalent. In hot & arid regions, the minimum curing period shall be 14 days or its equivalent.

g. Subject to General Guidelines detailed out as above, PPC manufactured conforming to IS:1489 (Part-I) shall be treated at par with OPC for manufacture of Design Mix Concrete for structural use in RCC.

h. Till the time, BIS makes it mandatory to print the %age of fly ash on each bag of cement, the certificate from the PPC manufacturer indicating the same shall be insisted upon before allowing use of such cements in works.

i. While using PPC for structural concrete work, no further admixing of fly ash shall be permitted.

2.2.2 Samples of cement arranged by the contractor shall be taken by the Engineer-in-Charge and got tested in accordance with provisions of relevant BIS Codes. The cement for such testing purpose shall be supplied by the contractor free of charge. In case test results indicate that the cement arranged by the contractor does not conform to the relevant BIS Codes, the same shall stand rejected and shall be removed from the site by the contractor at his own cost within a week's time of written order from the Engineer-in-Charge or his authorized representative to do so. The cost of tests shall be borne by the contractor.

2.2.3 Cement shall be brought at site in bulk supply of approximately 200 tones or as decided by the Engineer-in-Charge.

2.2.4 OPC &PPC bags shall be stored in separate godowns. Separate godowns for tested cement and fresh cement (under testing) to be constructed by the contractor at his own cost as per sketches given in C.P.W.D Specifications having weather-proof roofs and walls. The size of the cement godown is indicated in the sketches for guidance. The actual size of godown shall be as per site requirements and nothing extra shall be paid for the same. Each godown shall be provided with a single door with two locks. The keys of one lock shall remain with Engineer-in-Charge or his authorized representative of the work and that of other lock with the authorized agent of the contractor at the site of work so that the cement is issued from godown according to the daily requirement with the knowledge of both parties. The account of daily receipt and issue of cement shall be maintained in a register in the prescribed proforma and signed daily by the contractor or his authorized agent and Engineer-in-Charge or his authorized representative in token of its correctness. The day to day receipt and issue accounts of different grade/brand of cement shall be maintained separately in the standard proforma by the contractor or his authorized representative which shall be duly signed by the authorized representative of the Engineer-in-Charge before issue to the work on day to day basis.

Required number of cement godowns each having capacity as decided by the Engineer-in-Charge shall be constructed by the contractor at site of work for which no extra payment shall be made. The contractor shall be responsible for the watch and ward and safety of the cement go-downs. The contractor shall facilitate the inspection of the cement go-downs by the Engineer-in-Charge at any time.

The register should be issued by the EE and each page should be machine numbered. The cement godown and the register are required to be checked by the AE/EE in-charge of the work as mentioned below: -

a. At least weekly or fortnightly, respectively in case of works located at the headquarters of AE/EE and.

b. Whenever they visit the site of work in case of works located outside the Sub-Divisional/Divisional Head Quarters.

c. In the case of large concentrated projects like major bridges etc., the EE should check the cement register at least fortnightly.

2.2.5 The actual issue and consumption of cement on work shall be regulated and proper accounts maintained as provided in the contract. The theoretical consumption of cement shall be worked out as per procedure prescribed in Clause-38of the contract and shall be governed by the conditions laid therein.

2.2.6 If the quantity of cement actually used in the work is found to be more than the theoretical quantity of cement including authorized variation, nothing extra shall be payable to the contractor on this account. In the event of it being discovered that after the completion of the work, the quantity of cement used is less than the quantity ascertained as herein before provided (allowing variation on the minus side as stipulated in Clause - 38), the cost of quantity of cement not so used shall be recovered from the contractor as specified in schedule. Decision of the Engineer-in-Charge in regard to theoretical quantity of cement which should have been actually used as per the schedule and recovered at the rate specified, shall be final and binding on the contractor.

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

2.2.7 Cement brought to site and cement remaining unused after completion of work shall not be removed from site without written permission of the Engineer-in-Charge.

2.2.8 Damaged cement shall be removed from site immediately by the contractor on receipt of notice in writing from the Engineer-in-charge. If he does not do so within three days of receipt of such notice, the Engineer-in-charge shall get it removed at the cost of the contractor.

2.2.9 In case the contractor brings surplus quantity of cement the same shall be removed from the site after completion of work by the contractor at his own cost after approval of the Engineer-in-Charge.

2.2.10 In case cement has been stored for over six (06) months from the date of manufacture or for any reason the stored cement shown sign of deterioration and contamination it shall be tested prior to use in the work.

The sample shall be taken within three weeks of the delivery and all the tests shall be commenced within one week of sampling and not later than 03 months from the receipt of sample for testing.

After completion of previous test if cement is stored more than 03 months, it shall be retested before use.

2.2.11 **Compressive Strength of Cement**

The average compressive strength of at least three mortar cubes (area of face 50 $cm^2$) composed of one part of cement, three parts of standard sand (conforming to IS 650:1996) by mass and P/4+3.0 percent (of combined mass of cement plus sand) water, and prepared, stored and tested in the manner described in IS 4031 (Part 6): 1988, shall be as follows:

a) 72±1 hour not less than 23 MPa
b) 168±2 hour not less than 33 MPa
c) 672±4 hour not less than 43 MPa

NOTE: - P is the percentage of water required to produce a paste of standard consistency (see as below)

**Consistency of Standard Paste: -**

The quantity of water required to produce a paste of standard consistency, to be used for the determination of the water content mortar for the compressive strength tests and for the determination of soundness and setting time, shall be obtained by the method described in IS 4031 (part 4) : 1988.

**2.3 STEEL REINFORCEMENT: -**

2.3.1 The Contractor shall procure IS marked ~~TMT bars/~~low Alloy steel reinforcement bars of grade Fe-500 D or more from the approved steel manufacturers as per list of approved makes forming part of this document or their authorized dealers having valid BIS license for IS: 1786-2008 and further confirming to the **OM No.CSQ/SE(TAS)/Steel/2024/262(H) dated 14.08.2024.**

The procured steel should have following qualities:

i. Excellent ductility, bend ability and elongation of finished product due to possible refining technology.
ii. Consumption of steel should be accurate as per design
iii. Steel should have no brittleness problem in finished product.
iv. Steel should carry the quality of corrosion and earthquake resistance.
v. Quality steel with achievement of proper level of Sulphur and phosphorus as per IS: 1786-2008.

2.3.2 The contractor shall have to obtain and furnish test certificates to the Engineer-in-charge in respect of all supplies of steel brought by him to the site of work.

2.3.3 Samples shall also be taken and got tested by the Engineer-in-charge as per the provisions in this regard in relevant BIS codes. In case the test results indicate that the steel arranged by the contractor does not conform to the specifications, the same shall stand rejected, and it shall be removed from the site of work by the contractor at his cost within a week time on written orders from the Engineer-in-charge to do so. Else the department shall remove it and recover double the cost of removal from the contractor.

2.3.4 The steel reinforcement bars shall be brought to the site in bulk supply of 10tonnesor more, or as decided by the Engineer-in-charge.

2.3.5 The steel reinforcement bars shall be stored by the contractor at site of work in such a way as to prevent their distortion and corrosion, and nothing extra shall be paid on this account. Bars of different sizes and lengths shall be stored separately to facilitate easy counting and checking.

2.3.6 For checking nominal mass, tensile strength, bend test, re-bend test etc. specimens of sufficient length shall be cut from each size of the bar at random, and at frequency not less than that specified below:

| Size of bar | For consignment below 100tonnes | For consignment above 100tonnes |
|---|---|---|
| Under 10mm dia bars | One sample for each 25tonnes or par thereof. | One sample for each 40tonnes or part thereof. |
| 10mm to 16mm dia bars | One sample for each 45tonnes or part thereof. | One sample for each 50tonnes or part thereof. |
| Over 16mm dia bars | One sample for each 50tonnes or part thereof. | One sample for each 75tonnes or part thereof. |

2.3.7 The contractor shall supply free of charge the steel required for testing including its transportation to testing laboratories. The cost of tests shall be borne by the contractor.

2.3.8 The actual issue and consumption of steel on work shall be regulated and proper accounts shall be maintained as provided in clause 10 of the contract. The theoretical consumption of steel shall be worked out as per procedure prescribed in **clause 38** of the contract and shall be governed by conditions laid therein.

In case the consumption is less than theoretical consumption including permissible variations leading to under designing of the structure, the work shall be summarily rejected, otherwise recovery at the rate so prescribed shall be made after ensuring structural soundness and stability.. In case of excess consumption, no adjustment needs to be made.

2.3.9 The steel brought to site and the steel remaining unused shall not be removed from site without the written permission of the Engineer-in-charge.

2.3.10 The contractor shall submit original vouchers from the manufacturer for the total quantity of steel supplied under each consignment to be incorporated in the work. All consignment received at the work site shall be inspected by the Site staff along with the relevant documents before acceptance. The contractor shall obtain Original Vouchers and Test Certificates and furnish the same to the Engineer-in-Charge in respect of all the lots of steel brought by him from approved supplier to the site of work. The original vouchers and test certificates shall be defaced by the Site staff and kept on record in the site office.

2.3.11 Reinforcement including authorized spacer bars and laps shall be measured in length of different diameters as actually (not more than as specified in the drawings) used in the work nearest to a centimeter. Wastage and unauthorized overlaps shall not be measured.

2.3.12 The standard sectional weights referred to as in Table 5.4 in para 5.3.4 in CPWD Specifications will be considered for conversion of length of various sizes of M.S. Bars, Steel Bars and T.M.T. bars into Standard Weight.

2.3.13 Records of actual Sectional weights shall also be kept dia-wise and lot-wise. The average sectional weight for each diameter shall be arrived at from samples from each lot of steel received at site. The decision of the Engineer-in-Charge shall be final for the procedure to be followed for determining the average sectional weight of each lot. Quantity of each diameter of steel received at site of work each day will constitute one single lot for the purpose. The weight of steel by conversion of length of various sizes of bars based on the actual weighted average sectional weight shall be termed as Derived Actual Weight. However for the stipulated issue of steel reinforcement up to and including 10mm diameter bars, the actual weight of steel issued shall be modified to take into account the variation between the actual and the standard coefficients and the contractors' accounts will be debited by the cost of modified quantity.

2.3.14 (a) If the Derived Weight as in sub-para (2.3.13) above is less than the Standard Weight as in Sub-para (2.3.12) above then the Derived Actual Weight shall be taken for payment provided,if it is within the following tolerances specified in IS1786-2008, otherwise whole lot will be rejected.

**Tolerances on Nominal Mass**

| Nominal Size in mm | Tolerance on Nominal mass Percent | | |
|---|---|---|---|
| | Batch | Individual Sample* | Individual sample for coil** |
| Upto and including 10 | ±7 | -8 | ±8 |
| a) Over 10 upto and Including 16 | ±5 | -6 | ±6 |
| b) Over 16 | ±3 | -4 | ±4 |

* For individual sample plus tolerance is not specified.

**For coils batch tolerance is not specified.

c) If the Derived Actual Weight is found more than the Standard Weight, the Standard Weight as per in sub-para (2.3.12) above shall be taken for payment. In such case nothing extra shall be paid for the difference between the Derived Actual Weight and the Standard Weight.

## 2.4 SAFETY IN CONSTRUCTION

2.4.1 The contractor shall employ only such methods of construction, tools and plants as are appropriate.

2.4.2 The contractor shall take all precautions and measures to ensure safety ofworks and work man and shall be fully responsible for the same.

2.4.3 Safety pertaining to construction such as centering & shuttering, scaffolds, ladders, working platforms, gangway etc. shall be governed by CPWD safety code, relevant safety codes and the directions of Engineer in charge.

2.4.4 All the staging to be either of tubular steel structure with adequate bracings as approved or made of built up structural sections made from rolled structural steel sections.

2.4.5 Form work shall be properly designed for self-weight, weight of reinforcement, weight of fresh concrete and in addition the various live loads likely to be imposed during construction process.

2.4.6 The form work shall be designed & constructed so as to remain sufficiently rigid during placing & compaction of concrete & shall be such as to prevent loss of slurry from the concrete.

2.4.7 The vertical supports shall be adequately braced or otherwise secured in position that these do not fall when the load gets released or the supports are accidentally hit.

2.4.8 A thorough inspection of tubular steel centering is necessary before its erection and members showing evidence of excessive rusting, kinks, dents or damaged welds shall be discarded. Buckled or broken members shall be replaced. Care shall also be taken that locking devices are in good working order and that coupling pins are effectively aligned to frames. Tubes should have end to end joints in adjacent tubes staggered. Sleeve couplers should be used in preference to joint pins for axial connections.

2.4.9 Inclined forms which give rise to very high horizontal forces should be taken care of by trussing and diagonal bracing

2.4.10 Vertical members should be placed centrally under the members to be supported and over the member supporting them with no eccentricity exceeding 25mm

2.4.11 The centering frames shall be tied together with sufficient braces to make a rigid and solid unit. It shall be ensured that struts and diagonal braces are in proper position and are secured so that frames develop full load carrying capacity. As erection progresses, all connecting devices shall be in place and shall be fastened for full stability of joints and units.

2.4.12 Wedges under the supports shall be set on firm soil / PCC which assures adequate stability for all props. Care shall be taken not to disturb the soil under the supports. Adequate drainage shall be provided to drain away the water coming due to rains, easing of forms or during the curing of the concrete to avoid softening of the supporting soil strata.

2.4.13 During pouring of the concrete the centering shall be constantly inspected and strengthened, if required wedges below the vertical supports tightened and adjustment screws properly adjusted as necessary.

2.4.14 Only workmen actually engaged in the form work shall be allowed in the area during operations. Those engaged in removing the form work shall wear helmets, gloves and heavy soled shoes and approved safety belts etc.

2.4.15 The safety code as lay down in respective clauses of Agreement shall be strictly followed.

# PARTICULAR SPECIFICATIONS

## (Civil Component)

## 1. GENERAL

1.1 The work shall be carried out as per CPWD Specifications 2019 Vol. I & II with upto date correction slips.

1.2 The work shall be executed and measured as per metric dimensions given in the Schedule of quantities, drawings etc. (F.P.S. units wherever indicated are for guidance only).

1.3 Wherever any reference to any Indian Standard Specification occurs in the documents relating to this contract, the same shall be inclusive of all amendments issued thereto or revisions thereof, if any.

1.4 Unless otherwise specified in the schedule of quantities the rates for all items of the work shall be considered as inclusive of pumping out or bailing out water if required for which no extra payment will be made. This will include water encountered from any source, such as rains, floods, and sub-soil water table being high due to any other cause whatsoever.

1.5 Unless otherwise specified in the schedule of quantities, particular specifications or CPWD specifications (subject to the order or preference) the rates tendered by the tenderer shall be all inclusive and shall apply to all lifts, all heights and all floor including terrace, leads and depths and nothing extra over and above the schedule of quantity shall be payable on this account.

1.6 The work shall be carried out in accordance with the Architectural drawings, structural drawings and approved shop drawings. The structural shop and architectural drawings shall have to be properly correlated before executing the work. In case of any difference noticed between architectural and structural drawings, the contractor shall obtain final decision of the Engineer-in-charge. In case of any discrepancy in the item given in the schedule of quantities appended with the tender and architectural drawings related to the relevant items, the former shall prevail unless and otherwise given in writing by the Engineer in charge. Nothing extra shall be payable on this account.

1.7 Wherever any reference to any Indian Standards occurs in the documents relating to this contract, the same shall be inclusive of all amendments issued thereto or revisions thereof, if any, up to the date of receipt of tenders.

1.8 The following additional specifications shall apply:

1.8.1 All stone aggregate and stone ballast shall be of hard stone variety and to be obtained from quarries near& around to site of work, approved by the Department of Mines and as per direction of the Engineer in charge

1.8.2 Coarse sand should be obtained from sand quarries of nearby rivers, approved by the Department of Mines, Govt. of Kerala. and as per direction of the Engineer in charge and to be used for cement concrete work including RCC, mortar for masonry and plaster work shall be of standard quality and screened as required. It shall be clean sand.

The agency may be permitted at the discretion of Engineer-in Charge to use crushed stone sand/Manufacture sand provided it confirms to grading and other requirements given in CPWD specifications. The change in sand type or source would require revision of Mix Design of Concrete from the approved laboratories any Government Engineering College /Institute, for which nothing extra shall be paid norany extra time will be granted. In case of use of crushed stone sand/Manufacture sand, all necessary precautions for CC work, RCC work, masonry work, plaster work and all other related works shall be taken by the agency as per relevant CPWD specifications and BIS codes without any extra cost.

1.9 The rates for all items of work shall unless clearly specified otherwise include for all floor levels of building and cost of all operations and all inputs of labour, material, T&P, scaffolding, wastages, watch and ward, other inputs, all incidental charges, all taxes, GST, duties, levies etc. required for execution of the work.

1.10 All crossings, embedment etc. in walls and floors for water supply, drainage and sanitary pipes, fittings etc. shall be provided for individual walls and floors so as to avoid cuttings of masonry work and floors. All such areas shall be made good during finishing and nothing extra shall be payable on these accounts.

1.11 **Product delivery, storage and handling of chemicals.**

1.11.1 The contractor shall construct storage space for Chemicals to ensure that the storage conditions are as recommended by the manufactures.

1.11.2 All the materials shall be procured and delivered in sealed containers with labels legible and intact.

1.11.3 All the chemicals (polymers, epoxy, water proofing compound, plasticizer, Polysulphide, all exterior and interior paints, polish etc.) shall be procured in convenient packs say 20 liters/Kgs.} capacity packing only or as approved by the Engineer-in-Charge, and not in bigger capacity containers, say 200 liter (Kgs.) drums unless otherwise specifically permitted by the Engineer-in-Charge. One sample from each lot of the chemical procured by the contractor shall be tested in a laboratory as approved by the Chief Engineer.

1.11.4 All material required for the execution of the work shall be got approved, procured and deposited with the Departmental supervisory staff. The materials shall be kept in joint custody of the contractor and the Department. The watch and ward of such material shall, however, remain to be the responsibility of the contractor and no claim, whatsoever, on this account shall be entertained. Different containers of each chemical shall be serially numbered on packing and also consumed in that order. Day-to-Day account of receipt, issue and balance shall be regulated by the Department and proper account shall be maintained at site of work in the prescribed form as per the standard practice.

1.11.5 All the chemicals shall be procured by the contractor directly from the manufacturer. In exceptional circumstances, the contractor may be allowed to procure the materials from the authorized dealers of the manufacturers, if specifically permitted by the Engineer-in-Charge.

1.11.6 The original copies of challan / cash memos towards the quantity of various chemicals procured shall be made available by the contractor at the request from the Engineer-in-Charge and a copy of the same shall be kept in record.

1.11.7 The Name of manufacturers, manufacturer's product identification, manufacturer's mixing instructions, warning for handling and toxicity and date of manufacturing and shelf life shall be clearly and legibly mentioned on the labels of each container.

1.11.8 The contractor shall submit for the chemicals procured, manufacturer's and / or authorized dealer's certificate regarding supplying and verifying conformance to the material specifications, as specified.

1.11.9 All filled containers shall be handled in safe manner and in a way to avoid breaking container seals.

1.11.10 Empty containers of the chemicals should not be removed from site till the completion of work and shall be removed only with the written approval of the Engineer-in-Charge.

1.11.11 All arrangements for measuring, dosing and mixing of material / chemicals at site have to be made by the contractor.

1.11.12 Contractor shall suitably advise his site Engineer and all the workers as regards safe handling of chemicals. Necessary protective and safety equipments in form of hand gloves, goggles etc. shall be provided by the contractor and be also used at site.

1.11.13 All incidental charges of any kind including cartage, storage and wastage and safe custody of material etc. shall be borne by the contractor and no claim, whatsoever, shall be entertained on this account.

1.11.14 The chemicals shall be tested in an independent laboratory as approved by the Chief Engineer at the frequency as specified. If required, more samples may have to be tested as per the directions of the Engineer-in-Charge. Nothing extra shall be payable on this account. However, all the testing charges shall be borne by the Contractor.

**2 <u>EARTH WORK: -</u>**

2.1 Earth work shall be executed as per CPWD specifications.

2.2 Excavation shall be undertaken to the width of footing including necessary margins for construction operation as per drawing or directed otherwise. Where the nature of soil or the depth of the trench and season of the year, do not permit vertical sides, the contractor at his own expense shall put up the necessary shoring, strutting and planking or cut slopes with or without steps, to a safer angle or both with due regard to the safety of personnel and works and to the satisfaction of the Engineer. Measurement of plan area of excavation for payment shall only be permitted.

2.3 All the major excavation shall be carried out by mechanical excavator. No extra payment shall be made for that.

2.4 The contractor shall make at his own cost all necessary arrangements for maintaining water level, in the area where works are under execution low enough so as not to cause any harm to the works or problems in carrying out with the execution and the rates for all items of work shall be considered asinclusive of pumping out or bailing out water, if required and for which no extra payment shall be made. This will include water coming from any source, such as rains, accumulated rain water, floods, leakages from sewer and water mains subsoil water table being high or due to any other cause whatsoever. The contractor shall make necessary provision of pumping, dredging, bailing out water coming from all above sources and excavation and other works shall be kept free of water by providing suitable system approved by the Engineer-in-Charge.

2.5 De-watering required, if any, shall be done conforming to BIS Code IS: 9759 (guide lines for de-watering during construction) and / or as per the specifications approved by the Engineer-in-Charge. Design of an appropriate and suitable dewatering system shall be the Contractor's responsibility. Such scheme shall be modified / augmented as the work proceeds based on fresh information discovered during the progress of work, at no extra cost. At all times during the construction work, efficient drainage of the site shall be carried out by the Contractor and especially during the laying of plain cement concrete, taking levels, etc. The Contractor shall also ensure that there is no danger to the nearby properties and installations on account of such lowering of water table. If needed, suitable precautionary measures shall be taken by the Contractor. Also, the scheme of dewatering adopted shall have adequate built-in arrangement to serve as stand-bye to attend to repair of pumps etc. and disruption of power / fuel supply. Nothing extra shall be payable on this account.

2.6 In trenches where surface water is likely to get into cut / trench during monsoons, a ring bund of puddle clay or by any other means shall be formed outside, to the required height, and maintained by the Contractor. Also, suitable steps shall be taken by the Contractor to prevent back flow of pumped water into the trench. Nothing extra shall be payable on this account.

## 3.0 R.C.C. WORK: -

### 3.1 Design Mix Concrete.

3.1.1 The term machine batched, machine mixed and machine vibrated design mix cement concrete used in the document shall mean the concrete produced in fully automatic concrete batching & mixing plant, placed in position by the concrete pump and vibrated by surface vibrator/ needle vibrator/ plate vibrator, as the case may be to achieve the required strength and durability.

The RCC work shall be done with Design Mix Concrete. Wherever letter "M" has been indicated, the same shall imply for the Design Mix Concrete. The Design Mix Concrete will be designated based on the principles given in IS: 456, 10262 & SP 23. The Conditions & Specifications stated herein shall have precedence over all conditions & specifications stated in relevant I.S. Codes / C.P.W.D. Specifications. The concrete mix shall be designed for the specified target mean compressive strength in order to ensure that work test result do not fall below the acceptance criteria specified for the concrete mix. The cement shall be actually weighed as presumption of each bag having 50kg shall not be allowed. The Contractor shall design mixes for each class of concrete indicating that the concrete ingredients and proportions will result in concrete mix meeting the requirements specified. Nothing extra shall be paid on this account.

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

(b) Admixture may be added in case of specific technical requirement so as to meet the workability / slump requirement or for any other reason but nothing extra is to be paid to contractor on account of adding admixtures. The admixture shall conform to IS: 9103. The chloride content in admixture shall satisfy the requirement of BS: 5075. The total amount of chlorides in admixture mixed concrete shall also satisfy the requirements of IS: 456:2000. Admixtures shall not be used without approval of Engineer-in-Charge. Whenever required, the admixture of approved quality & approved make only shall be used to attain the required workability. Nothing extra on account of use of Admixture / Plasticizer shall be payable.

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

### 3.2 GENERAL INFORMATION FOR READY MIX CONCRETE (RMC) TO BE GIVEN TO THE SUPPLIER BY THE CONTRACTOR

3.2.1 The contractor shall bring Ready Mix Concrete from approved RMC plants as mentioned in the list showing preferred Brands/ Manufacturers/Makes enclosed in this NIT. The contractor has to produce text of MOU proposed to be entered between purchaser (the contractor) and supplier (R.M.C. plant) to the Engineer-in-charge. The Engineer-in-charge shall give approval in writing. The contractor shall draw the MOU with approved RMC plant owner / company and submit to Engineer-in-charge within a week of such approval. The contractor will not be allowed to purchase ready mixed concrete without completion of above stated formalities for use in this project.

3.2.2 Notwithstanding the approval granted by Engineer-in-charge in aforesaid manner, the contractor shall be fully responsible for quality of concrete including input control, transportation and placement etc.

3.2.3 The Engineer-in-charge will reserve right to inspect at any such stage and reject the concrete if he is not satisfied about quality of product. The contractor should therefore draw MOU / agreement with RMC owner / company very carefully keeping all terms and conditions / specifications forming a part of this tender document.

(i) The Engineer-in-charge reserves the right to exercise control over the ingredients, water and admixtures purchased, stored and to be used in the concrete including conducting of tests for checking quality of materials, recordings of test results and declaring the materials fit or unfit for use in production of mix.

(ii) Calibration check of the RMC.

(iii) Weight and quantity check on the ingredients, water and admixtures added for batch mixing.

(iv) Time of mixing of concrete.

(v) Testing of fresh concrete, recordings of results and declaring the mix fit or unfit for use. This will include continuous control on the workability during production and taking corrective action.

3.2.4 For exercising such control, the Engineer-in-charge shall periodically depute his authorized representative at the RMC plant. It shall be responsibility of the contractor to ensure that all necessary equipment manpower & facilities are made available to E-in-C and/ or his authorized representative at RMC plant.

3.2.5 Ingredients, admixtures & water declared unfit for use in production of mix shall not be used. A batch mix found unfit for use shall not be loaded into the truck for transportation.

3.2.6 All required relevant records of RMC shall be made available to the Engineer-in-charge or his authorized representative. The E-in-C shall, as required, specify guidelines & additional procedures for quality control & other parameters in respect of materials and production & transportation of concrete mix, which shall be binding on the contractor & the RMC plant.

**3.3 Ingredients:**

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

(a) **Coarse Aggregate: -** As per CPWD Specifications

(b) **Fine Aggregate: -** As per CPWD Specifications

(c) **Water: -** It shall conform to requirements laid down in IS:456-2000 / Para 3.1.1 of CPWD Specifications (Vol. I 2019)

(d) **Cement: -**Portland Pozzolana Cement (Fly Ash based) conforming to IS: 1489/ OPC of grade 43 shall confirm to IS: 269, required in the work from reputed manufacturers of cement as per the approved make in 50 kg. bags bearing manufacturer's name and ISI marking, along with manufacturers test certificate for each lot. Portland Pozzolana Cement is to be used for RCC works only subject to fulfillment of conditions of circular number CDO / SE (RR) / fly ash (MAN) 02 dated 09.04.09 shall be used for design mix concrete and shall conform to IS-1489 (Part I). However, if the contractor uses higher grade of cement nothing extra shall be paid.

(e) **Admixture/ Plasticizer: -**The admixture shall conform to IS: 9103. The chloride content in admixture shall satisfy the requirement of BS: 5075. The total amount of chlorides in admixture mixed concrete shall also satisfy the requirements of IS: 456:2000. Admixtures shall not be used without approval of Engineer-in-Charge. Whenever required, the admixture of approved quality & approved make only shall be used to attain the required workability. Nothing extra on account of use of Admixture / Plasticizer shall be payable.

**3.4. WATER CEMENT RATIO AND SLUMP**

3.4.1 In proportioning a particular mix, the manufacturer/producer/contractor shall give due consideration to the moisture content in the aggregates, and the mix shall be so designed as to restrict the maximum free water cement ratio to less than the 0.45.

3.4.2 Due consideration shall be given to the workability of the concrete thus produced. Slump shall be controlled on the basis of placement in different situations.

| *Placing Conditions* | Degree of Workability | Slump (mm) |
|---|---|---|
| (1) | (2) | (3) |
| Lightly reinforced sections in slabs, beams, walls, columns | Low | 25-75 |
| Heavily reinforced section in slabs, beams, walls, columns. | Medium | 50-100 |
| Pumped concrete | Medium | 75-100 |

**3.5 CHARACTERISTIC COMPRESSIVE STRENGTH COMPLIANCE REQUIREMENT**

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

| **Specified Grade** | **Mean of the Group of 4 Non-overlapping consecutive test results in N/mm2** | **Individual Test Results in N/mm2** |
|---|---|---|
| (1) | (2) | (3) |
| M25 Or Above | ≥ $F_{ck}$ + 0.825 x established standard deviation (rounded off to nearest 0.5 N/mm$^2$) Or $F_{ck}$ + 4 N/mm$^2$, whichever is greater where $f_{ck}$ is characteristic compressive strength of CC cube at 28 days. | ≥ $F_{ck}$ – 4 N/mm$^2$ |
| **Note:** (i) In the absence of established value of standard deviation, the values given in Table as mentioned below may be assumed, and attempt should be made to obtain results of 30 samples as early as possible to establish the value of standard deviation.<br>(ii) The acceptance criteria for compressive strength as mentioned in IS:456- 2000 as amended upto date shall prevail over the above criteria in case of any difference. | | |

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

The contractor shall submit at his own cost, the mix design report from approved laboratories such as any Government Engineering College /Institute for approval of Engineer-in-charge within 30 days from the date of issue of letter of acceptance of the tender. No concreting shall be done until the mix design is approved. Every time sources of materials/cement is changed mix design report shall be got re- done and has to be got approved from Engineer In charge.

The various ingredients for mix design / laboratory tests shall be sent to the lab/ test houses through the Engineer-in-charge and the samples of such aggregates sent shall be preserved at site by the department. Nothing extra shall be paid on this account.

**In the event if all the above laboratories are unable to carry out the requisite design/ testing, the contractor may have it done from any other NABL accredited laboratory with prior approval of the Superintending Engineer-Calicut.**

3.7 The contractor shall submit the report on design mix from any of above approved laboratories for approval of Engineer in Charge within 30 days from the date of issue of letter of acceptance of the tender. No concreting shall be done until the design mix is approved. In case of the likely use of admixtures in concrete, the contractor shall design and test the concrete mix by using trial mixes with admixtures also, for which nothing extra shall be payable.

3.8 In case of change of source or characteristic properties of the ingredients used in the concrete mix design during the work, the contractor as per the directions of the Engineer-in-charge shall submit a revised concrete mix design report conducted at laboratory established at site. Nothing extra shall be paid on this account.

3.9 All cost of mix designing and testing, connected therewith, including charges payable to the laboratory shall be borne by the Contractor including redesigning of the concrete mix whenever required & as directed by Engineer-In-Charge.

3.10 The mix design for a specified grade of concrete shall be done for a target mean compressive strength Tck = Fck + 1.65s

Where Fck = Characteristic compressive strength at 28 days.

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

The degree of Quality Control for this work is "good" for which the standard deviation obtained for different grades of concrete shall be as follows: -

| GRADE OF CONCRETE | STANDARD DEVIATION |
|---|---|
| M-25 | 4.0 |
| M-30 | 5.0 |
| M-35 | 5.0 |
| M-40 | 5.0 |

However, actual standard deviation based on test strength of samples for each grade of concrete shall be calculated separately as per procedure laid down in clause 9.2.4 of Code of Practice IS 456:2000.

3.10.1 **TRIAL BATCHES**

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

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

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

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

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

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

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

**3.10.2 APPROVAL OF DESIGN MIX**

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

(a) The average strength of each test-set is not less than the specified target mean compressive strength (Tck).

(b) The strength of any specimen cube is not less than 0.85 fck.

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

## 3.11 DESIGN MIX CONCRETE FROM FULLY AUTOMATIC COMPUTERISED CONCRETE BATCHING AND MIXING PLANT

### 3.11.1 Proportioning Concrete

In proportioning cement concrete, the quantity of both cement and aggregates shall be determined by weight. The cement shall be weighed separately from the aggregates. Water shall either be measured by volume in calibrated tanks or weighed. All measuring equipment shall be maintained in a clean and serviceable condition. The amount of mixing water shall be adjusted to compensate for moisture content in both coarse and fine aggregates. The moisture content of aggregates shall be determined in accordance with IS: 2386 (Part III). Suitable adjustments shall also be made in the weights of aggregates to allow for the variation in weight of aggregates due to variation in moisture content.

### 3.11.2 Production of Concrete

3.11.2.1 The concrete shall be produced in a central batching and mixing plant with, computerized printing for contents and admixture dosage. The batching plant shall be fully automatic. Automatic batcher shall be charged by devices which, when actuated by a Single starter switch will automatically start the weighing operation of each material and stop automatically, when the designated weight of each material has been reached. The batching plant shall have automatic arrangement for dispensing the admixture and shall also be capable of discharging water in more than one stage. A print out from the batching plant for every lot shall be submitted. A batching plant essentially shall consist of the following components: Separate storage bins for different sizes of aggregates, silo for cement; and water storage tank.

- Batching equipment
- Mixers
- Control panels
- Mechanical material feeding and elevating arrangements

3.11.2.2 The compartments of storage bins for aggregates shall be approximately of equal size. The cement compartment shall be centrally located in the batching plant. It shall be watertight and provided with necessary air vent, aeration fittings for proper flow of cement & emergency cement cut off gate. The aggregate and sand shall be charged by power operated centrally revolving chute. The entire plant from mixer floor upward shall be enclosed and insulated. The batch bins shall be constructed so as to by self-cleansing during drawdown. The batch bins shall in general conform to the requirements of IS: 4925.

**3.11.2.3 WATER:**

1. Water to be used in manufacturing and curing of Concrete shall be tested before use. All such tests shall be submitted to the Engineer in charge forhis approval before water is used in work.
2. Contractor shall identify the location of source of water intended to be used. Each such source of water shall be separately tested. In the event of a change in source of water all tests specified herein shall have to be repeated.
3. In the event of water is drawn from tube wells or open wells, water samples shall be for seasonal fluctuations in water table or at intervals to be directed by the Engineer in charge.

1. Water samples from each source shall be tested as under:

   One test at commencement of work for approval of each source and there after change of source and

   Thereafter, water from each source shall be got tested during the dry season before monsoon and again after the monsoon.

   Time period between two tests shall not exceed six months.

2. Approved quality water shall be collected and stored in the Under Ground sumps/elevated tanks for the day to day requirement of work and same shall be used for all cement works and also for curing. Due care shall be taken in this regard.

3.11.2.4 The batching equipment shall be capable of determining and controlling the prescribed amounts of various constituent materials for concrete accurately i.e., water, cement, sand, individual size of coarse aggregates etc. The accuracy of the measuring devices shall fall within the following limits.

| | |
|---|---|
| Measurement of Cement | ±2% of the quantity of cement in each batch |
| Measurement of Water | ±3% of the quantity of water in each batch |
| Measurement of Aggregate | ±3% of the quantity of aggregate in each batch |
| Measurement of Admixture | ±3% of the quantity of admixture in each batch |

**3.11.2.5 Mixing Concrete**

3.11.2.5.1 The mixer in the batching plant shall be so arranged that mixing action in the mixers can be observed from the operator's station. The mixer shall be equipped with a mechanically or electrically operated timing, signaling and metering device which will indicate and assure completion of the required mixing period. The mixer shall have all other components as specified in IS: 4925.

**3.11.2.6 Transportation, Placing and Compaction of Concrete**

3.11.2.6.1 Mixed concrete from the batching plant shall be transported to the point of placement by transit mixers or through concrete pumps or steel closed bottom buckets capable of carrying 0.6 cum concrete. In case the concrete is proposed to be transported by transit mixer, the mixer speed shall not be less than 4 rev/ min. of the drum nor greater than a speed resulting in a peripheral velocity of the drum as 70 m / minute at its largest diameter. The agitating speed of the agitator shall be not less than 2 rev / min. nor more than 6 rev / min. of the drum. The number of revolutions of the mixing drum or blades at mixing speed shall be between 70 to 100 revolutions for a uniform mix, after all ingredients, have been charged into the drum. Unless tempering water is added, all rotation after 100 revolutions shall be at agitating speed of 2 to 6 rev / min. and the number of such rotations shall not exceed 250. The general construction of transit mixer and other requirements shall conform to IS: 5892.

3.11.2.6.2 In case concrete is to be transported by pumping, the conduit shall be primed by pumping a batch of mortar / thick cement slurry through the line to lubricate it. Once the pumping is started, it shall not be interrupted (if at all possible) as concrete standing idle in the line is liable to cause a plug. The operator shall ensure that some concrete is always there in the pump-receiving hopper during operation. The lines shall always be maintained clean and shall be free of dents.

3.11.2.6.3 Materials for pumped concrete shall be batched consistently and uniformly. Maximum size of aggregate shall not exceed one-third of the internal diameter of the pipe. Grading of aggregate shall be continuous and shall have sufficient ultra-fine materials (materials finer than 0.25mm). Proportion of fine aggregates passing

through 0.25mm shall be between 15 & 30% and that passing through 0.125 mm sieve shall not be less than 5% of the total volume of aggregate. When pumping long distances and through hot weather, set-retarding admixtures may be used. Admixtures to improve workability can be added. Suitability of concrete shall be through pumping shall be verified by trial mixes and by performing pumping tests.

**3.12 PREPARATION OF MIXES AS PER APPROVED DESIGN MIX AND CONDUCTING CONFIRMATORY TEST AT FIELD LAB.**

3.12.1 The contractor shall make the cubes of trial mixes as per approved Mix design at site laboratory for all grades, in presence of Engineer in charge using sample of approved materials proposed to be used in the work prior to commencement of concreting and get them tested in his presence to his entire satisfaction for 7 days and 28 days. Test cubes shall be taken from trial mixes as follows.

3.12.2 For each mix, a set of six cubes shall be made from each of the three consecutive batches. Three cubes from each set of six shall be tested at age of 7 days and remaining three cubes at age of 28 days. The cubes shall be made, cured, transported and tested strictly in accordance with specifications. The average strength of nine cubes at age of 28 days shall exceed the specified target mean strength for which design mix has been approved, the evaluation of test results will be done as per IS: 456-2000.

**3.12.3 Frequency of Sampling**

**3.12.3.1 *Sampling Procedure*engaged for**

A random sampling procedure shall be adopted to ensure that each concrete batch shall have a reasonable chance of being tested that is the sampling should be spread over the entire period of concreting and cover all mixing units.

**3.12.3.2 Frequency**

***The*** minimum frequency of sampling of concrete of each grade shall be in accordance with the following:

| ***Quantity of Concrete in the Work, m3*** | ***Number of Samples*** |
|---|---|
| I -10 | 1 |
| 11 - 30 | 2 |
| 31 -60 | 3 |
| 61- 100 | 4 |
| 101 and above | 4 plus one additional sample for each additional 50 m3 or part thereof |

**NOTE-** *Each sample shall be adequate quantity so that a minimum of 3 specimen cubes can be made. Test of the sample is to be done in accordance with IS: 516 (Minimum Quantity : 10 cum).*

**3.12.4 Test Specimen**

Three test specimens shall be made for each sample for testing at 28 days. Additional samples may be required for various purposes such as to determine the strength of concrete at 7 days or at the time of striking the formwork, or to determine the duration of curing, or to check the testing error. Additional samples may also be required for testing samples cured by accelerated methods as described in IS 9103. The specimen shall be tested as described in IS 516.

**3.12.5 Test Results of Sample**

The test results of the sample shall be the average of the strength of three specimen. The individual variation shall not be more than +/- 15 percent of the average. If more, the test results of the sample are invalid. 90% of the total tests shall be done at the laboratory established at site by the contractor and remaining 10% in the laboratory as mentioned in para 3.6, or in any other NABL accredited laboratory as directed by the Superintending Engineer, CPWD, Calicut.

### 3.12.6 ACCEPTANCE CRITERIA

#### 3.12.6.1 Compressive Strength

The concrete shall be deemed to comply with the strength requirements when both the following condition are met:

a) The mean strength determined from any group of four consecutive test results complies with the appropriate limits in col 2 of Table given under para 3.5 above.

b) Any individual test result complies with the appropriate limits in col 3 of Table given under para 3.5 above.

#### 3.12.6.2 Quantity of Concrete Represented by Strength Test Results

The quantity of concrete represented by a group of four consecutive test-results shall include the batches from which the first and last samples were taken together with all intervening batches.

Where the mean rate of sampling is not specified the maximum quantity of concrete that four consecutive test results represent shall be limited to 60 $m^3$.

3.12.6.3 Concrete of each grade shall be assessed separately.

3.12.6.4 Concrete is liable to be rejected if it is porous or honey-combed, its placing has been interrupted without providing a proper construction joint, the reinforcement has been displaced beyond the tolerances specified, or construction tolerances have not been met. However, the hardened concrete may be accepted after carrying out suitable remedial measures to the satisfaction of the Engineer-in-Charge.

### 3.12.7 Ultrasonic Pulse Velocity Method of Test for RCC

3.12.7.1 The underlying principle of assessing the quality of concrete is that comparatively higher velocities are obtained when the quality of concrete in terms of density, homogeneity and uniformly is good. The consistency of the concrete as regards its general quality gets established. In case of poorer quality lower velocities are obtained. If there are cracks, voids or flaws inside the concrete which come in the way of transmission of pulse, lower velocities are obtained.

3.12.7.2 The quality of concrete in terms of uniformity, incidence or absence of internal flaws, cracks and segregation etc. indicative of the level of workmanship employed, can thus be assessed using the guidance given in table below, which have been evolved for characterizing the quality concrete in structure in term of the ultrasonic pulse velocity.

**Velocity criterion for Concrete Quality Grading.**

| Sl. No. | Pulse velocity by Cross Probing (km/sec) | Concrete Quality Grading |
|---|---|---|
| 1 | Above 4.40 | Excellent |
| 2 | 3.75 to 4.40 | Good |
| 3 | 3.0 to 3.75 | Doubtful |
| 4 | Below 3.0 | Poor |

Note: In Case of "doubtful" quality it may be necessary to carry further tests.

3.12.7.3 Pulse velocity method of test of concrete is to be conducted for CPWD works as a routine test. The acceptance criteria as per the above table will be applicable which is as per IS 13311 (part-1): 1992. From the above "Good" and "Excellent" grading are acceptable and below these grading the concrete will not be acceptable. The cost of testing shall be borne by the contractor.

3.12.7.4 5% of the total number of RCC members in each category for the works executed by the agency i.e., beam, column, slab and footing may be tested by UPV test method for establishing quality of concrete. It is suggested that test be conducted on RCC beam near joint with column, on RCC column near joint with beam, on RCC footings and rafts. On RCC rafts a suitable grid can be worked out for determining number of

tests. In addition, doubtful areas such as honeycombed locations, locations, where continuous seepage is observed, construction joints and visible loose pockets will also be tested.

3.12.7.5 The test results are to be examined in view of the above acceptance criteria "Good" and "Excellent" and wherever concrete is found with less than required quality as per acceptance criteria, repairs to concrete will be made. Honeycombed areas and loose pockets will be repaired by grouting using Portland Cement Mortar/Polymer Modifies Cement Mortar /Epoxy Mortar etc. after chipping loose concrete in appropriate manner. In areas where concrete is found below acceptance criteria and defects are not apparently visible on surface, injecting approved grout in appropriate proportion using epoxy grout /acrylic Polymer modified cements slurry made with shrinkage compensating cement / plain cement slurry etc. will be resorted to for repairs. (refer relevant chapters from CPWD Hand Book on Repairs and Rehabilitation of RCC Buildings).Repair to concrete will be done till satisfactory results are obtained as per the acceptance criteria by retesting of the repaired area. If satisfactory results are not obtained dismantling and relaying of concrete will be done.

## 3.13 SPECIAL CONDITIONS FOR DESIGN MIX CONCRETE

1 The term machine batched, machine mixed and machine vibrated design mix cement concrete used in the document shall mean the concrete produced at site in fully automatic concrete batching & mixing plant (IS 4925), placed in position by the concrete pump and vibrated by surface vibrator/ needle vibrator/ plate vibrator, as the case may be to achieve required strength and durability. (However, for small elements like lintels, chajjas, shelves etc., the requirement of pumping would be dispensed with as per direction of Engineer – in – charge and placement would be done through alternative means).

2. Design mix concrete shall be used in the work for all structural members. For design mix concrete revised CPWD specifications 2019 along with relevant IS codes shall be followed in general along with the specific provisions made herein.

3. Following parameters shall be adopted for mix design.

3.1

| Grade of Concrete | M25 | M30 | M40 |
|---|---|---|---|
| (i) Nominal Max size of aggregate | 20 mm angular as per CPWD specification | 20mm angular as per CPWD specification | 20 mm angular as per CPWD specification |
| ii) Degree of workability (Slump) mm<br>a) Without Pump<br>b) With Pump | 25 to 75mm<br>75 to 100 mm | 25mm to 75mm<br>75mm to 100 mm | 25 to 75 mm<br>75 mm to 100 mm |
| (iii) Degree of quality control | Good. | Good. | Good. |
| (iv) Type of exposure | Severe | Severe | Severe |
| (v) Max free water cement/ ratio | 0.45 | 0.45 | 0.40 |
| (vi) Minimum Cement Content | 330kg/cum and as specified in the item. | 350 kg/cum and as specified in the item. | 390 kg/cum and as specified in the item. |
| (vii) Fine Aggregate | Coarse sand as per CPWD specifications. | Coarse sand as per CPWD specifications. | Coarse sand as per CPWD specifications. |
| (viii) Mix applicable | Plain/Reinforced cement concrete | Plain/Reinforced cement concrete | Plain/Reinforced cement concrete |

| | | | |
|---|---|---|---|
| (ix) Method application | Pumping | Pumping | Pumping |
| (x) Max Cement content | 500 kg/Cum | 500 kg/Cum | 500 /Cum |
| (xi)<br>a) Characteristic compressive strength compliance requirement.<br>(Mean of group of 4 non-overlapping tests and consecutive test)<br>(N/ Sqmm) | Greater than or equivalent to $f_{ck}$+0.825xEstablished standard deviation<br>Or<br>$F_{ck}$+3whichever is more | Greater than or equivalent to $f_{ck}$+0.825xEstablished standard deviation<br>Or<br>$F_{ck}$+4whichever is more | Greater than or equivalent to $f_{ck}$+0.825xEstablished standard deviation<br>Or<br>$F_{ck}$+4whichever is more |
| b) Individual test (N/Sqmm) | $F_{ck}$-3 | $F_{ck}$-4 | $F_{ck}$-4 |

**Design parameters for M 10 & M15 Design mix concrete**

Following parameters shall be adopted for mix design.

| Sl. No. | Grade of Concrete | M10 | M15 |
|---|---|---|---|
| **1** | Nominal Max size of aggregate | 20 mm angular as per CPWD specification | 20 mm angular as per CPWD specification |
| **2** | Degree of workability (Slump) mm | 25 - 75 | 25 - 75 |
| **3** | Degree of quality control | Good. | Good. |
| **4** | Type of exposure | Severe | Severe. |
| **5** | Max free water cement/ ratio | 0.50 | 0.50 |
| **6** | Type of cement used | Portland Pozzolana cement or OPC- 43 grade | Portland Pozzolana cement or OPC- 43 grade |
| **7** | Minimum Cement Content | 220Kg/cum and as specified in the item. | 240Kg/cum and as specified in the item. |
| **8** | Fine Aggregate | Coarse sand as per CPWD specifications. | Coarse sand as per CPWD specifications. |
| **9** | Mix applicable | Plain/Reinforced cement concrete | Plain/Reinforced cement concrete |
| **10** | Method application | Pumping | Pumping |
| **11** | Max Cement content | 500 kg/Cum | 500 kg/Cum |
| **12** | (A) Characteristic compressive strength compliance requirement.<br>(Mean of group of 4 non-overlapping tests and consecutive test)<br>(N/Sq.mm) | Greater than or equivalent to fck+0.825xEstablished standard deviation<br>Or<br>Fck+3whichever is more | Greater than or equivalent to fck+0.825xEstablished standard deviation<br>Or<br>Fck+3whichever is more |
| | (B) Individual test (N/Sq.mm) | Fck-3 | Fck-3 |

Sl. No.12 above is added for the purpose of operation of Clause 16 of IS 456 - 2000.

(1) Approved admixtures conforming to IS-9103 shall be permitted to be used. The chloride content in the admixture shall satisfy the requirement of BIS 5075. The total amount of chloride content in the admixture mixed concrete shall satisfy the requirement of IS 456-2000.

(2) The concrete mix design with and without admixture will be carried out by the contractor through the laboratory to be approved by the Engineer-in- Charge.

(3) The various ingredients for mix design/ laboratory tests shall be sent to the lab/test houses through the Engineer-in-Charge and the samples of such ingredients sent shall be preserved at site till completion of work or change in Design Mix whichever is earlier. The sample shall be taken from the approved materials, which are proposed to be used in the work.

(4) The contractor shall submit the mix design report from approved laboratories such as any Government Engineering College /Institute for approval of Engineer-in-charge within 30 days from the date of issue of letter of acceptance of the tender. No concreting shall be done until the mix design is approved.

(5) The contractor shall make cubes of trial mixes as per approved mix design at site laboratory for all grades of concrete in presence of the Engineer-in-charge using same ingredients as adopted for design mix, prior to commencement of concreting and get them tested in presence of Engineer- in – Charge for 7 days and 28 days. For each design mix, a set of six cubes shall be prepared from each of the three consecutive batches. Three cubes from each set shall be tested at the age of 7 days and three cubes at the age of 28 days. The cubes shall be made, cured, transported and tested strictly in accordance with CPWD specification. The average strength of nine cubes at the age of 28 days shall exceed the specified target mean strength for which design mix has been approved.

(6) Tests shall be done at the laboratory as approved by the Engineer-in-charge.

(7) For each change of source or quality / characteristic properties of the ingredients during the work, from that approved & used in the concrete mix a fresh mix design shall be got done by the contractor. Revised trial mix test shall be conducted and shall be submitted by the contractor as per the direction of the Engineer-in-charge.

(8) The cost of packaging, scaling, transportation, loading, unloading cost of samples and the testing charges for mix design in all cases shall be borne by the contractor.

(9) The mix design shall be done considering the degree of quality control as 'good' in all cases.

(10) The Item of design mix cement concrete shall be inclusive of all the ingredients including admixtures it required labour, machinery, T&P etc. (Expect shuttering which will be measured & paid for separately) required for a design mix concrete of required strength and workability. The rate quoted by the agency for the mix design items shall be net & nothing extra shall be payable on account of change in quantities of concrete ingredients like cement, sand, aggregates and admixtures etc. as per the approved mix design until unless specified elsewhere in the Notice Inviting Tender Documents.

(11) No fly ash shall be allowed to be added in the Design Mix at site

**3.14. COVER BLOCKS**: Contractor shall use factory made cover blocks of approved shape and strength for all RCC works to avoid displacement of bars in any direction and to ensure proper cover. Alternatively, the contractor may manufacture the cover blocks as per approved methodology by Engineer-In-charge. The grade of concrete shall be same grade as of concrete in which they will be used. The concrete shall be fiber reinforced concrete with 6mm downgraded aggregate. Shape & size shall be as decided by Engineer-In-charge.

**3.15. CURING:**

i) The contractor shall ensure moist curing to all structural members in general. Curing shall be done with 2 or 3 layers of wet hessian cloth covered by PVC sheets in order not to allow the moisture to evaporate.

ii) Since the design mix is having controlled water content, the contractor shall protect the concrete from drying shrinkage by resorting to early age curing. Covering of wet hessian cloth shall be done after the onset of the final setting time.

iii) The contractor shall submit methodology of proposed curing which ensures continuous maintenance of required temperature regime.

iv) Membrane curing by chemical compounds may be allowed at places which are normally inaccessible and repair works and nothing extra is payable on this account. If curing compounds are proposed for any particular use, the contractor shall obtain permission for use of any particular brand of compounds from Engineer-In-Charge.

**3.16 RATES: -**

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

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

**3.17. RCC WORK (ORDINARY)**

3.17.1 The work shall be done in accordance with CPWD Specifications.

3.17.2 Water Cement ratio for Ordinary RCC work shall not be more than 0.5. Contractor shall use concrete mixture of proper design having arrangement for measuring water for mixing of concrete.

**3.18 FORM WORK**

3.18.1 The work shall be done in general as per CPWD Specifications.

3.18.2 Only M.S. centering / shuttering and scaffolding material unless & otherwise specified shall be used for all R.C.C. work to give an even finish of concrete surface. However, marine-ply shuttering in exceptional cases as per site requirement may be used on specific request from contractor to be approved by the **Engineer-in-Charge**.

**3.18.3** Nothing extra shall be paid for the centering and shuttering, circular in shape whenever the formwork is having a mean radius exceeding 6m in plan.

**3.18.4** Nothing extra shall be paid for grid beams and the corresponding slabs having clear span more than 1.20 meters.

**3.18.5** In order to keep the floor finish as per architectural drawings and to provide required thickness of the flooring as per specifications, the level of top surface of R.C.C. shall be accordingly adjusted at the time of its centering, shuttering and casting for which nothing extra shall be paid to the Contractor except the places where different type of flooring is provided in the same room.

As per general engineering practice, level of floors in toilet / bath, balconies, shall be kept 12 to 20mm or as required, lower than general floors shuttering should be adjusted accordingly. Nothing extra is payable on this account.

**3.18.6** Steel shuttering as approved by the Engineer-in-Charge shall be used by the contractor. Minimum size of shuttering plates shall be 600mm x 900mm except for the case when closing pieces are required to complete the shuttering panels.

Dented, broken, cracked, twisted or rusted shuttering plates shall not be allowed to be used on the work.

The shuttering plates shall be cleaned properly with electrically driven sanders to remove any cement slurry or cement mortar or rust. Proper shuttering oil or de-bonding compound such as "Reebol " of FOSROC or equivalent shall be applied on the surface of the shuttering plates in the requisite quantity before assembly of steel reinforcement. Nothing extra shall be paid on this account.

**3.18.7** Concreting of upper floor shall not be done until concrete of lower floor has set at least for 14 days but form work and reinforcement can be taken up after the concrete has set at least for three days.

**3.18.8** Double steel scaffolding having two sets of vertical supports shall be provided for external wall finish, cladding etc. The supports shall be sound and strong, tied together with horizontal pieces over which scaffolding platform shall be fixed. Scaffolding shall have steel staircase for inspection of works at upper levels. Nothing extra shall be paid on this account.

**3.19. REINFORCEMENT: -**

**3.19.1.** The reinforcement shall be done as per CPWD Specifications.

**3.19.2.** The rate of item of reinforcement of RCC work includes all operations including straightening, cutting, bending, welding, binding with annealed steel or welding and placing in position at all the floors with all leads and lift complete as per CPWD Specifications.

**3.19.3** The contractor shall provide approved type of support for maintaining the bars in position and ensuring required spacing and correct cover of concrete to reinforcement as called for in the drawings, spacer blocks of required shape and size. Chairs and spacer bars shall be used in order to ensure accurate positioning of reinforcement. Spacer blocks shall be cast well in advance with approved proprietary pre-packed free flowing mortars (Conbextra as manufactured by M/S Fosroc Chemicals India Ltd. or approved equivalent) of high early strength and same colour as surrounding concrete. However, Cover Guard Bars shall also be used to maintain proper cover of RCC Columns in addition to spacer blocks as mentioned above. Pre-cast cement mortar/concrete blocks/blocks of polymer shall not be used as spacer blocks unless specially approved by the Engineer-in-charge. The rate of RCC items is inclusive of cost of such cover blocks & Cover Guard Bars. Nothing extra shall be paid on this account.

**4.0 MASONRY WORK: -**

4.1.1 The PCC block work shall be carried out with good quality Fly ash cement blocks of class designation 7 (strength not less than 70kg/sq.cm)as per CPWD Specifications.

4.1.2 The rate shall also include for leaving chases / notches for dowels / cramps for all kinds of cladding to come over brick work.

4.1.3 Brick work provided around shaft or lift walls or around slab cutouts shall be measured in the brick for corresponding floor level. Nothing extra shall be paid on this account.

4.1.4 M.S. Strip/ Bar provided at every third course of half brick masonry shall be in single piece. If required, welding joint can be used without overlaps. Nothing extra shall be paid for welding and overlaps.

**5.0 EXPANSION JOINT**

**5.1 General**

5.1.1 Seismic / separation/ expansion joints shall be provided where shown in the drawings and as per CPWD specifications and as directed by Engineer-in-Charge.

They shall be constructed with in gap between the adjoining parts of the works of the width specified.

5.1.2 The contractor shall ensure that no debris is allowed to enter and be lodged in seismic/ separation/ expansion joints.

5.1.3 The expansion joint shall be cleaned and made dry completely. All loose materials shall also be removed. The joints gap shall be made uniform in width and depth after cleaning the joints. The backup materials of best quality shall be provided in position in order to produce thoroughly together in required proportion as prescribed by manufacture specification, so that a uniform mixture obtained. The mixed solution shall be applied to two sides of the joint that it covers the sides complete. Disturbed edges of RCC members near expansion joints shall be finished with rich mortar without any extra work includes providing required width of expansion board in the joints and measurement of expansion board only shall be taken.

**6.0 GRANITE/ MARBLE OR LIKE WORKS**

6.1 The granite/ marble or like stonework shall, in general, be carried out as per the CPWD Specifications. The specifications for dressing, laying, curing, finishing, measurements, rate etc. for the granite/ marble or like stone flooring shall be same as that of works for the Marble flooring, skirting and risers of steps under Flooring Sub Head of the CPWD Specifications. The wall lining / veneer work with granite/ marble or like stone shall be as per the CPWD Specifications for Marble work Sub Head.

6.2 The decision of the Engineer-in-Charge as regards the approval of the samples for the various types of the granite/ marble or like stones shall be final and binding on the Contractor. No claim of any kind whatsoever shall be entertained from the Contractor on this account. The Contractor shall then procure and get the mock up prepared at site of work for approval of quality of workmanship and the granite/ marble or like stone as specified. The mock up shall be prepared in lift lobby, toilet etc. on one of the floors. The size of the stones shall be as per the architectural drawings. If the quality of the workmanship and the material is as per the required standards, the mock up shall be allowed as part of the work and measured for payment and shall not be dismantled. Otherwise, it shall be dismantled by the contractor as directed by the Engineer-in-Charge and taken away from the site of the work at his own cost. Nothing extra shall be payable on this account.

6.3 The granite/ marble or like stone slabs shall be cut to required sizes and shapes, as per the architectural drawings, to negotiate the curved steps in segmented manner. The risers shall also be cut to required sizes and shapes and the edges chamfered at the joints, all as per the architectural drawings. However, the Contractor shall prepare the detailed shop drawings for the same and commence work only after the approval by the Engineer-in-Charge. The rate shall also include any consequent wastage, incidental charges involved in this work. Nothing extra shall be payable on this account. For the purpose of payment, the actual area of each type of granite/ marble or like stone as laid shall be measured.

6.4 For the steps (risers and treads) in the linear profile, the granite/ marble or like stone shall be provided in single pieces as per the architectural drawings, unless otherwise specifically permitted by the Engineer-in-Charge. Wherever grooves are required to be provided the same is to be done as per architectural drawings and as directed by the Engineer-in-charge. Wherever required, the joints shall be provided as per the architectural drawings. Nothing extra shall be payable on these accounts.

6.5 The granite/ marble or like stone slabs used for providing and fixing in the sills, soffits and jambs of doors, windows, ventilators and similar locations shall be in single piece unless otherwise directed by the Engineer-in-Charge. Wherever stone slab other than in single piece is allowed to be fixed, the joints shall be provided as per the architectural drawings and as per the directions of the Engineer-in-Charge. Depending on the number of joints, as far as possible, the stone slabs shall be

procured and fixed in slabs of equal lengths as per the architectural drawings and as directed by Engineer-in-Charge.

6.6 While fixing the granite/ marble or like stone slabs in sills, soffits and jambs of doors, windows, ventilators etc., rebates shall be made by overlapping the stones at the required places for fixing shutters for doors, windows and ventilators etc. as shown in the architectural drawings and as per the directions of the Engineer-in-Charge. Epoxy based adhesives shall be used for fixing the granite/ marble or like stones to each other, or wherever required. The authorized overlap as per the architectural drawings or as directed by the Engineer-in-Charge shall be measured for payment under the same item. However, any extra mortar thickness required due to the overlap arrangement shall be deemed to have been included in the rate of this item. Nothing extra shall be payable on this account. The stone shall have uniform thickness and shall be provided in sizes as per the architectural drawings. The stone slab shall have uniformly leveled surface after fixing. All the joints shall be finished smoothly in a workmanlike manner.

6.7 The granite/ marble or like stone work shall be adequately protected by a layer of Plaster of Paris, which shall be maintained throughout and removed just before handing over of the works for which nothing extra shall be payable.

## 7.0 WOOD WORK

7.1 The wood work in general shall be carried out as per CPWD Specifications (Volume-I) 2019, with up-to-date correction slips

7.2 The sample of timber to be used shall be deposited by the contractor with Engineer-in-charge before commencement of work.

7.3 The shape and size of beading shall be as per drawings. The joints of beading shall be mitred.

7.4 Timber shall be of specified species, good quality and well-seasoned. It shall have uniform colour, reasonably straight grains and shall be free from knots, cracks, shakes and sapwood. It shall be close grained. The contractor shall deposit the samples of species of timber to be used with the Engineer-in-Charge for testing before commencement of the work.

7.5 Wood work shall not be painted, oiled or otherwise treated before it has been approved by the Engineer-in-charge. All portion of timber including architrave abutting against masonry, concrete, stone or embedded in ground shall be painted with approved wood preservative or with boiling coal tar.

7.6 The contractor(s) shall produce cash voucher and certificates from approved Kiln Seasoning Plants about the timber used on the work having been kiln seasoned and chemically treated by them, falling which it would not be accepted as kiln seasoned and/or chemically treated.

7.7 Transparent sheet glass conforming to IS: 2835 shall be used. Thickness being governed as under unless otherwise specified in the item in wood work/steel work:

| Area of Glazing | Thickness |
|---|---|
| (a) For glazing area up to 0.50 sqm | 4.0 mm |
| (b) For glazing area more than 0.50 sqm to 0.90 sqm | 6.0 mm |

7.8 Factory made wooden flush door and paneled and wire gauge shutters shall be manufactured and carried out as per CPWD specifications (Volume-I, 2019 with upto date correction slips).

7.9 The work shall be executed through specialized agencies to be approved by the Engineer –in- Charge.

7.10 The contractor shall propose well in advance to Engineer-in-Charge, the names and address of the factory where from the contractor intends to get the shutters manufactured along with the credential of the firm. The contractor shall place the

order for manufacturing of shutters only after obtaining approval of the Engineer in Charge whose decision in this case shall be final & binding. In case the firm is not found suitable he shall propose another factory. The factory may also be inspected by a group of officers before granting approval; shutters shall however he accepted only if these meet the specified test.

7.11 Contractor will arrange stage wise inspection of the shutters at factory by the Engineer-in-Charge or his authorized representative. The contractor will have no claim if the shutters brought at site in part or full lot are rejected by the Engineer-in-Charge due to bad workmanship / quality. Such defective shutters will not be measured and paid. The contractor shall remove the same from the site of work within 7 days after the written instruction in this regard are issued by the Engineer-in-Charge.

7.12 The shutters should be brought at site without primer / painting.

7.13 **(a)** Inspection of shutters shall be carried out for dimensions & tolerances, size & type general construction & workmanship, finish & glazing at the following frequency: -

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

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

**(c) Testing: -** The shutters shall be tested for species seasoning & treatment, defects in the timber, panel material, construction & workmanship in the approved Laboratory at the frequency mentioned in CPWD specification.

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

**(d) Finish**

i) All components of door shutter shall have smooth finish.

ii) Panels of the door shutters shall be flat and well sanded to a smooth and level Surface.

iii) All the surfaces of door shutters which are required to be painted or polished or varnished shall be got approved from the Engineer in Charge before applying protective coat of primer, polish or varnish.

**8.0 Flush Doors**

**8.1 General**

The door shall be of flush type solid core marine grade with single or double shutter as the case may be.

**8.2 Shutters**

Flush door shutters shall have a solid core and may be of the decorative or non-decorative (Paintable type as per IS 2202 (Part I). Nominal thickness of shutters may be 30mm as mentioned in the BOQ. Thickness and type of shutters shall be as specified.

Width and height of the shutters shall be as shown in the drawings or as indicated by the Engineer-in-Charge. All four edges of the shutters shall be square. The shutter shall be free from twist or warp in its plane. The moisture content in timbers used in the manufacture of flush door shutters shall be not more than 12 per cent when tested according to IS 1708.

**8.3 Core**

The core of the flush door shutters shall be a marine grade block board having wooden strips held in a frame constructed of stiles and rails. Each stile and rail shall be a single piece without any joint. The width of the stiles and rails including lipping, where provided shall not be less than 45mm and not more than 75mm. The width of each wooden strip shall not exceed 30mm. Stiles, rails and wooden strips forming the core of a shutter shall be of equal and uniform thickness. Wooden strips shall be parallel to the stiles.

**8.4 End joints** of the pieces of wooden strips of small lengths shall be staggered. In a shutter, stiles and rails shall be of one species of timber. Wooden strips shall also be of one species only but it may or may not be of the same species as that of the stiles and rails. Any species of timber may be used for core of flush door. However, any non-coniferous (Hard wood) timber shall be used for stiles, rails and lipping.

**8.5 Face Panel**

The face panel shall be formed by gluing, by the hot-press process on both faces of the core, either plywood or cross-bands and face veneers. The thickness of the cross bands as such or in the plywood shall be between 1.0mm and 3.0mm. The thickness of the face veneers as such or in the plywood shall be between 0.5mm and 1.5mm for commercial veneers and between 0.4mm and 1.0mm for decorative veneers, provided that the combined thickness of both is not less than 2.2mm. The direction of the veneers adjacent to the core shall be at right angles to the direction of the wooden strips. Finished faces shall be sanded to smooth even texture. Commercial face veneers shall conform to marine grade plywood and decorative face veneers shall conform to type I decorative plywood in IS 1328.

**8.6 Lipping**

Lipping, where specified, shall be provided internally on all edges of the shutters. Lipping shall be done with battens of first-class hardwood or as specified of depth not less than 25mm. For double leaved shutters, depth of the lipping at meeting of stiles shall be not less than 35 mm. Joints shall not be permitted in the lipping.

**8.7 Rebating**

In the case of double leaves shutters the meeting of stiles shall be rebated by 8 mm to 10 mm. The rebating shall be either splayed or square type as shown in drawing where lipping is provided. The depth of lipping at the meeting of stiles shall not be less than 30 mm.

**8.8 Opening for Glazing**

When required by the purchaser opening for glazing shall be provided and unless otherwise specified the opening for glazing shall be as per drawings. The bottom of the opening shall be at a height as shown in the drawings. Opening for glazing shall be lipped internally with wooden batten of width not less than 25 mm.

**8.9 Tolerance**

Tolerance on width and height shall be + 3 mm and tolerance on nominal thickness shall be ± 1.2 mm. The thickness of the door shutter shall be uniform throughout with a permissible variation of not more than 0.8 mm when measured at any two points.

Adhesive: - Adhesive used for bonding various components of flush door shutters namely, core, core frame, lipping, cross-bands, face veneers, plywood etc. and for bonding plywood shall conform to BWP type, phenol formaldehyde synthetic resin adhesive conforming to IS 848.

**8.10 Tests:** As per CPWD Specifications.

**8.11 Fixing:** As per CPWD Specifications.

**8.12 Measurements:** As per CPWD Specifications.

**9.0. STEEL WORK**

9.1 All steel work shall be carried out as per CPWD Specifications. (Volume 1) 2019 with up-to-date correction slips.

9.2 All welded steel work shall be tested for quality of weld as laid down in IS 822: 1970 before actual execution.

**10.0 FLOORING**

10.1 All work in general shall be carried out as per CPWD Specifications (Volume 1) 2019 with up-to-date correction slips.

10.2 Whenever flooring is to be done in patterns of tiles and stones, the contractor shall get samples of each pattern laid and approved by the Engineer-in-charge before final laying of such flooring. Nothing extra shall be payable on this account.

10.3 Different stones / tiles used in pattern flooring shall be measured separately as defined in the nomenclature of the item and nothing extra for laying pattern flooring shall be paid over and above the quoted rate. No additional wastage, if any, shall be accounted for any extra payment.

10.4 Samples of flooring stones/ Tile (Kota/ Marble/ Granite/ Ceramic tiles/ Vitrified tiles etc.) shall be deposited well in advance with the Engineer-in-Charge for approval. The sizes of stones for flooring shall be of a size not less than 600mmx600mm or as approved by Engineer-in-Charge. Approved samples should be kept at site with the Engineer-in-Charge and the same shall not be removed except with the written permission of Engineer-in-Charge. No payment whatsoever shall be made for these samples.

10.5 The Marble/ Kota/ Granite or any other stone shall be fully supported by the details establishing the quarry and its location or source.

10.6 Full width Marble/ Kota/ Granite stone over kitchen platform shall be provided except to adjust for closing pieces. The marble / stone flooring in treads and risers of staircase is to be laid in single piece.

10.7 Chasing of required width and thickness shall be made in brick work at skirting location so as to flush the external surface of skirting with internal plastering. No extra payment towards making chases in brick work at skirting shall be made and the same is presumed to be inclusive of rate quoted for the item of providing and fixing skirting.

10.8 Proper gradient shall be given to flooring for toilets, verandah, kitchen, courtyard etc. so that the wash water flows towards the direction of floor trap. Any reverse slope if found, shall be made good by the contractor by ripping open the floor/grading concrete and nothing shall be paid for such rectifications.

10.9 The flooring and skirting will be executed as per pattern shown in the Architectural drawings and as per approval of Engineer-in-Charge and nothing extra shall be payable on this account.

10.10 The rate shall include the cost of all materials and labour involved in all the operations. Nothing extra shall be paid for use of cut/sawn stone/ tiles in the work.

**10.11 The flooring laid with stone slab / tile / marble / Granite/ Ceramic tiles / vitrified tiles etc. shall be adequately protected by a layer of plaster of Paris, which shall be maintained throughout and removed just before handing over of the works for which nothing extra shall be payable.**

## 11.0. VITRIFIED TILES FLOORING

11.1 The tiles shall be of approved make and shall generally conform to Table 12 ofIS15622. The Vitrified tiles of specified sizes shall be used & sample of tiles shall be got approved from the Engineer – in – charge. The Mandatory tests for vitrified tiles shall be got done as per CPWD Specifications (volume – 1) / relevant BIS Code.

11.2 The vitrified shall be as specified in the item. The tiles shall be of specified colours as shown in the drawings or as approved by Engineer – in – Charge and will be laid in pattern as per architectural drawings. Nothing extra shall be paid for laying tiles in specific pattern. The tiles shall be first quality of approved make and to be procured from mother plant only.

11.3 The vitrified tile flooring / ceramic tile flooring or like tile flooring work shall be adequately protected by a layer of plaster of Paris, which shall be maintained throughout and removed just before handing over of the works for which nothing extra shall be payable.

## 12. SPECIFICATIONS FOR BITUMINOUS WORK

12.1 GENERAL

Before starting the earth work, the following steps are taken in original ground levels are recorded in the Level Book in the presence of the contractor or his/her authorized representative, and the Assistant Engineer of CPWD. All the local mounds and depressions are indicated clearly in the drawing and the field Level Book, and agency get it checked by the Assistant engineer before the levelling work is started. Plans showing initial levels, location of bench marks and reduced levels, is prepared and signed by the contractor or his/her authorized representative, and the Assistant Engineer of CPWD. Further the levels after excavation, after filling of compacted earth, G.S.B., D.L.C.,Concrete Pavement OR any of the layer stated in schedule of quantities are recorded in the Level Book in the presence of the contractor or his/her authorized representative, and is signed by him/her and the Assistant Engineer of CPWD. Nothing extra shall be paid on this account.

Note: No extra payment will be made for operation/activities mentioned above

12.1.1 The contractor shall have to necessarily deploy self-propelled mechanical paver with suitable screeds capable of spreading, tamping and finishing the mix true to the specified lines, grades and cross sections of the road. The paver finisher shall have the following essential features:

a) Loading hoppers and suitable distributing mechanism.

b) All drives having hydrostatic drive/control.

c) The machine shall have a hydraulically extendable screed for appropriate width requirement.

d) The screed shall have tamping and vibrating arrangement for initial compaction to the layer as it is spread without rutting or otherwise marring the surface. It shall have adjustable amplitude and variable frequency.

e) The paver shall be equipped with necessary control mechanism so as to ensure that the finished surface is free from surface blemishes.

f) The paver shall be fitted with automatic levelling and profile control within the specified tolerances.

g) The screed shall have the internal heating arrangement.

h) The paver shall be capable of laying either 2.5 to 4.0m width or 4.0 to 7.0m width as stipulated in the contract.

i) The paver shall be so designed as to eliminate skidding/slippage of the tyres during operation.

12.1.2 The contractor shall have to necessarily deploy the road rollers, for BM,DBM&DBC for their compaction as per relevant MORTH specifications, as described below :-

| | | |
|---|---|---|
| (i) | For Initial Rolling :- | 80 to 100 KN static weight smooth wheel roller (3 wheels or tandem) |
| (ii) | For Intermediate Rolling :- | Vibratory roller of 80 to 100 KN static weight or pneumatic tyred roller of 150 to 250 KN weight with minimum 7 wheels and minimum tyre pressure of 0.7 Mpa. |
| (iii) | For Final Rolling :- | 60 to 80 KN tandem roller. The joints and edges shall be rolled with 80 to 100 KN static roller |
| (iv) | Roller should not move at a speed of more than 6 km/ hour. | |

12.1.3 Mix shall be prepared in hot mix plant of adequate capacity and capable of yielding a mix of proper and uniform quality with thoroughly coated aggregate.

12.1.4 Being small quantity of DBM, BM & DBC, and Engineer-in Charge is authorized to approve Job Mix Formula already approved/used and brought by the agency, subject to that the ingredients used for this work will be of the same source from where the ingredients were used in the Job Mix Formula already approved and now being approved for this work. No recovery on a/c of preparation of Job Mix Formula will be made from the agency.

12.1.5 The contractor shall provide sample stretch minimum 100 sqm the BM/DBM/DBC/Micro-surfacing etc. as required & as per directions of Engineer-in-Charge in terms of mix proportion, laying and compaction etc. No work shall be carried out at site by the agency without approval of sample stretch by the Engineer-in-charge. In case, the sample prepared by the contractor is not acceptable to the Engineer-in-charge, same shall be dismantled and removed from site for which nothing shall be payable to the contractor. However, another sample acceptable to the Engineer-in-charge shall be made and will be approved by Engineer-in-charge. The approved sample stretch shall be preserved till the completion of the work and is open for inspection by the senior officers at any time during the concurrency of the work.

**12.2 TACK COAT**

The work shall consist of application of single coat of low viscosity liquid bituminous material to an existing road surface preparatory to another bituminous construction over it. The binder used for tack coat shall be bitumen of suitable grade as specified in nomenclature of item.

12.2.1 The emulsified bitumen for tack coat on road shall be medium setting (MS) type conforming to IS: 8887-1995. The bitumen emulsion shall be brought at site in one lot in sealed drums and shall be got verified and checked by the representative of Engineer-in-Charge before its use.

The work shall be done strictly in accordance with clause 503 and sub-clauses there to of MORTH specification for Roads & Bridges work(Fourth revision),2001.

**12.3 BITUMINOUS MACADAM**

The work shall consist of construction, in single course, of compacted crushed stone aggregates mixed with bituminous binder, to serve as base/binder course, laid immediately after mixing, on a previously prepared base in accordance with the requirement as per the specification as laid down in clause 504 and sub-clause there to of MORTH specification for Road & Bridge works 2001 (Fourth revision) and as directed by Engineer-in-charge.

**MATERIAL**

12.3.1 **BITUMEN**

12.3.2 Bitumen shall conform to grade and quantity as specified in nomenclature of the item.

12.3.3 **AGGREGATE**

Aggregate shall consist of crushed stone aggregate confirming to grading specifications as laid in paras 504.2.2 to 504.2.4 of MORTH specification 2001. No natural aggregate or sand shall be allowed.

## 12.4 DENSE BITUMINOUS MACADAM

The work shall consist of construction, in single course of compacted crushed stone aggregates mixed with bituminous binder, to serve as base/binder course, laid immediately after mixing on a previously prepared base in accordance with the requirement as per the specification as laid down in clause 507 and sub-clause thereto of MORTH specifications for Roads & Bridges works 2001 (Fourth revision) or as directed by Engineer-in-Charge.

### 12.4.1 MATERIAL

#### 12.4.1.1 BITUMEN

Bitumen shall conform to grade and quantity as specified in nomenclature of the item.

#### 12.4.1.2 AGGREGATE

Aggregate shall consist of crushed stone aggregate conforming to grading &specification as laid down in paras 507.2.2 to 507.2.5 of MORTH specification 2001. Nonatural aggregate or sand shall be allowed.

#### 12.4.1.3 FILLER

Filler shall consist of hydrated lime confirming to specification & grade as specified in clause 507.2.4 of MORTH specifications 2001.

## 12.5 DENSE BITUMINOUS CONCRETE

The work shall consist of constructing a single layer of specified compacted thickness of dense bituminous concrete consisting of crushed stone aggregate mixed with bituminous binder, to serve as wearing course, laid immediately after mixing on a previously prepared base in accordance with the requirement of specification as laid down in clause 512 and sub clause there to of MORTH specifications for Roads & Bridges works (Fourth revision) 2001and as directed by Engineer-in-Charge.

### 12.5.1 MATERIAL

12.5.1.1 **(i) BITUMEN**

Bitumen shall conform to grade and quantity as specified in nomenclature of the item.

#### 12.5.1.2 AGGREGATE

Aggregate shall consist of crushed stone aggregate conforming to grading &specification as laid down in sub clause 509.2.2 to 509.2.5 of MORTH specification 2001for Roads & Bridges works (Fourth revision) 2001. No natural aggregate or sand shall be allowed.

#### 12.5.1.3 FILLER

Filler shall consist of hydrated lime of grade & specification conforming to clause509.2.4 of MORTH specifications 2001.

**CONDITION FOR PROCUREMENT AND ACCOUNTING OF BITUMEN**

1. The contractor shall procure bitumen of required grade as specified confirming to IS:73-1992 with upto date amendments and other relevant codes from the manufactures of repute like Indian Oil Corporation Ltd., Hindustan Petroleum, Govt. of India and holding license to use ISI certificate mark for their products.

**2. MODE OF PROCUREMENT:**

2.1 Bitumen/Bitumen emulsion for tack coat shall be brought at site/plant in sealed drums only bearing following marking (legible)

(i) Name of Manufacturers.
(ii) Gross Wt.,Net Wt. And Tare Weight.
(iii) Month and year of Manufacture.
(iv) Use before_____(date)
(vi) Type and Grade.
(vi) Batch Number.
(vii) "ISI" Certification and Standard Mark.
(viii) Name of Contractor/Supplier.
(ix) Serial No. & Total Nos. of drums in each batch.

2.2 For providing bituminous surface like BM, DBM, etc., the bitumen shall be procured either in sealed drums or in bulk and stored at the hot mix plant site. The drums/container shall bear the marking as mentioned in para-2.1 above.

2.3 The contractor will produce original challan/voucher for purchase of bitumen and emulsion from IOCL/HPCL/BP/HINCOL as a proof of having purchased the material form manufacturer. The voucher/challan shall be returned to the contractor after verification and making necessary endorsement.

2.4 Bitumen of specified grade shall be brought to plant site in one lot for theoretical requirement upto 100 tonnes and in lots of 100 tonnes or more for theoretical requirement of more than 100 tonnes. The day to day receipt and issue accounts of bitumen shall be maintained on the following proforma:-

| Date of receipt | Qty Received | Progressive Total | Date of Issue | Qty. Issued | Total Issued | Balance in hand | Cont.'s initial | JE's initial |
|---|---|---|---|---|---|---|---|---|
| **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** |

| Item of work for which issued | Appx. Qty. of work done on each day | Theoretical fulfilment of bitumen for work done on each day | Remarks | Initial of AE/AEE/EE/Ex. Eng. |
|---|---|---|---|---|
| **10** | **11** | **12** | **13** | **14** |

2.5 When bitumen is issued /brought in drums, the same shall be stacked in fenced enclosures to be provided by the contractor at his own cost, as directed by the Engineer-in-Charge on one side of the roadway. The contractor shall be responsible for the watch & ward and safety of bitumen. The contractor shall facilitate the inspection of bitumen stockyard by the Engineer-in-Charge or his representative at any time.

2.6 Material shall be kept in the joint custody of the contractor and the representative of the Engineer-in-charge. The empty containers shall not be removed from the site of work till the relevant item of work has been completed and permission obtained from the Engineer-in-Charge. No heating of bitumen in drums for any purpose whatsoever shall be allowed.

2.7 All the tippers carrying bituminous mix from Hot Mix Plant should accompany the computerised print out of job-mix from automated Hot Mix Plant including measurement certificate from weigh-bridge duly certified by a responsible person at plant. This record shall be preserved by the field unit along-with all documents and registers. Contractor shall also be responsible for recording weight of bituminous mix brought at site by each tipper in registers and entry of same shall be checked by JE (100%) and authenticated by AE.

## 3. SAMPLING AND TESTING

The contractor shall have to obtain and furnish test certificate issued by manufacturer to the Engineer-in-Charge in respect of bitumen procured by him. The samples shall be collected at direction of Engineer-in-Charge and got tested as per provisions of IS:73/MORTH/CPWD specification from the laboratories approved by him. The contractor shall supply free of charge, the bitumen required for testing. The cost of specimen sample shall be borne by contractor. In case the test result indicate that the bitumen procured by the contractor does not Conform to the relevant BIS codes/specification, the same lot shall rejected and shall be removed from the site of work by the contractor at his own cost within a week's time of written order from Engineer-in-Charge to do so.

The bitumen content in bituminous mix shall be checked by conducting the bitumen extraction test Conforming to IRCII at regular interval on the completion of work, the actual consumption of bitumen shall be worked out based on such test results. The theoretical consumption shall be worked out based on the design mix formula and the actual consumption (based on extraction test as well as MAS account) if found less than theoretical one, the recovery shall be made from

contractor for less use of bitumen. However, nothing extra shall be paid if actual consumption so worked out is higher than theoretical consumption. This is without prejudice to action under relevant clause of the agreement.

Bitumen brought to site/Hot Mix Plant and bitumen remaining unused after completion of work shall not be removed from site without written permission of the Engineer-in-charge.

**NOTE: Nothing extra shall be paid for cartage of bitumen to the site of work.**

**Guarantee Bond for Bituminous Works**

Guarantee Bond in respect of Bituminous Works: Five (5) years guarantee bond in prescribed proforma shall be signed & submitted by the contractor to meet their liabilities under the guarantee bond for a period of five years.

## 13.0 Metallic Fire Door Sets

### 13.1 General

This specification covers metallic fire rated partially insulated and un-insulated doorset consisting of frame, shutter / door leaf (hollow metal door or sandwich panel door), its hardware and vision panel as complete assembly along with its sizes, design, materials, general construction requirements, finishing and performance criterion. It is intended to define standard items not subject to variation. The doorset defined herein should have demonstrated successful test performance to establish the minimum fire rating of 120 min. Metallic Fire Door frame and shutter shall conform to IS 3614: 2021. All doorset shall be ISI marked. This specification does not cover the Stainless steel or laminated steel or Wooden Composite, Metallic Sliding or Metallic Rolling fire doors. Single skin door shutter shall not be used as fire door and door tested with single skin shall not be the part of this specification.

The size of door way opening size shall not exceed 7.2 sqm with the maximum permissible width of 2.4 m and height of 3.0 meter.

The maximum door width for single leaf shall be 1250 mm and for double leaf 2400 mm. The internal construction of door shall be provided with rigid reinforcement in addition to the core as per IS 16074:2013.

The maximum allowable bottom undercut for door set to be fixed on floor shall not be more than 19 mm whereas it shall not be more than 9 mm if the door set is to be fixed on sill of 100 mm or higher than floor level.

The door frames shall be fixed to the opening with minimum 10 Nos. (4 numbers on each vertical side up to 2100 mm height and 2 numbers on top) of fasteners and 12 numbers of fasteners for height 2400 mm (5 Nos. on each vertical side and 2 Nos. on top) with minimum M8 size, 80mm long hot dipped galvanized fasteners with polyamide sleeves inserted in pre marked & machine drilled holes for single/double leaf doors.

The space between the wall and frame shall be filled with fire rated puff and joineries to be closed with fire rated silicon sealant as per direction of the engineer in charge.

The door set (both frame and shutter leaf/leaves) shall be factory finished with minimum 50 micron polyester powder coating in desired shade as per Engineer in-Charge.

13.2 Material

13.2.1 Fire Door Frames and Door Leaf

a. The alloy type Zinc coated steel sheet shall be used for frame and door leaf conforming to IS 277. The coating weight shall meet the minimum requirement of 120 gm/$m^2$for both sides of sheet. The sheet material with embossed design, grained steel design can be used for fire doors for better aesthetics and interior surface finishes of the doors if any and it shall not compromise the construction integrity of the doors. The surface of the door frame shall be pre treated with phosphate by chemical means conforming to IS: 1477 Part-1. No pickling is required for galvanized surface.

b. The steel sheet thickness of 1.2 mm (18 gauge) minimum shall be used for a frame having depth upto 150 mm. Any addition in depth from 150mm shall require higher sheet thickness of at least 1.6 mm (16 gauge). The maximum depth of frame shall not be more than 350mm. The tolerance of + 1 mm for all dimension of profile will be admissible.

c. For door leaf of 120 min fire rating of un-insulated and partially insulated door, the minimum sheet thickness shall be 1.2 mm (18 gauge).

d. Electrolytic alloy deposited zinc coated steel shall be provided for anchors and accessories and should meet the minimum requirements for coatings of 120 gm/$m^2$.

e. The door frame and shutter shall be finished with polyester powder coating of minimum thickness of 50 micron conforming to IS: 13871 in desired shade as per the direction of Engineer in-Charge.

f. The minimum frame size shall be 90mmx60mm or as per IS: 4351 and provided with cover plate of required size 120x30x6mm inside the frame at the places where hinges are to be fixed and threaded to take the required size of machine screw. Frame design and construction shall be as per tested specimen in butt, mitered or welded assembly with proper reinforcement and protection for taking required hinges, locks, strike plate including door closers. The door frame shall have provision for housing EPDM smoke seal.

g. The infill material used in door leaf shall be Resin bonded materials like honeycomb paper core, mineral wool of minimum density 96 to 120 kg/cum, ceramic wool and any proprietary material provided they satisfy the requirement of fire door rating of un-insulated and partially insulated door. Polyurethane foam (PUF) as an infill material for fire doors shall not be permitted.

h. An in tumescent seal of minimum size 15 mm wide and 1.5 mm thick or as per test report shall be provided with insulated doors which is chemically designed to expand when exposed to heat. It is of two types i.e. Rigid and flexible type and both react differently, therefore it should be tested with the door. The in tumescent seal provided in the door brought at site should be of the same formulation, dimensions and configuration as mentioned in the door manufacturer's fire test report.

i. Smoke seal shall be fixed either in the grooved frame profile or stuck with adhesive on the entire perimeter of the frame to stop smoke passing through the gaps. It is independent of in tumescent seal provided on the door leaf. The smoke seal material shall be of EPDM tested in accordance with ASTM E-84 Standard Method of Testing for Surface Burning Characteristics of Building Materials and Assemblies and should have a flame-spread classification of 25 or less.

13..2.2 Fire Rated Hardware

a. Stainless steel (grade SS 304 and above) ball bearing hinges as per EN 1935:2002 or butt hinges (as per IS 12817:2020) of minimum size 100 mm x 75 mm x 3 mm.

b. Fire rated Stainless Steel Mortise dead lock 50/60/65/70/80mm back set size (as per test of door), Square for end of 20/22/24 mm size (as per test of door) including Escutcheon (key hole flap) and 65mm dia cylinder with both side key as per IS:16015:2022/EN:12209.

c. D type Pull handle (SS 304) of 22/25 mm dia, centre to centre distance -300mm, back-to-back fixing with spindle.

d. Panic devices of 120minutes fire rating, single point panic push bar (carry bar) suitable for single leaf door as per EN:1125 with appropriate classification code.

e. Panic devices of 120 minutes fire rating, double point panic push bar (carry bar) i/c bottom strike with vertical bolt for active leaf in case of single leaf door and on Inactive leaf in case of double leaf door as per EN:1125 with appropriate classification code.

f. External lever handle with euro profile half cylinder as per EN: 1125 with appropriate classification code.

g. Mortise lock of 120 minutes fire rating, 70mm back set square forend, with allen key and dead strike plate as approved by Engineer in-Charge.

h. Stainless steel (SS 304 or more) recessed flush pull handle of minimum size 40mm x120mm as approved by Engineer in-Charge.

i. Concealed flush bolt (Dye-cast stainless steel finish) of length 300mm for door height of 2100 mm shall be provided and for more than 2100 mm door height, the length of concealed flush bolt will be door height minus 1800mm.

j. Dust proof socket of 30 mm length for bottom concealed flush bolts.

k. CSK/Hex headed fastener of minimum size 8 mm dia& 80 mm long hot dip galvanized with 8 mm dia polyamide sleeves.

l. 120 min fire rating heavy duty door closer of spring size EN 3-5 for partially insulated door and un-insulated door with standard arm as per EN 1154 with appropriate classification code.

m. Surface integral door coordinator to be provided for use on fire doors for sequencing the closing of active and inactive leaf of the panic device in double door as approved by Engineer-in-Charge.

n. Hardware such as tower bolts, aldrops, sliding bolts, chains with pad locks shall not be used on fire doors.

o. All the hardware to be used on fire doors shall be type tested for 2 hrs fire rating. All other hardware mentioned which is not tested as part of the door assembly, proper fire test certificates for compliance for recommended fire rating to be provided.

13.2.3 Fire Rated Vision Panel

a. The glass of fire rating of 120 minutes integrity shall be used for vision panel. The annealed or tempered glass or tempered wired glass or interlayer glass or laminated gel glass which become opaque and affect visibility shall not be used. The glass should have inedible mark on all the panels showing the name of manufacturer and name of product.

b. Whenever larger vision pane is required the overall glass area can be increased by upto 15% of the door leaf size provided the door has been tested with a larger glass. Such increase is not applicable for any insulated door.

c. Ceramic tape of minimum size 13x2mm or size as per manufacturer's specification.

13.3 Fire rated partially insulated hinged Door set marked as 'FD 120 PI

Partially insulated metallic hinged fire door set shall have 120 minutes integrity and 30 minutes insulation along with complete assembly tested in latch condition. It shall comprise of single rebate door frame and double skinned sandwich door shutter along with necessary hardware and vision panel.

All double leaf fire door assembly shall be provided and tested with astragals to ensure compatibility with actual fire performance.

The performance of partially insulated fire rated doors (single/ double leaf) depends on the quality of infill material. The infill material shall be resin bonded mineral wool, ceramic wool and of any proprietary material provided it satisfies the requirement of insulation fire door rating. The overall thickness of double skinned single or double leaf fire rated insulated door shall be minimum 50 mm thick or as per test evidence furnished by the respective manufacturer in compliance of its fire rating as FD 120 PI. The performance of the fire door varies based on infill material, hence changing the infill material in fire door supplied at site shall not be allowed other than the tested with infill material.

The in tumescent seal shall be provided in the groove/on the surface on the three sides of door leaf (i.e. on top, hanging and meeting edges of door leaves). The formulation, material, dimensions and configuration of in tumescent seal provided in the door shall be of the same material or of which the test report is produced by the manufacturer.

The smoke seal of appropriate size shall be provided on three sides of door frame (i.e. on top and sides). The formulation, material, dimensions and configuration of EPDM/self-adhesive smoke seal shall be the same with which the test report is produced by the manufacturer.

Each of the door leaf shall be provided with vision panel of size not more than 0.06 sqm in size (maximum width 200 mm and maximum height 400mm) with fire rated clear glass having at least 13 mm wide and 2 mm thick ceramic tape on the perimeter of glass on both faces.

Minimum 4 no. of hinges shall be fixed with machine screws of M6 x 25 CSK/Hex (conforming to IS:1365) per door leaf upto 2100mm height and 5 hinges for door leaf height above 2100 mm or as per test evidence.

The fire rated door set (frame & shutter leaf together) shall be provided as a complete system along with following necessary hardware.

A. For single leaf door

1. The maximum size of single leaf door shall be 1250 mm x 3000 mm
2. One number Panic device shall be provided on the push side of the single leaf door. .
3. One number External trim shall be provided on pull side of the door
4. One number Surface mounted heavy-duty door closer of spring size EN 3-5 shall be provided as per width and weight of the door leaf on pull side of the door.

B. For Double leaf door

1. The maximum size of double leaf door shall be 2400 mm x 3000 mm
2. One number Panic device shall be provided on the push side of the active leaf and one number vertical bolt shall be provided on the push side of Inactive leaf.
3. One number External trim shall be provided on pull side of the door.
4. In case of double leaf doors with inactive leaf width less than 450mm, single point panic device for active leaf and additional fire rated auto flush bolt on both top and bottom of the inactive leaf shall be provided.
5. One number Surface mounted heavy duty door closer of spring size EN 3-5 shall be provided on each door leaf as per width and weight of the door leaf on pull side of the door.

13.4. One number integral surface door coordinator shall be, provided for sequencing the closing of active and inactive leaf of the panic device in double door.

13.5 Codes & Acceptance Criterion

The complete assembly of the doors i.e. frame, shutter, vision glass and hardware shall conform to following codes:

| | |
|---|---|
| IS 3614: 2021 | Specification for fire doors and door set |
| IS 4351:2003 | Steel door frames-Specifications |
| IS 277-2003 | Standard specification for steel sheet zinc coated (Galvanized) |
| IS 8183-1993 | Bonded mineral wool |
| IS 16231 (Part 4) 2016 | Use of glass in buildings- Code of practice. |
| ISO 834-1: 1999 | Fire-Resistance Tests Elements of Building Construction Part 1 General Requirements |
| IS/ISO 834- part 8 | Fire-Resistance Tests Elements of Building Construction Part 8 Specific Requirements for Non-load Bearing Vertical Separating Elements. |
| IS 17518 Part-1 | Fire Resistance test Door and shutter assemblies, Part-1 (General Requirement) |
| EN 1125 | Panic exit devices operated by horizontal bar for 2 hrs fire rating |
| EN 1154/IS 3564 | Door closer/Door coordinators for 2 hrs fire rating |
| EN12209/IS 3564 | Mechanically operated locks, latches and locking plates for 2 hrs fire rating |
| IS 16074 | Steel Flush door shutters-Specifications |
| EN 1906 | Lever handles and knob furniture for 2 hrs fire rating |
| IS 13871 | Power Coatings- Specification |

Necessary documentation/ test certificates obtained from the manufacturer by contractor/agency shall be furnished to Engineer-in-charge for approval before actual supply for installation. All hardware of fire door shall be subjected to approval by Engineer-In-Charge.

13.6 Marking and Labeling

Each fire door set shall be identified by a label (metal plate) on the frame and shutter preferably bearing a unique number and shall be ISI Marked.

The label shall contain the following information:

a. Name of the manufacturer,
b. Type of fire door (Partially Insulated or Un-insulated)
c. Fire rating classification,
d. Serial number of the door,
e. Year of manufacture,
f. Certificate reference number.
g. BIS Mark.

Fire door set shall be tested for both latched and un-latched condition and shall satisfy the requirement of the application and site condition. All doors with dead bolt are considered to be unlatched and the door manufacturer shall have separate test certificate for doors tested in latched and un-latched condition. All hardware & glazing, shall be 120 mm fire rated and compliant to IS standards /EN standards with appropriate classification code.

9.29.A.7 Installation

Fire Door set installation shall be as per manufacturer's specifications for which contractor shall submit the shop drawing to the Engineer-in Charge. Shop drawings shall include all details of construction, anchoring, connections, fastener etc.

The installation of doors sets shall be carried out by the manufacturer or installers trained by the manufacturer.

a. Door Frame Installations

All frame shall be fastened to the adjacent structure to retain their position and stability. The maximum allowable gap between the frame and structure should not be more than 5mm and sealed with proper sealant once the frame is installed. Installations of frame shall be as per manufacture's recommendation and should be suitable for various type of wall construction.

b. Door leaf Installation:

Doors shall be installed and fastened to maintain alignment with frame to achieve a perimeter clearance of maximum 3-4 mm unless otherwise more clearance is requested due to smoke seal which require a larger gap but the gap should be within the tested tolerances.

c. Hardware Installation:

The hardware item shall be installed in accordance with good practices and hardware manufacturer's recommendation/templates. The hardware to be installed shall be approved by the Engineer-in-charge before installation in view of intended use, corrosion condition, door mass, durability etc. The hardware shall be fixed with door, frame and shutter with screws and fasteners as suggested by hardware manufacturer. The self-adhesive seals shall be fitted into the groove / surface when it is dry and free from dust to ensure good bond. In areas where temperature falls below 10 degree centigrade, self-adhesive seals shall also be fixed mechanically.

13.7. Testing and Certification

(i) The Door set shall be tested from CBRI, Roorkee or any of the lab as approved by Engineer-in-charge for the complete assembly i.e. frame, shutter, vision panel and hardware. Any certificate from any manufacturer shall not be acceptable to the effect that all parts of the assembly are covered. All doors shall be tested in accordance to the Indian standard IS 17518 (Part-1) and shall satisfy the criteria mentioned in the standard for integrity and insulation as per applicable category of doorset. Test certificates submitted shall be valid at the time of supply of doorset and its validity period shall be 5 years from the date of issue of the test report by the lab.

(ii) Fire door test certificate within its validity period shall not be required any additional test except as mentioned below:

a. Change in design, material and construction of door including infill material.

b. Overall perimeter of the door, width and height or total area is more than the tested specimen. This is applicable for both, doors with or without vision panel.

c. Change in size of the vision glass or vision panel.

d. For doors with continuous partitions as a part of an assembly or fixed glazed partitions, it is necessary to provide assessment report from approved laboratory based on one or more combination of test reports. These reports shall be validated for integrity or integrity along with insulation.

e. Single-leaf and double-leaf fire doors shall be tested separately and different certificates shall be obtained.

(iii) Manufacturer's Test Certificate shall be submitted for material and sheet thickness of doors and frames. The Engineer-in-Charge or his authorized representative shall inspect the manufacturer before supply to the site of work for checking sheet thickness, infill material, construction process and weight of the doorset, facility hardware etc. Additionally, if required, site engineer shall cut any fire door, single or double leaf as per his discretion and evaluate material for sheet thickness, reinforcement, construction, infill material etc. in comparison with the actual test certificate.

(iv) The following test shall be conducted on site on the door shutter in accordance with IS: 4020 at site.

a. Dimension and Squareness Test

The following tolerance on size of door shutters shall apply:

Dimension Tolerance (mm)

Width+0/-2
Height+0/-4
Thickness±1.5

The door shutter shall not deviate by more than 1.00 mm on a length of 500 mm. The thickness of the door shutters shall be uniform throughout with the permissible variation of not more than 0.8 mm between any two points.

b. General Flatness Test

Tested in accordance with IS 4020 (Part 3), the twist, cupping and warping in door shutter shall not exceed 5 mm.

c. Local Planeness Test

When tested in accordance with IS 4020 (Part 4), the depth of deviation measured at any point of the door shutter shall not be more than 0.5 mm.

13.8 Submittals by The contractor

Following documentation/drawings shall be furnished.

1. Specimen Test Certificate of the doorset as a complete assembly
2. Specification/ Manufacturer's literature, Test certificates and other documents of related items intended to be used.
3. Glass and hardware manufacturer literature along with their individual test certificate.
4. The letter of compliance for supply and installation of fire rated doors as mentioned in ANNEX-C page No. 21 of IS 3614: 2021
5. There shall be a warranty of 5 years from the manufacturer side for all parts and components of the fire rated door set system except counter balance spring and finish.

13.9 **Measurements**

13.10. Measurement of fire rated door set

The outer-to-outer dimension of door frame shall be measured correct to a millimeter on horizontal side and from top level of frame to floor finish level vertically and area shall be calculated in square metre upto two places of decimal. The sealing of space between door frame and wall openings shall not be measured.

13.11 **Rate**

The rate includes supply and installation cost of complete door set which shall include frame, shutter, vision panel, ceramic tape, smoke seal, in tumescent seal and all hardware including fixing at site. It includes all labour cost including making good the jambs and soffits etc.

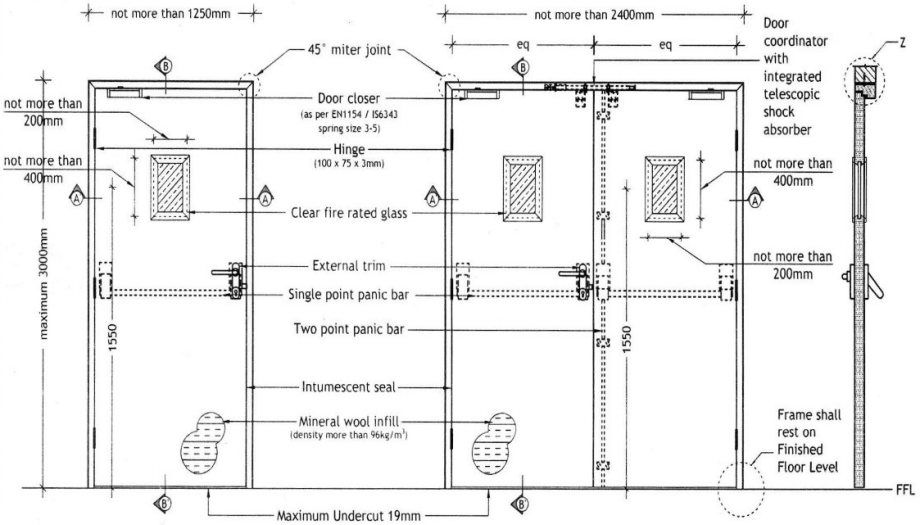
# Fire Rated Partially Insulated Door (FD120PI)

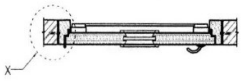
(ISI marked Fire Door as per IS 3614:2021 tested as per IS 17518 Part 1)

**Fire rated door:**
**Integrity :** 120min
**Insulation :** 30min

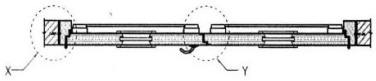
**Application:** Staircase / Exit pathway / Refuge area

**Note:**
All insulated doors must be in latched condition.
If unlatched, then they must be in locked condition.

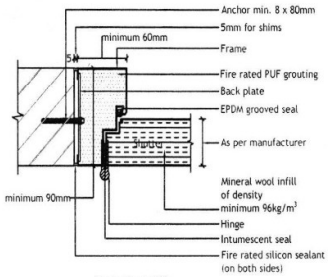


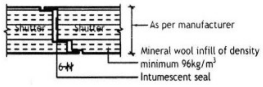

Section AA'



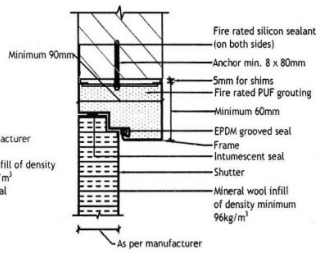

Section AA'




**Detail at 'X'**
Side Jamb




**Detail at 'Y'**
Astragal




**Detail at 'Z'**
Head Jamb

**Abbreviations:**
**WOW** : Wall Opening Width
**WOH** : Wall Opening Height
**UC** : Under Cut
**FFL** : Finished Floor Level

**Specification:**
**Frame sheet thickness:** Minimum 1.2mm Galvanized steel 120 GSM as per IS 277
**Shutter sheet thickness:** Minimum 1.2mm Galvanized steel 120 GSM as per IS 277
**Frame profile:** Minimum 90 x 60mm grooved frame
**Shutter thickness:** As per manufacturer
**Fire rating:** Integrity 120 minutes; insulation 30 minutes
**Infill:** Mineral wool of density minimum 96kg/m³
**Hinges:** 5 Knl, Ball bearing hinges of size 100 x 75 x 3mm
**Optional:**
**Vision panel:** Clear fire rated glass, Maximum area 0.06sqm

**14.0 WATER PROOFING: -**

14.1 The work shall be got executed as per CPWD or manufactures' specifications and from the specialized agency as approved by the Engineer in Charge.

14.2 Contractor shall also submit the names of water proofing specialist along with information about their technical capabilities and list of similar works executed by the specialized agency in the past for the approval of Engineer-in-charge within 30 days from the date of award of work.

14.3 Total quantity of the water proofing compound required shall be arranged only after obtaining the prior approval of the make by Engineer-in-charge in writing. Materials shall be kept under double lock and key and proper account of the water proofing compound used in the work shall be maintained. It shall be ensured that the consumption of the compound is as per specified requirements.

14.4 The finished surface after water proofing treatment shall have adequate smooth slope as per the direction of the Engineer-in-charge.

14.5 Before commencement of treatment on any surface, it shall be ensured that the outlet drain pipes / spouts have been fixed and the spout openings have been chased and rounded off properly for easy flow of water.

14.6 The entire execution of waterproofing work shall be video recorded and submitted to Engineer-in-Charge on a DVD disc. Various toilets shall be indexed and written with paint on the walls for reference and identification purpose.

14.7 **GUARANTEE BOND FOR ALL WATER PROOFING ITEMS: -**

**Ten years** Guarantee bond in prescribed proforma **given in the tender document** shall be submitted by the contractor which shall also be signed by both the specialized agency and the contractor to meet their liability / liabilities under the guarantee bond. However, the sole responsibility about efficiency of water proofing treatment shall rest with the building contractor.10%(Ten per cent) of the cost of water-proofing work shall be retained as Security Deposit and the amount so deducted would be released after 10 (Ten) years from the date of completion of the entire work under the agreement, if the performance of the treatment is found satisfactory. If any defect is noticed during the guarantee period, the contractor shall rectify it within 15 days of receipt of intimation of defects in the work. If the defects pointed out are not attended to within the specified period, the same will be got done from another agency at the risk and cost of contractor. However, this security deposit can be released in full, if bank Guarantee or FDR of equivalent amount for Full 10 (Ten) years is produced and deposited with the department.

15.0. **FINISHING: -**

15.1 The work shall be done in accordance with CPWD Specifications -2019 Vol. I to Vol. II with upto date correction slips and the manufacturer's specifications where CPWD specifications are not available.

15.2 The quantity of paint required as per the theoretical consumption including wastages, if any, shall be procured from the approved manufacturer or his authorized dealers and deposited with the representative of the Engineer-in-Charge at site.

15.3 The paint shall be obtained in smaller packing (around 20 liters).

15.4 The paint shall be kept in the joint custody of the Department and the Contractor and day-to-day account of receipt and issue shall be maintained. However, the safe custody and watch and ward shall remain to be the responsibility of the Contractor. Nothing extra shall be payable on this account.

15.5 The name of the manufacturer, manufacturer's product identification, manufacturer's mixing instructions, warnings and instructions for handling and application, toxicity and date of manufacturing and shelf life shall be clearly and legibly mentioned on the labels of each container. These details shall be kept in

record. The material shall be consumed in the order of material brought to site, first come first consume basis. The Contractor shall obtain and submit to the Department the manufacturer's certificate for compliance of the various characteristics of the materials as per the manufacturer's specifications and also copy of the manufacturer's test report for the record.

15.6 Empty containers of the paints shall not be removed from site till the completion of the work unless otherwise permitted and shall be removed only with the permission of the Engineer-in-Charge or his authorized representative at site of work.

15.7 All arrangements for measuring, dosing etc. at site shall be made by the Contractor. Nothing extra shall be payable on this account.

15.8 The Contractor shall apply samples of each kind of paint for the approval of shade and colour as per the directions of the Engineer-in-Charge before procuring the paint in mass.

15.9 All incidental charges of cartage, storage, wastage, safe custody, scaffolding, cost of samples and mock ups etc. shall be borne by the Contractor and no claim, whatsoever, shall be entertained on this account.

## 16.0 SANITARY INSTALLATIONS /WATER SUPPLY / DRAINAGE: -

16.1 The contractor shall be responsible for the protection of the sanitary and water supply fittings and other fittings and fixtures against pilferage and breakage during the period of installation and thereafter until the building is handed over.

16.2 The contractor shall furnish all labour, materials and equipment, transportation and incidental necessary for supply, installation, testing and commissioning of the complete Plumbing / Sanitary system as described in the Specifications and as shown on the drawings. This also includes any material, equipment, appliances and incidental work not specifically mentioned herein or noted on the Drawings/Documents as being furnished or installed, but which are necessary and customary to be performed under this contract. The Plumbing / Sanitary System shall comprise of following:

a. Sanitary Fixtures and Fittings.
b. Internal and External Water Supply.
c. Internal and External Drainage.
d. Balancing, testing & commissioning.
e. Test reports and completion drawings.

16.3 For the work of water supply and sanitary installations, the contractor shall engage the approved licensed plumbers and submit the name of proposed plumbing agencies with their credentials for approval of the Engineer-in-Charge. For quality control & monitoring of workmanship, contractor shall assign at least one engineer who would be exclusively responsible for ensuring strict quality control, adherence to specifications and ensuring top class workmanship for the installation.

16.4 The work in general shall be carried out as per CPWD Specifications (Volume II) 2019 with up-to-date correction slips.

16.5 The tendered rates shall include the cost of cutting holes in walls, floors, RCC slabs etc. wherever required and making good the same for which nothing extra shall be paid.

16.6 Nothing extra for providing & fixing CP Brass caps /extension pieces wherever required for CP Brass fittings shall be paid beyond the rates payable for corresponding CP Brass fittings.

16.7 The contractor shall examine all architectural, structural, plumbing, electrical and other services drawings and check the as-built works before starting the work, report to the Engineer In-Charge any discrepancies and obtain clarification. Any changes found essential to coordinate installation of his work with other services and trades, shall be made with prior approval of the Engineer In-Charge without additional cost to the department.

16.8 All the shop drawings shall be prepared on computer through AutoCAD System based on Architectural Drawings and site measurements within two months of the stipulated date of start of the contract, contractor shall furnish, for the approval of

Engineer In-Charge, the two sets of detailed shop drawings of complete work and materials including layouts for Plant room, Pump room, Typical toilets drawings showing exact location of supports, flanges, bends, tee connections, reducers, detailed piping drawings showing exact location and type of supports, valves, fittings etc.; external insulation details for pipe insulation etc.

16.9 These shop drawings shall contain all information required to complete the work. These Drawings shall contain details of construction, size, arrangement, operating clearances, performance characteristics and capacity of all items of equipment, also the details of all related items of work by other contractors. Each shop drawing shall contain tabulation of all measurable items of equipment/materials/works and progressive cumulative totals from other related drawings to arrive at a variation-in-quantity statement at the completion of all shop drawings. Minimum 4 sets of drawings shall be submitted after final approval along with CD. When he makes any amendments in the above drawings, the contractor shall supply two fresh sets of drawings with the amendments duly incorporated along with check prints, for approval. The contractor shall submit further four sets of shop drawings to the Engineer In-Charge for the exclusive use by the Engineer In-Charge and all other agencies. No material or equipment may be delivered or installed at the job site until the contractor has in his possession, the approved shop drawing for the particular material/equipment / installation.

16.10 Shop drawings shall be submitted for approval four weeks in advance of planned delivery and installation of any material to allow the Engineer In-Charge ample time for scrutiny. No claims for extension of time shall be entertained because of any delay in the work due to his failure to produce shop drawings at the right time, in accordance with the approved programme.

16.11 Samples of all materials like valves, pipes and fittings etc. shall be submitted to the Engineer In-Charge prior to procurement for approval and retention by Engineer In-Charge and shall be kept in their site office for reference and verification till the completion of the Project. Wherever directed a mockup or sample installation shall be carried out for approval before proceeding for further installation without any extra cost.

16.12 Approval of shop drawings shall not be considered as a guarantee of measurements or of building dimensions. Where drawings are approved, said approval does not mean that the drawings supersede the contract requirements, nor does it in any way relieve the contractor of the responsibility or requirement to furnish material and perform work as required by the contract.

16.13 All materials and equipment shall conform to the relevant Indian Standards and shall be of the approved make and design. Makes shall be in conformity with list of approved manufacturers as per the tender document.

16.14 Balancing of all water systems and all tests as called for the CPWD Specifications shall be carried out by the contractor through a specialist group, in accordance with the Specifications and Standards. The installation shall be tested and shall be commissioned only after approval by the Engineer In-Charge. All tests shall be carried out in the presence of the representatives of the Engineer In-Charge and nothing extra shall be payable on this account.

16.15 The contractor shall submit completion plans for water supply, internal sanitary installations and building drainage work within 15 days of the date of completion. These drawings shall be submitted in the form of two sets of CD's and four portfolios (300 x 450 mm) each containing complete set of drawings on approved scale indicating the work as installed. These drawings shall clearly indicate complete plant room layouts, piping layouts and sequencing of automatic controls, location of all concealed piping, valves, controls and other services. In case the contractor fails to submit the completion plans as aforesaid, security deposit shall not be released and these shall be got prepared at his risk and cost.

16.16 The CCI/CI/PVC pipe and GI pipe etc. wherever necessary shall be fixed to RCC columns, beams etc. with rawl plugs and nothing extra shall be paid for this.

16.17 The variation in consumption of material shall be governed as per CPWD specification and clauses of the contract to the extent applicable.

16.18 The pig led to be used in joints of 150mm,100mm, 75mm, 50mm dia of sand cast iron, centrifugally cast (Spun) iron pipes shall be as per relevant CPWD Specifications.

16.19 The contractor shall bear all incidental charges for cartage, storage and safe custody of materials and shall construct suitable godowns, yards at the site of work for storing materials so as to be safe against damage by sun, rain, fire or theft etc., at his own cost and also employ necessary watch and ward establishment for the purpose at his own cost.

16.20 All fixtures and fittings shall be provided with all such accessories as are required to complete the item in working condition whether specifically mentioned or not in the Schedule of Quantities, specifications, elsewhere in this tender document & drawings. The quoted rates shall be deemed to be all inclusive for a complete item fit for use including all materials, labour, T&P, specials, equipment, testing & commissioning etc. Accessories shall include proper fixing arrangement, brackets, nuts, bolts, screws and required connection pieces. Nothing extra whatsoever shall be payable on this account.

16.21 Fixing screws shall be half round head chromium plated brass screws with C.P. washers where necessary or otherwise as provided in the item.

16.22 Porcelain sanitary ware shall be glazed vitreous China of first quality free from warps, cracks and glazing defects and shall conform to relevant BIS codes. Colour of sanitary ware, shall be specified or as selected by the Engineer-in-Charge. Nothing extra shall be payable on this account.

16.23 Horizontal pipes running along ceiling shall be fixed on structural adjustable clamps of approved design. Horizontal pipes shall be laid to uniform slope and the clamps adjusted to the proper levels so that the pipes fully rest on them and are properly secured.

16.24 Contractor shall provide all nuts, bolts, welding material and paint the Clamps with one coat of red oxide and two or more coats of black enamel paint.

16.25 Slotted angle/channel supports on walls shall be provided wherever shown on drawings. Angles/channels shall be of sizes shown on drawings or specified in schedule of quantities. Angles/channels shall be fixed to brick walls with bolts embedded in cement concrete blocks and to RCC walls with suitable anchor fasteners. The spacing of support bolts horizontally shall not exceed 1m.

16.26 Wherever M.S. clamps are required to be anchored directly to brick walls, concrete slabs, beams or columns, nothing extra shall be payable for clamping arrangement and making good with cement concrete 1:2:4 mix (1 cement: 2 coarse sand: 4 stone aggregate 20 mm nominal size) or as directed by the Engineer-in-Charge.

16.27 The ground colour shall be applied throughout the entire length of pipe. Colour bands shall be superimposed on the ground colour and shall be applied near valves, junctions, joints, service appliances, bulkheads, valves, etc. for clear identification of fluid being carried and to avoid confusion. The relative proportional widths of the first colour band to the subsequent bands shall be 4:1.The minimum width of the narrowest colour band shall be 25 mm.

16.28 Rates for all items quoted shall be inclusive of all work and items given in the above mentioned specifications and Schedule of Quantities and applicable for the work under floors, in shafts or at ceiling level at all heights and depths. All rates are inclusive of cutting holes and chases in RCC and masonry work and making good the same. All rates are inclusive of pre testing and on site testing of the installations, materials and commissioning.

**16.29 Cleaning and Disinfection of Pipelines:-**

On completion of hydraulic tests and before a pipe is disinfected, it shall be proved to be free from obstruction, debris and sediment by scouring or by any other process

which the Engineer-in-charge may prescribe. Upon satisfactory completion of testing and cleaning, the pipelines shall be disinfected as ordered. Chlorine solution shall be applied at the charging point as the pipeline is being filled and dosing shall be continued until the pipeline is full and at least 50 parts of chlorine per million parts of water have been made available and distributed evenly. If ordinary bleaching powder is used, proportions will be 150 gms of bleaching powder to 1000 litres of water. If a proprietary brand is used, the proportion shall be as specified by the manufacturer. The treated water shall be left in pipeline for a period as directed but not exceeding 24 hours chlorine residual tests shall be taken at various points along the pipeline. The disinfection process shall be repeated until the sample of water taken from the pipeline are declared fit for human consumption by a recognized laboratory.

16.30 Opening, cut out in slabs, beams as required shall be left out by inserting PVC spouts of required size before casting of RCC members. Nothing extra shall be paid on this account.

16.31 The entire responsibility for the quality of work will however rest with the building contractor only.

**17. <u>STAINLESS STEEL RAILINGS:</u>**

17.1 Providing, fabricating and fixing in position welded built-up section using stainless pipes and connecting plates, of Grade as per Schedule of Quantities and of required diameter & thickness as per the directions of the Engineer-in-Charge, at the junctions of doors, on walls, other locations as directed etc. including cutting, welding, grinding, bending to required profile and shape, hoisting, buffing and polishing, cutting chase/embedding in RCC / Masonry, fixing using stainless steel screws, nuts, bolts and washers or stainless steel fasteners as required to make it rigidly fixed & stable and making good the plaster/flooring etc. all complete, at all floors and all levels as directed by the Engineer-in-Charge.

17.2 Rate includes cost of all inputs of materials, labour, T&P, etc. involved in the work and all incidental charges to execute this item. However, for the purpose of payment only the actual weight of the stainless pipes and stainless steel plates provided and fixed shall be measured in kg.

17.3 Guarantee Bond: The Contractor shall submit Guarantee Bond as per Proforma given in the tender document. In addition 5% (five percent) of the cost of this item of work shall be retained as security deposit and the amount so withheld would be released after **five** years from the date of completion of the entire work under the agreement, if the performance of the work done is found satisfactory. If any defect is noticed during the guarantee period, it shall be rectified by the contractor along with any incidental repairs to structure, flooring, finishing, fixtures and any other related damaged work within fifteen days of receipt of intimation of such defects in the work. If the defects pointed out are not attended to within the specified period, the same shall be got done from another agency at the risk and cost of the contractor and the cost of attending such repairs shall be deducted from any dues payable to the contractors

**18.0 Aluminium Work**

18.1.1 The work shall be carried out as per specified CPWD Specifications in general and as per directions of Engineer – in – charge.

18.1.2 Guarantee Bond: The Contractor shall submit Guarantee Bond as per Proforma given in the tender document. In addition 5% (five percent) of the cost of this item of work shall be retained as security deposit and the amount so withheld would be released after **Five years** from the date of completion of the entire work under the agreement, if the performance of the work done is found satisfactory. If any defect is noticed during the guarantee period, it shall be rectified by the contractor along with any incidental repairs to structure, flooring, finishing, fixtures and any other related damaged work within fifteen days of receipt of intimation of such defects in the work. If the defects pointed out are not attended to within the specified period, the same shall be got done from another agency at the risk and cost of the contractor and the cost of attending such repairs shall be deducted from any dues payable to the contractors.

**19.0 uPVC WINDOWS& VENTILATORS**

All open able and fixed window system shall have minimum 3 hollow chambers from front to back. The sliding system frames shall have minimum3 chambers from front to back. The Sliding system Sashes shall have minimum 2 chambers from front to back. The outer profile shall not be less than 56mm.

All sections of the frame and sash shall be reinforced in accordance with the system supplier's recommendations us in galvanized mild steel in a single continuous length.

| **GENERAL REQUIRMENT** | |
|---|---|
| **Profile** | |
| The profile is to be extruded from a compound that has been blended to ensure quality and consistency. The material shall be pristine white high impact modified window grade uPVC and shall be conform to BS EN 12608:2003 as below. | |
| Description | Required Value |
| Flexural modulus of Elasticity Resistance to impact by falling massat– 10°C for Class II (falling mass 1000g; falling height 1500 mm – as per BSEN 12608:2003). | Shall notbelessthan2200N/mm2 not more than 1 test specimen shall show rupture in wall. |
| Mean Breaking Stress for welded corners. | Shall not be less than 35N/mm2for compression bending testor25N/mm2 for tensile bending test. |

The profile shall be a hollow 3-chamber (across depth) profile with an outer wall thickness not less than 2. 2mm.The profile shall be of first grade/quality uniform and free from foreign bodies, cracks or marks.

**Fabrication of Window: -**

i) The window units shall be designed with all corner joints; transom joints and mullion joints being mitred and fusion welded.

ii) All excess material is to be neatly trimmed and neatly feature grooved/raised nib finish at corners, transom joints and mullion joints.

iii. There will be no mechanical joining of the profile

iv. No polishing flush of any joints will be permitted

v) The window units shall be designed so that the route of drainages prevented from passing through the reinforcement chamber.

vi) The finished product shall be free from all sharp edges, burrs and the like that may be hazardous to the user.

vii) The dimensional tolerances on the finished outer frame height and width shall be+3mm. Frame assemblies shall be such that they can be installed square within a maximum difference in the diagonals of4mm.Minimumoverlap of sash on frame shall be8mm.

viii) In all window units, adequate drainage should be provided to permit the escape of water from platforms or horizontal members beneath each sealed unit. The drainage slots shall not penetrate into the reinforcement chambers. Rain water Stop to be provided wherever necessary to provide barrier to excess rain water.

**Reinforcement**

i) Reinforcement shall be made from GI tube of not less than 1.5mm thickness as per strength requirement unless otherwise approved by Engineer-in-Charge.

ii) Steel reinforcement shall conform to IS277:2003 or equivalent. Base material of steel shall conform to IS 513:2008–Drawing Grade.

iii) The reinforcement shall be installed in accordance with the recommended actions. The reinforcement shall conform to the wind load requirements of IS 875: Part 3. The reinforcement shall be in one continuous length and should be installed minimum 5mm and maximum 10mm from the face of the profile tube welded.

iv) The reinforcement shall be secured to the profile so that it does not move or rattle and it maintains the structural integrity of the frame and satisfactory thermal separation. Reinforcement is to be fixed at a maximum of 100mm from the ends and then at a maximum of 300mm centers.

**Glazing and Weather Seals**
**GLAZING**

i) Window shall be such that glazing or re-glazing on site is possible without the need to remove the outer frames from the structure of the building.

ii) All glazing is tube packed in accordance with the system supplier's recommendations to prevent any kind of damage during handling.

**WEATHER SEALS**

The weather seals shall be EPDM/Silicone seals. ASTM-D412 and ASTM-D2240 are standard specifying test methods for Tensile strength and Hardness of the gasket whereas the required value shall be specified

Ultimate tensile strength min >7.5/mm2

The weather seals are to be fitted in continuous lengths and grooves. The joints in the vent weather seal are to be positioned at the bottom and in the outer frames at the top.

**Security and Safety**

Fasteners shall be designed so that they cannot be released from the outside by the insertion of a thin blade.

No opening light shall be open able or removable from the outside, when it is fastened in the closed position, except by use of special tools or breaking part of the window.

**QUALITYCONTROLANDTESTINGOFMATERIALS**

Raw Material

The material from which the profiles are made shall consist substantially from white polyvinylchloride as per BSEN 12608:20003. Only those additives and pigments may be used that are needed for the manufacture of the compound and its subsequent conversion in to sound, durable extrusions of good surface finish and mechanical strength, as assessed by the requirements of this specification.

**Profile Properties**

Appearance and Finish

The color of the profile shall be uniform and the color offal profiles in a system shall be uniform. The profile shall be free from foreign bodies, cracks or sink marks when viewed by normal corrected vision at 90o to the surface and at a distance of 1meter in normal diffused north light.

**Dimensions and Weights**

The profiles shall be straight such that the longitudinal axis of the profile, as measured on the face surfaces, may deviate from the straight line by no more than 1mm per meter.

The cross section of the profile shall conform in shape and dimensions and may deviate by no more than + 0.5mm; glazing channels and seal grooves may deviate by not more than + 0.3mm. The weight of the profile per meter shall not be more than 5% below the nominal value.

**Window properties**

U-Value: The total Uw–U value of complete window shall be 3.3W/m2K Resistance to wind load:

All load bearing members shall be adequately reinforced so as to resist the wind load requirements of IS875: Part 3. Calculations shall be submitted for all window designs.

**AIR Tightness**:

The air in filtration for windows shall not exceed 1liters/second m2 @ 75Pa for both positive and negative pressures (certified for use in air conditioned buildings)

**Water Tightness:**

The water penetration for windows shall be minimum 15minutes @ 150Pa asper AS 4420.5.

**Installation of Frame**

i. Before installation the Installation Team is to make sure that the opening has been prepared and any repair work has been carried out. Allow a 5mm gap between the frame and the opening. The new window shall be set in the prepared opening. Allow for suitable packing blocks.

ii. The window shall be fixed into the aperture, by drilling and fixing through the outer frame, to the existing structure using 'Fischer' fixings, F8 S type bolts.

iii. The fixings shall be no less than 150 mm from corners or transoms/mullions and at no more than 600mm centers.

iv. When the frame is securely fixed in position then fit glass and glazing beads. Allow for any necessary glazing blocks and glass lock devices.

v. Check windows for correct operation before proceeding with making good.

vi. No fixings are to penetrate the drainage channels.

vii. The windows shall be first treated with Polyurethane Foam (P U Foam) to enhance insulation against heat and Noise. The gap between masonry and the frame is to be filled with Neutral Cure Silicon (exposed to sun surface) and/or Acrylic Sealant (only for the internal surface). The windows shall be first treated with Polyurethane Foam (PU Foam) to enhance insulation against heat and Noise.

viii. The silicone joints should be covered with Architraves/trims as per direction of Engineer-in-charge.

**Making Good**

i) Making good to the external surface of the window frame and finish with a compatible approved low modular silicone sealant to BS5889. All trims and quadrants are to be approved by the Engineer-in-Charge prior to fixing.

ii) Allow for making good any disturbed plaster, brick work and decorations internally and externally including color wash to brick work.

iii) Clean off excess material and check fittings and gearing.

iv) Leave installation clean and in good working order.

**GENERAL ITEMS**

i) This specification is to be read in conjunction with any other relevant documents and drawings.

ii) Sizes are not to be scaled from any drawings or sketches but should be measured on site prior to manufacture.

**Window Accessories**

i) Window should be designed and reinforced such that it can with stand the wind load requirements by providing suitable strengthening accessories.

ii) The window shall meet the requirements of water tightness

Trims shall be used to cover the window to masonry joints

**Window Hard ware**

i) All slider door/windows are to be provided with multi point locking arrangement with/without key locking facility as per the requirement. The hardware shall be provided as per preferred list attached. The slider locking mechanism handles are of projected/flush type.

ii) Casement window friction stays are to be of G-U or Securistyle or equivalent make of appropriate size and weight bearing capacity, made of SS 304. The stack height of friction stay is to be 16+0.5 mm.

i) The casement windows are to be provided with multi point locking mechanism of shall be provided as per preferred list attached.

## Special Conditions of uPVC Doors, Windows and Ventilators.

The uPVC profile manufacturer shall provide warranty of 10 years for colour fastness and any manufacturing defects in respect of uPVC profiles as well as water and air tightness in case of casement uPVC door/window/ventilator unit.

uPVC doors/windows hardware and fittings manufacturer shall provide warranty of 10 years for any manufacturing defects

In addition the above contractor shall provide a guarantee bond as follows

**Guarantee bond**

The Contractor shall submit Guarantee Bond as per Proforma given in the tender document. In addition, 10% (Ten percent) of the cost of this item of work shall be retained as security deposit and the amount so withheld would be released after Ten years from the date of completion, if the performance of the work done is found satisfactory. If any defect is noticed during the guarantee period, it shall be rectified by the contractor along with any incidental repairs to structure, flooring, finishing, fixtures and any other related damaged work within fifteen days of receipt of intimation of such defects in the work. If the defects pointed out are not attended to within the specified period, the same shall be got done from another agency at the risk and cost of the contractor and the cost of attending such repairs shall be deducted from any dues payable to the contractors.

**Special condition for External Painting work**

The Contractor shall provide a warranty for the external painting work executed under this contract in accordance with the manufacturer's warranty policy. The Contractor shall arrange and comply with all necessary requirements, materials, procedures, surface preparation, application methods, and other conditions specified by the manufacturer to ensure the validity of the warranty

**Guarantee bond**

The Contractor shall submit Guarantee Bond as per Proforma given in the tender document. In addition, 10% (Ten percent) of the cost of this item of work shall be retained as security deposit and the amount so withheld would be released after Ten years from the date of completion, if the performance of the work done is found satisfactory. If any defect is noticed during the guarantee period, it shall be rectified by the contractor along with any incidental repairs to structure, flooring, finishing, fixtures and any other related damaged work within fifteen days of receipt of intimation of such defects in the work. If the defects pointed out are not attended to within the specified period, the same shall be got done from another agency at the risk and cost of the contractor and the cost of attending such repairs shall be deducted from any dues payable to the contractors.

**FORM –H**

**CONSENT LETTER FROM ELIGIBLE ASSOCIATE AGENCY OF MINOR COMPONENT OF WORK**

**Name of work:**" ***Providing Development and Bulk Services to RTC Peringome. SH : C/o 300 KLD Capacity of water Harvesting System including Collection sump filtered water distribution lines,UG sump, Sludge Drying bed, and Plant room etc. RTC,Peringome, Kannur, Kerala.***

I / We hereby give my consent to associate with M/s ……., for executing the minor component of work of ……. (Mention category).

1. I / We will execute the work as per specifications and conditions of the agreement and as per directions of the Engineer –in-Charge for the corresponding minor work till the completion of the work.

2. I / We will be responsible for necessary action to handover the installations and for rectification of defects and repair during the maintenance / warranty period.

3. Also, I / We will employ full time technically qualified Engineer / supervisor for the minor component of the work as required for the work. I / We will attend inspection of officers of the department as and when required.

Date:

| | |
|---|---|
| Signature with date of Major component | Signature with date of Associate/ Minor -Component |
| Contractor | Contractor |
| Address | Address |
| Witness with address (From major component contractor side) | Witness with address (From minor component contractor side) |

**LIST OF FIELD TESTS**

i) Particle size and shape.

ii) Slump test.

iii) Flakiness & Elongation Index tests.

iv) Compressive strength (concrete or bricks) test.

v) Rebound Hammer test.

vi) Bulking of sand.

vii) Silt content of sand.

viii) Any other tests as per CPWD specifications.

**(TABLE-1)**

**Equipments for Testing of Materials & Concrete at Site Laboratory**

All necessary equipment for conducting all necessary tests shall be provided at the site in the well-furnished site laboratory of minimum 25 sqm area by the contractor at his own cost The following minimum laboratory equipments shall be set up at site office laboratory: -

| Sl. No. | Equipment | Numbers (Minimum) |
|---|---|---|
| 1. | Cube testing machine - 100MT compression testing machine, electrical-cum-manually operated | 1 |
| 2. | Slump cone | 2 |
| 3. | Pumps and pressure gauges for hydraulic testing of pipes | 2 |
| 4. | Graduated glass measuring cylinder | As per requirement |
| 5. | Sets of sieves for coarse aggregate | 1 |
| 6. | Sets of sieves for fine aggregate | 1 |
| 7. | Cube moulds size 70mmx70mmx70mm | 5 |
| 8. | Cube moulds size 150mmx150mmx150mm | 18 |
| 9. | Electronic balance 100kg | 1 |
| 10. | Physical balance weight upto 5kg | 1 |
| 11. | Measuring jars 100ml, 200ml, 500ml | 2 Nos. each |
| 12. | Gauging trowels 100mm & 200 mm with wooden handle | 2 Nos. each |
| 13. | Spatula 100mm & 200mm with long blade wooden handle | 1 No. each |
| 14. | Vernier calipers 12” & 6” size | 1 No. each |
| 15. | Digital PH meter least count 0.01 mm | 1 |
| 16. | Digital Micrometer least count 0.01mm | 1 |
| 17. | GI tray 600x450x50mm, 450x300x40mm | 4 Nos. each |
| 18. | Screw gauge 0.1mm -10mm, least count 0.05 | 1Nos. |
| 19. | Thickness gauge for measuring flakiness index | 1 No. |
| 20. | Elongation gauge | 1 No. |
| 21. | Measuring cylinder 3,5-,10- & 15-liter cylinder | 2 Nos. each |

| | | |
|---|---|---|
| 22. | Motorized sieve shaker | 1 No. |
| 23. | Pruning Rods 2kg weight length 40 cm and ramming face 25 Sqm. | 2 Nos. |
| 24. | Extra Bottom plates for 15 cm cube mould | 6 nos. |
| 25. | Concrete temperature measuring thermometer with Brass protection sheath 0- 100 degree centigrade | 1 Nos. |
| 26. | Mortar Cube vibrator | 1 No. |
| 27. | Iron Weight of 5 kg, 2 kg, 1 kg, 500 gm, 200 gm, 100 gm | 1 No. each |
| 28. | Brass Weight of 50 gm, 20 gm, 10 gm, 5 gm, 2 gm, 1 gm | 1 No. each |
| 29. | Hammer 1lb& 2lb | 2 Nos. each |
| 30. | Soil Testing Equipment. | As per requirement & as decided by Engineer-in-Charge. |
| 31. | Bituminous Road-Testing Equipment. | As per requirement & as decided by Engineer-in-Charge. |
| 32. | Any other equipment for site tests as outlined in BIS and as directed by the Engineer-in-charge. | As per requirement |

**Note:**

1. The contractor has to establish within 21 days from the award of work a field laboratory at site including all necessary equipments and skilled manpower for the Field Tests as indicated in the tender document this own cost to have proper quality control. Rs.5,000/-per day shall be recovered from the contractor for any delay beyond the specified period. If contractor fails to establish lab within additional period of 15 days, the Engineer in charge shall initiate action as deemed fit under relevant clauses of the agreement.

2. All the above structures should be decent looking and shall be fabricated as per direction of Engineer-in-charge.

3. All the above structure shall be demolished after completion of work and the dismantled material shall be the property of the contractor.

   Quality assurance by technical team and the report submitted by the quality assurance team shall be communicated to the contractor by the Engineer-in-charge. The contractor has to comply / rectify the defects/ shortcomings pointed out by the quality assurance team at his own cost within the time specified by Engineer-in-charge.

**(TABLE – 2)**

**PLANT AND EQUIPMENT REQUIRED TO BE OWNED / TAKEN ON LEASE BY THE CONTRACTOR**

| Sl.No. | Equipment | Numbers (Minimum) |
|---|---|---|
| 1 | Tower crane with sufficient boom and capacity as per site requirement and as decided by Engineer-in-charge. | As per requirement and as decided by Engineer-In-charge. |
| 2 | Mobile tower crane with 40m boom length with 5MT tip load | As per requirement and as decided by Engineer-In-charge. |
| 3 | Self-loading concrete mixer with digital print facility of capacity not less than 4.00 cum per batch | 1 |
| 4 | Excavator cum loader (JCB 3D model or equivalent) | 2 Nos. |
| 5 | Compressor machine minimum 200 cfm with rock breaker | As per requirement and as decided by Engineer-In-charge. |
| 6 | DG set of capacity as per requirement | 1 |
| 7 | Needle Vibrators. | 4 |
| 8 | Screed leveller. | 2 Nos. |
| 9 | Plate Vibrators. | 2 |
| 10 | Dumper/ Tipper | 4 |
| 11 | Reinforcement bending machine. | 4 |
| 12 | Reinforcement cutting machine. | 4 |
| 13 | Power driven earth rammer (Soil compactor). | 2 |
| 14 | Total station. | 1 |
| 15 | Auto level & staff. | 1 |
| 16 | Welding machine 400 Amps | 2 |
| 17 | Tractor with trolley. | 1 |
| 18 | Water tanker of minimum 5000 litres capacity | 2 |
| 19 | Screener for coarse sand and fine sand | 4 |
| 20 | Centrifugal Mono block water pump minimum Capacity 2 HP (2+1 stand by) | 3 |
| 21 | Drilling Machine | 2 |
| 22 | Centering & Shuttering | As per requirement and as decided by Engineer-In-charge. |
| 23 | Double scaffolding and staging materials | As per requirement and as decided by Engineer-In-charge. |
| 24 | Air compressor | 1 |
| 25 | Floor grinding / polishing machines | 2 |
| 26 | Granite cutting machine | 4 Nos. |
| 27 | Ceramic / vitrified tile cutting machine | 4 Nos. |
| 28 | Granite hand polishing machine | 2 Nos. |
| 29 | Vacuum dewatering machine for concrete | As per requirement and as decided by Engineer-In-charge. |

| | | |
|---|---|---|
| 30 | Good quality Camera mounted on Drone for taking photographs andVideo recording of major activities for record purpose and for quality assurance. | 2 Nos. |
| 31 | Any other machinery required for completion of the Work as per decision of Engineer-in-charge. | As per requirement and as decided by Engineer-In-charge. |

**Note:**

(i) The above list is only indicative and not exhaustive.

(ii) The plants and equipment to be brought to the site as per Works requirement and as instructed by Engineer-in-charge within 14 days of issue of such instruction, failing which, a penalty at Rs.5,000/- per day delay in the mobilization of equipment will be levied on the agency. Such penalty levied will be recovered from the immediate next RA bill of the contractor. However, if the work is completed within the stipulated date of completion, then the amount recovered will be refunded without any interest payment.

## GUARANTEE TO BE EXECUTED BY CONTRACTOR FOR REMOVAL OF DEFECTS AFTER COMPLETION IN RESPECT OF BITUMINOUS WORKS

The Agreement made this ……**……. day of ……**…….. Two Thousand Twenty Four between ……**……. son of ……**…….. Of M/s……..** (hereinafter called the Guarantor of the one part) and the PRESIDENT OF INDIA (hereinafter called the Government of the other part).

WHEREAS THIS agreement is supplementary to a contract (hereinafter called the Contract), dated ……..** and made between the GUARANTOR OF THE ONE part and the Government of the other part, whereby the Contractor, inter alias, undertook to render the Bituminous work (included in items of tack coat, Bituminous concrete & DBM etc.)surfaces in the said contract completely crack-proof and impermeable without showing separation of construction joints and losing desired hardness.

AND WHEREAS THE GUARANTOR agreed to give a guarantee to the effect that the said

Roads surface will remain sound as per above noted undertaking for five years from the date of record of completion certificate for the work.

NOW THE GUARANTOR hereby guarantees that Bituminous work (included in items of tack coat, Bituminous concrete & DBM etc.) carried out by him will render the Roads surface completely crack proof and impermeable wearing course and shall be defect free for five years to be reckoned from the date of record of completion certificate for the work.

The guarantor agrees to withheld additional security deposit amounting to 10% of cost of executed road work items Recycling Pavement by Cold Milling Process, SMA, DBM, Tack Coat and Bituminous Concrete Works. The amount so withheld would be released in two stages after three years and after five years from the date of completion of whole work as provided under the agreement, if the performance of the work done is found satisfactory.

The decision of the Engineer-in-Charge with regard to cause of crack formation, permeability, loss of hardness, separation of construction joints shall be final.

During this period of guarantee, the guarantor shall make good all defects mentioned above by Re-Executing the Bituminous work (included in items of tack coat, Bituminous concrete & DBM etc.) after removing the defective layer over the affected area, as per specifications of agreement. Repairing of the existing defective surface shall not be allowed. In case of any defect being found, render the rectification as described above, to the satisfaction of the Engineer-in-Charge,

at GUARANTER'S cost and he shall commence the work for such rectification within seven days from the date of issue of notice by the Engineer-in-Charge calling upon him to rectify the defects, failing which the work shall be got done by the DEPARTMENT through some other contractor at the GUARANTOR'S cost and risk. The decision of the Engineer-in-Charge as to the cost payable by the Guarantor shall be final and binding.

That if the Guarantor fails to execute Bituminous work (included in items of tack coat, Bituminous concrete & DBM etc.)or commits breach there under, then the Guarantor will indemnify the Principal and his successors against all loss, damage, cost, expense or otherwise which may be incurred by him by reason of any default on the part of the GUARANTOR in performance and observance of this supplementary agreement. As to the amount of loss and / or damage and / or cost incurred by the Government, the decision of the Engineer-in-Charge will be final and binding on the parties.

IN WITNESS WHEREOF these presents have been executed by the Obligor ……**…… and by **The Executive Engineer-, CPWD, Kannur-670 001** for and on behalf of the PRESIDENT OF INDIA on the day, month and year first above written.

Signed, sealed and delivered by Obligor in the presence of:

1.

2.

GUARANTOR

Signed for and on behalf of PRESIDENT OF INDIA by **The Executive Engineer, CPWD, Kannur - 670 001**, in the presence of:

1.

2.

**EXECUTIVE ENGINEER**
**CPWD, KANNUR**

**(On non-judicial stamp paper of minimum Rs.100)**

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

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

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

AND WHEREAS THE GUARANTOR agreed to give a guarantee to the effect that the said structures will remain water/leak proof for **(10)Ten years** to be reckoned from the date after the expiry of maintenance period prescribed in the Contract.

NOW THE GUARANTOR hereby guarantees that work executed by him will render the structures completely leak proof and the minimum life of such water proofing treatment shall be **(10) Ten years** to be reckoned from the date after the expiry of maintenance period prescribed in the contract.

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

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

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

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

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

1. ..... 2. .....

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

1. ..... 2. .....

**(On non-judicial stamp paper of minimum Rs.100)**

**GUARANTEE BOND TO BE EXECUTED BY THE CONTRACTOR**

**FOR REMOVAL OF DEFECTS AFTER COMPLETION**

**IN RESPECT OF ALUMINIUM DOORS, WINDOWS &VENTILATOR WORK/STAINLESS STEEL WORK**

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

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

AND WHEREAS THE GUARANTOR agreed to give a guarantee to the affect that the said work will remain structurally stable and guaranteed against faulty material and workmanship, defective anodizing/ powder coating for **Five years** to be reckoned from the date after the expiry of maintenance period prescribed in the Contract.

The decision of the Engineer-In-Charge with regard to nature and cause of defect shall be final.

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

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

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

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

1. ..... 2. .....

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

1. ..... 2. .....

**GUARANTEE TO BE EXECUTED BY THE CONTRACTOR FOR REMOVAL OF DEFECTS AFTER COMPLETION OF UPVC WINDOWS.**

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

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

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

NOW THE GUARANTOR hereby guarantees that work executed by him remain structurally stable, completely leak proof and guaranteed against faulty material and workmanship, colouring for a minimum life at **ten years** to be reckoned from the date after the maintenance period prescribed in the contract.

The decision of the Engineer-in-charge with regard to cause of defect(s) small be final.

During this period of guarantee, the guarantor shall make good all defects to the satisfaction of the engineer-in-charge at his cost and commence the work for such rectification within 15 days from the date of issue of notice from the Engineer-in-charge calling upon him to rectify the defects failing which the work shall be got done by the department of some other contractor at the GUARANTOR‟S coat and risk. The decision of Engineer-in-charge as to the cost, payable by the GUARANTOR shall be final and binding. That if the guarantor fails to make good all the defects or commits breach the reunder, then the guarantor will indemnify the principal and his successors against all loss damage, cost, expense or otherwise which may be incurred by reason of any default on part of the GUARANTOR in performance and observance of this supplementary agreement. As tothe amount of loss and/or damage and/or cost incurred by the GOVERNMENT, the decision of the ENGINEER-IN-CHARGE will be final and binding on the parties.

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

SIGNED, SEALED AND delivered by OBLIGATOR in the present of :

1. _____ 2. _____

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

1. _____ 2. _____

**(On non-judicial stamp paper of minimum Rs.100)**

## GUARANTEE BOND TO BE EXECUTED BY THE CONTRACTOR FOR REMOVAL OF DEFECTS AFTER COMPLETION IN RESPECT OF EXTERNAL PAINTING WORKS (EXTERNAL PAINTING WORK).

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

WHEREAS THIS agreement is supplementary to a contract (Hereinafter called the Contract) dated ..... and made between the GUARANTOR OF THE ONE PART AND the Government of the other part whereby the contractor inter alia undertook to render the external painting works in the said contract recited completely durable, fade-resistant, and weather-proof.

AND WHEREAS THE GUARANTOR agreed to give a guarantee to the effect that the said structures shall remain free from paint defects such as peeling, blistering, flaking, chalking, loss of anti-algal / anti-fungal performance or severe premature fading for Eight years with respect to durability (colour retention and film integrity), to be reckoned from the date after expiry of the maintenance period prescribed in the Contract.

NOW THE GUARANTOR hereby guarantees that work executed by him will render the structures completely protected with external paint film integrity and the minimum life of durability, waterproofing, and anti-algal protections shall be Eight years, to be reckoned from the date after the expiry of maintenance period prescribed in the contract.

Throughout this warranty and guarantee bond, the words "Paint Failure" shall mean any of the following occurring, subject to the other conditions laid under this agreement:-
i. Film integrity, flaking and peeling of the paint undercoat and/or external topcoat caused by one coat of paint coming off from another or the paint film coming off the substrate.
ii. The paint film shows blistering, splits, tears or shows evidence of excessive weathering due to defective material or workmanship.

iii. Shade fading/excessive weathering of the paint film.

iv. Growth of fungus and algae on wall surfaces

v. Water ingress through exterior surfaces (only vertical walls) where the external painting system is applied (water ingress through the roof or any through any other part of the structure not protected through the external painting system will not be covered by this guarantee).

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

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

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

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

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

1. .....  2. .....

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

1. .....  2. .....

## List of Preferred brand / Manufacturer/ Make (Civil component)

NOTE: - 1) A List of Preferred Brand Names of Various Materials / Products are shown below for usage in execution of Work. However, approved equivalent material of any other Specialized Companies / Firms may also be used, in case it is established that the Brands Specified below are not available in the market or in other unavoidable circumstances and subject to Approval of the alternate Brand by the Engineer-In-charge. However, in case, the equivalent model so approved, is cheaper than the model already mentioned in item/approved makes list, the price adjustment will be made based on the difference in market rate. In case, the rate of subsequently approved model is more, no extra payment will be made on this account.

2) It must be ensured, in general, that all materials to be used in the works shall bear BIS Certification mark. In cases where for a particular material/product, BIS Certification Mark is not available, then the material proposed to be procured can be used subject to the condition that it should conform to CPWD Specifications and relevant BIS codes. In such cases written approval of the Engineer-in - Charge shall be obtained before use of such material in their works.

3) The list given below does not absolve the Executing Agency from their responsibility for using these products. It is only after, they are satisfied about the quality and performance, the products shall be used. To achieve this, proper check on the quality of the product, actually to be used, should be exercised.

4) The **Superintending Engineer, CPWD, Calicut** reserves the right to add or delete any materials and brands in the list of approved makes. However, in case, the equivalent model so approved, is cheaper than the model already mentioned in item/approved makes list, the price adjustment will be made based on the difference in market rate. In case, the rate of subsequently approved model is more, no extra payment will be made on this account.

| Sl. No. | Materials | APPROVED MAKES |
|---|---|---|
| 1 | WHITE CEMENT | J.K. WHITE, BIRLA WHITE, ASIAN PAINTS |
| 2 | CHEMICAL ADMIXTURES | ARDEX ENDURA, FOSROC, MC BAUCHEMIE, SIKA, BASF, PIDILITE, CHOKSEY CHEMICALS, BOSTIK |
| 3 | EXPANSION JOINT BOARD | SUPREME INDUSTRIES, SIL FILL OR EQUIVALENT, STP LTD |
| 4 | DAMP PROOF MATERIAL | ARDEX ENDURA, IMPERMO, DURASEAL, ACCO-PROOF |
| 5 | NON METALIC SURFACE HARDNER | ARDEX ENDURA, FOSROC, SIKA, PIDLITE, |
| 6 | INJECTION GROUTING | ARDEX ENDURA, FOSROC, SIKA, BASF, CICCO |
| 7 | RMC / DMC | ULTRATECH, LAFARGE, SEDC, AVON ,Geo Mix, |
| 8 | BITUMEN | INDIAN OIL, HINDUSTAN PETROLEUM, MANGALORE REFINERIES, BHARAT PETROLIUM |
| 9 | STEELWORK / LOW ALLOY STEEL REINFORCEMENT BARS | ISI MARKED LOW ALLOY STEEL REINFORCEMENT BARSOF TATA, JSPL, JSW, RINL, VSP OR THEIR AUTHORIZED DEALERS: |
| 10 | STRUCTURAL STEEL | TATA, JSPL, JSW, RINL,VSP, APL APOLLO OR THEIR AUTHORIZED DEALERS: |
| 11 | AAC BLOCKS | XTRALITE FROM ULTRATECH, AEROCON FROM HIL, SIPOREX INDIA LIMITED, NCL,RENACON |
| 12 | EPOXY MORTAR | ARDEX ENDURA, FOSROC, SIKA, BASF, ULTRATECH, BOSTIK, PIDILITE |
| 13 | CC BLOCKS/ FLYASH BLOCKS | SIPOREX, SUNVIK, HIL |
| 14 | FRP DOOR FRAME& SHUTTERS | MEENA, RAWJI, FIBERTECH, ASTRALWIN DOORS, SMP MAGMA |
| 15 | PVC DOOR SHUTTER AND FRAME | RAJASHRIPLASTIWOOD, SINTEX, DUROPLAST, SMP MAGMA |
| 16 | WOODEN FLUSH DOORS | KITPLY, CENTURY, GREENPLY, ARCHID PLY,KUTTY |
| 17 | WATER PROOF PLY / COMMERCIAL PLY | DURO, KITPLY, CENTURY, ARCHID PLY, GREENPLY,OXY MARINE PLYWOOD |
| 18 | LAMINATES | FORMICA/DECOLAM/CENTURY/ROYAL TOUCH/GREENLAM |
| 19 | HP LAMINATES | MERINO/GREENLAM/DECOLAM/ CENTURY/ ROYAL TOUCH |

| | | |
|---|---|---|
| 20 | PRE.LAMINATED PARTICLE BOARD | NOVOPAN, KITLAM, ARCHID PLY, CENTURY |
| 21 | NATURAL WOOD VENEER | ARCHID/ANCHOR/DURAIN/ KITPLY/ NATIONAL/ ACTION TESA |
| 22 | POLYSTER POWDER COATED SHADES | NEROLAC, BERGER, AKZONOBEL, ASIAN |
| 23 | GYPSUM BOARD | SAINT GOBAIN, LAFARGE, BORAL BOARD, ARMSTRONG |
| 24 | FALSE CEILING CALCIUM SILICATE | ARMSTRONG, AEROLITE, RAMCO, DIAMOND CEILINGS |
| 25 | FALSE CEILING MINERAL FIBRE | SAINT GOBAIN, ARMSTRONG, ANUTONE |
| 26 | MELAMINE POLISH | ASIAN PAINTS, MALAMYNE GOLD, WUDFIN OF PIDILITE INDUSTRIES, TIMBER TONE OF ICI DULUX |
| 27 | DOOR HARDWARE | DORMA/HAFELE/KICH/OZONE/DORSET/ BACKERS FS/GODREJ |
| 28 | HYDRAULIC DOOR CLOSERS / FLOOR SPRINGS | DORMA, KICH, GODREJ, HARDWYN, DORSET |
| 29 | LOCKS / LATCHES | GODREJ, HARRISON, LINK, DORSET, DORMA |
| 30 | FIRE CHECK DOOR | BANGALORE PROTECH, SHAKTI, NAVAIR, KENWOOD, VEROTECH, SHAKTI HARMON |
| 31 | SMOKE SEAL STRIP | IMPROTED PROMAT / ASTRO FLAME |
| 32 | FIRE RATED HARDWARE | DORMA, INGERSOL RAND, GEZE, DORSET BACKERS FS |
| 33 | SS SCREWS FOR FABRICATION AND FIXING OF WINDOWS. | KUNDAN, PUJA, ATUL, GRIPWELL, NAKODA |
| 34 | BUTT / BALL BEARING HINGES | HAFFLE, DORMA, DORSET, GODREJ |
| 35 | PIANO HINGES | JOLLY, GARG, AMIT, JYOTI |
| 36 | NUTS BOLTS/ SCREWS | KUNDAN, PUJA, ATUL, IT, BOLT MASTER, GRIPWELL, NAKODA |
| 37 | ACOUSTIC INSULATION | U.P. TWIGA LTD, LLOYD INSULATION, SAINT GOBAIN, ARMSTRONG |
| 38 | GLASS/ REFLECTIVE GLASS | SAINT GOBAIN ,ASAHI , PILKINGTON, MODI FLOAT, GLAVERBEL |
| 39 | UPVC WINDOWS & DOORS/ VENTILATION | FENESTA, REHAU, ENCRAFT, DUROPLAST WINTECH, NCL, MADHU INDUSTRIES, LG, SMP MAGMA, RAJSHRI PLASTIWOOD,QUTE |
| 40 | SOURCEFOR TEMPERING REFL. GLASS/ CLEAR | FUSO, SAINT GOBAIN, GURIND, IMPACT SAFETY |
| 41 | FIRE RATED GLASS | PYOSWISS OF SAINT GOBAIN, PYRAN OF SCHOTT, PILKINGTON |
| 42 | DOUBLY CHARGED VITRIFIED TILES BEING MANUFACTURED IN THE MOTHER PLANT. | KAJARIA, JOHNSON, RAK CERAMICS, NITCO,SOMANY |
| 43 | GLAZEDCERAMIC TILES | JOHNSON, KAJARIA, NITCO, SOMANY |
| 44 | FALSE FLOOR | HEWETSON, UNIFLOOR, UNITILE, KEBAO, PINNACLE |
| 45 | ENGINEERED WOOD /LAMINATE FLOORING | ARMSTRONG, WERNEL, PERGO, ACTION TESA, WELSPUN |
| 46 | CC PARKING TILES | NITCO, NTC, HINDUSTAN, PODDAR EUROCON, DAZZLE ULTRA. |
| 47 | INTERLOCKING CONCRETE BLOCKS | NITCO-(ROCKARD), BHARAT-(NILSAN), REGENCY, BESANT BEATONS |
| 48 | CLAY TILES ON ROOF | KENJAI, JOHNSON, COMMON WEALTH TRUST (IND) LTD |
| 49 | TILE ADHESIVE | ARDEX ENDURA, CICO, PIDILITE, PERROUS, FOSROC, SIKA,ULTRA BOND |
| 50 | CHEQUERED TILES | NITCO, BHARAT, PODDAR |

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|---|---|---|
| 51 | SYNTHETIC CARPET TILES | TOLI,HOLLITEX,STANDARDCARPETS, WELSPUN |
| 52 | GLASS MOSAIC TILES | ITALIA,PALLADIO,BISAZZA |
| 53 | PAINT/PRIMER/OBD/ACRYLIC PAINT/ ENAMEL/ ACRYLIC TEXTURED PLASTER / ACRYLIC EXTERIOR PAINT | ASIANPAINTS, ICIDULUX, NEROLAC, BERGER |
| 54 | WATER PROOF CEMENT PAINT | SNOWCEM INDIA LTD, ASIAN PAINTS, ICI DULUX, NIPPON PAINTS |
| 55 | FIRE RETARDANT PAINT | JOTUN, HILTI, AKZONOBEL, NIPPON |
| 56 | MIRRORGLASS | MODIGUARD, SAINT GOBAIN, ASAHI, ATUL |
| 57 | ANTI CORROSIVE BITUMASTIC PAINT | ASIAN / BERGER / SHALIMAR |
| 58 | EPOXYPAINT | BERGER PAINTS, ASIAN PAINTS, MRF, ARDEX ENDURA |
| 59 | EPOXYCOATING | ARDEX ENDURA, BASF,FORSOC,LATICRETE, MRF |
| 60 | STRUCTURAL SILICON/ WEATHER SILICON | DOW CORNING / WACKER / GE |
| 61 | ANODIZED ALU. FITTINGS FOR DOORS / WINDOWS | HARDIMA, EVERITE, SIGMA (ISI MARKED) JYOTHI |
| 62 | STAINLESS STEEL FITTINGS | DORSET, GODREJ, DORMA, OZONE, KITCH |
| 63 | ALUMINIUM SECTIONS | JINDAL, HINDALCO, INDALCO |
| 64 | FRICTION STAY HINGES | EBCO, HAFELE, SEVAX |
| 65 | ALU. COMPOSITE PANEL (ACP) | ALUCOBOND, EUROBOND, DURABUILD |
| 66 | E.P.D.M. GASKETS | ANAND/ ROOP/ BOHRA/ HANU/ AMEE RUBBER |
| 67 | WATER PROOFING COMPOUND | SIKA, ACCOPROOF, IMPERMO, FOSROC PIDILITE, ARDEX ENDURA, BOSTIK, BERGER |
| 68 | MEMBRANE WATER PROOFING SYSTEM | BASF,TEXSA, WR GRACE, PIDILITE, HYDRO TECH LTD. ARDEX ENDURA, BOSTIK, FOSROCK |
| 69 | POLYMER BASED WATER PROOF COATINGS | ARDEX ENDURA, BASF, MC-BAUCHEMIE, SIKA, FORSOLOC, PIDILITE, BERGER |
| 70 | WATER STOPS | ARDEX ENDURA, HYDROTITE, BASF, HYDROSWELL, PIDILITE, BOSTIK |
| 71 | PVC PERFORATED PIPES | REX POLY EXTRUSION LTD, AKASH ENTERPRISES, ZENPLAS PIPES PVT.LTD |
| 72 | MS PIPES | TATA, JINDAL, APOLLO |
| 73 | POLYSULPHIDE SEALANT | PIDILITE/CHEMETALL-RAJ/ FOSROC/ CHOKSEY CHEMICALS/ TUFF SEAL |
| 74 | BITUMEN IMPREGNATED BOARD | SHALITEX OR EQUIVALENT |
| 75 | POLYETHYLENE BACKER ROD | SUPREME IND.LTD. OR EQUIVALENT |
| 76 | FALSE CEILING MEMBERS (PERIMETER, CEILING SECTION, INTERMEDIATES, ANGLES ETC.) | ARMSTRONG, GYP. ROCK (SAINT GOBAIN), |
| 77 | WELDING ROD | ADVANI, ESAB |
| 78 | METAL DECK SHEET | TATA,JINDAL, ALFA, KAILASH ROOFIN, APL APOLLO |
| 79 | SHEAR STUD / CONNECTOR | KOCOOREQUIVALENT |
| 80 | CLAMP. REBAR, CHEMICAL FASTENER | HILTI,FISCHER,WURTH, AXEL |
| 81 | ANCHOR FASTENERS / BOLTS | HILTI, FISHER, CANON, BOSCH, AXEL |
| 82 | MASKING TAPES | 3M, SUN CONTROL,WONDER POLYMER |

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| 83 | DASH FASTENERS | HILTI, FISHER, CANON, BOSCH, AXEL |
| 84 | STAINLESS STEEL BOLTS, WASHERS AND NUTS | ATUL / HILTI / GRIPWELL / NAKODA |
| 85 | GRC JALI | TERRAFIRMA, ECOVISION, BIRLA WHITE GRC, EVEREST GRC |
| 86 | STAINLESS STEEL | SALEM,JINDAL,SAIL |
| 87 | POLYCARBONATESHEET | DANPALON,ALCOX,POLYGAL, .A.CORPORATION, ALFA, GE, LEXON, TUFLITE |
| 88 | PTSTRANDS | DP WIRES, TATA, USHA MARTIN |
| 89 | ADHESIVE (MANUFACTURE SPECIFICATIONS) | ARDEX ENDURA, DUNLOP,VAM ORGANIC, SIKA, FOSROC, PIDLITE, BOSTIK |
| 90 | GROUTS | KERAKOLL,WEBER, ARDEX ENDURA, BOSTIK, FOSROCK, PIDILITE |
| 91 | SOLAR STUDS/ MEDIAN MARKERS | 3M, AVERY DENNISION , NIKKALITE |
| 92 | POLYCARBONATE CONVEX MIRRORS, RUBBERISED ROAD HUMP | UNIQUESAFETYSOLUTIONS |
| 93 | AIRTRANSFERGRILLS | COOLGRILLSPUNE,SYSTEMAIRINDIA |
| 94 | THERMAL INSULATION TREATMENT | PIDILITE,BASF, BERGER, ARDEX ENDURA |
| 95 | VITREOUS WC / WASH BASIN | PARRYWARE, HINDWARE, CERA, JAQUAR |
| 96 | GULLY TRAPS | PERFECT, PARRY |
| 97 | STAINLESS STEEL SINKS | NILKANTH, AMC, COBRA, NIRALI, DIAMOND, HINDWARE |
| 98 | C. P. BRASS FITTINGS | JAQUAR, PARKO, MARC, HINDWARE, PARRYWARE, KINGSTON |
| 99 | GI PIPES | TATA, JINDAL, HISSAR, APL APOLLO |
| 100 | GI PIPE FITTINGS | ZOLOTO, UNIK, HB, ICS |
| 101 | RCCPIPES | INDIAN HUME PIPE, MOHAN HUME PIPE, BANGALORE CEMENT PIPES |
| 102 | SPUN CAST IRON COVERS &GRATINGS, PIPES, FITTINGS | NECO, SKF/ BENGAL IRON CORPORATION |
| 103 | SWR PVC PIPES AND FITTINGS | SUPREME, FINOLEX, PRINCE, ASTRAL, APL APOLLO |
| 104 | CPVC PIPE AND FITTINGS | SUPREME, ASHRIVAD, FINOLEX, PRINCE, FLOW GUARD, ASTRAL APL APOLLO |
| 105 | UPVC PIPES | SUPREME, PRINCE, FINOLEX,AIZAR |
| 106 | WATER SUPPLY VALVES | ZOLOTO,LEADER,ARCO |
| 107 | CI MANHOLE COVER | NECO, BIC |
| 108 | SFRC COVERAND GRATING | TULSHI CONCRETE, KK, ADVENT, NEWTECH |
| 109 | AIR RELEASE VALVES, CI DOUBLE FLANGE SLUICE VALVE | KIRLOSKAR, RBM, KARTAR |
| 110 | PLASTIC ENCAPSULATED FOOTREST | KK INDIA, KGM, ACCURATE BUILDCON |
| 111 | GUNMETALVALVES | ZOLTO,LEADER,SANT,ANDCOINDIA |
| 112 | CI DOUBLE FLANGED SLUICE VALVES, NON RETURN VALVES | KIRLOSKAR,IVS,BURN, ZOLOTO,LEADER |
| 113 | SANDWICH PUPANELLED ROOFING SHEETS | LLOYD NSULATION(INDIA)LTD. ,JINDAL,MECTEC PVT LTD., TATA |
| 114 | GALVALUME SHEET | LLOYD(INDIA)LTD. OXY ROOF, JSW, TATA BLUE SCOPE, APL APOLLO |
| 115 | CRYTALLINE WATER PROOFING ADMIXTURE AND COMPOUND | PENETRON, KRYTON, PIDILITE, FOSROC. |

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|---|---|---|
| 116 | STAINLESS STEEL WATER SUPPLY PIPES | JINDAL, SWASTIK, RAMPPART, J-PRESS. |
| 117 | HERMETICALLY SEALED PERFORMANCE GLASS, TOUGHENED, DGU, SGU, TOUGHENED LAMINATED GLASS | AUTHORISED TOUGHENERS OF (MODI GUARD, SAINT GOBAIN, ASAHI, AIS/GLAVERBEL, PILKINGTON |
| 118 | ORDINARY PORTLAND CEMENT (43 GRADE) & PORTLAND POZZOLONA CEMENT | ACC, CEMENT, ULTRA TECH CEMENT , COROMANDAL BIRLA, CHETTINADU ,BHARATI ,DALMIA ZUARI, JAYPEE, MAHA CEMENT, J.K.CEMENT, AMBUJA, CENTURY , PENNA , RAMCO CEMENT, VIKRAM, MAHA CEMENT, INDIA CEMENT, SHREE CEMENT |
| 119 | PLASTICISER AND SUPER PASTICISER | AS PER CEMENT MANUFACTURER'S RECOMMONDATION |
| 120 | EXPANSION JOINT BITUMEN BOARD | DURA BOARD, HD100, DURAFILL |
| 121 | HIGH DENSITY PRELAMINATEDEBOARD | PERGO, GREEN PLY INDUSTRIES LTD. |
| 122 | SS BUTT HINGES | OZONE ,DORMA, GEZE |
| 123 | MULTI WALLED POLYCARBONATE ROFING SHEETS | DANPALON, LEXAN GE, DPI DAYLIGHT. |
| 124 | PREMIER ACRYLIC SMOOTH EXTERIOR PAINT WITH SILICON ADDITIVES | ASIAN PAINT, ICIDULUX, NEROLOC<br>BERGER |
| 125 | CEMENT BASED WALL PUTTY | JK WALL PUTTY, BIRLA WALLCARE, ASIAN PAINT |
| 126 | FLUSHING CISTERN | KOHLER, GROHE, JAQUAR |
| 127 | PE-AL-PE COMPOSITE PIPES | KITECH, VECTUS, JINDAL |
| 128 | PVC /HDPE WATER TANKS | VECTUS, SYNTEX, SUPREME |
| 129 | WATER SUPPLY FIXTURES | JAQUAR, HINDWARE |
| 130 | ANODISED ALUMINIUMFITTINGS FOR DOORS AND WINDOWS | DEFNE, SCHUECO, BHORUKA, KAWANEER, HARDIMA, EVERITE, JYOTHI, SIGMA |
| 131 | STRUCTURAL GLAZING | MODI, SAINTGOBAIN, ASAHI, GLAVERBEL |
| 132 | WPC DOOR FRAMES AND SHUTTERS | RAJSHRI PLASTIWOOD, SMP MAGMA |
| 133 | GALVALUM ROOFING SHEET | OXYROOF |

**Note:**

1. **The Makes / Brands for the materials approved at a later date in addition to above list by the competent authority during the progress of work can also be used.**
2. **If any new brands of material which are in the approved list and not time tested previously shall be got tested by the Engineer-in-charge personally from the approved reputed laboratories before allowing such products using in the work. The testing charges shall be borne by the agencies only.**

# PART C

## FOR E & M WORKS
## (Minor Component)

**PROFORMA OF SCHEDULES A to F**
**(E&M Components)**

**SCHEDULE 'A'**
Schedule of quantities (E&M works): **(Pages from 153 to 163)**

**E&M work Minor component : Rs.85,49,922/-**

**SCHEDULE 'D'**

Extra schedule for specific requirements/documents for the work, if any : **NIL**

| | | |
|---|---|---|
| Particular Specification and Special Conditions for E&M Works | **:** | **Pages from 121 to 125** |
| Technical Specifications for E&M Works | **:** | **Pages from 126 to 131** |

**SCHEDULE 'E'**

| | | |
|---|---|---|
| Reference to General Conditions of contract | **:** | **As per Major Component.** |
| **Name of Work** | **:** | **Providing Development and Bulk Services to RTC Peringome. SH: C/o 300 KLD Capacity of water Harvesting System including Collection sump filtered water distribution lines, UG sump, Sludge Drying bed, and Plant room etc. RTC,Peringome,Kannur, Kerala.** |
| Estimated Cost Put to Tender | **:** | **Rs.2,14,04,864/-**<br>**(Civil - Rs. 1,28,54,942/- + E&M - Rs. 85,49,922/-)** |
| *Electrical work (Minor Component)* | **:** | **Rs.85,49,922/-** |
| (i) Earnest money | **:** | **As per Major Component.** |
| (ii) Performance Guarantee | **:** | **As per Major Component.** |
| (iii)Security Deposits | **:** | **As per Major Component.** |

**SCHEDULE 'F'** – General Rules & Directions

| | |
|---|---|
| Officer inviting tender | **Executive Engineer, CPWD, Kannur** |
| Maximum percentage for quantity of items of work to be executed beyond which rates are to be determined in accordance with Clauses 12.2 & 12.3 | **See below under Clause 12.** |
| Definitions: | |
| 2(vi) Engineer-in-Charge | **Executive Engineer (E), CPWD, Calicut or Successor thereof** |
| 2(viii) Accepting Authority | **As per major component** |
| 2(x) Percentage on cost of materials and labour to cover all overheads and profits | **15% (7.50% for profits + 7.50% for overheads)** |
| 2(x)(a) Standard schedule of Rates | **Delhi Schedule of Rates (E&M) 2025 for Electrical component as amended/** |

| | |
|---|---|
| | **modified up to last date of submission of e-tender and Market rates.** |
| 2(xi) Department | **Central Public Works Department.** |
| 9(ii) Standard CPWD Contract Form: | **General Conditions of contract Construction Works 2023& CPWD - 7 as amended/ modified up to last date of submission of e-tender.** |

**Clause 1**

| | | |
|---|---|---|
| i) | Time allowed for submission of performance Guarantee, Programme Chart (Time and Progress) and applicable labour licenses, registration with EPFO, ESIC and BOCW Welfare Board or proof of applying thereof from the date of issue of letter of acceptance. | **As per composite tender provisions** |
| ii) | Maximum allowable extension with late fee at 0.1% per day of performance Guarantee amount beyond the period as provided in (i) above | **As per composite tender provisions** |

| | | |
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| **Clause 2** | Authority for fixing compensation under Clause 2 | **Superintending Engineer, CPWD, Calicut or his successor thereof.** |
| **Clause 5** | Number of days from the date of issue of letter of acceptance for reckoning date of start | **As per composite tender provisions** |

**MILE STONE(S) FOR ELECTRICAL COMPONENT AS PER TABLE GIVEN BELOW**

| Sl. No. | Description of Milestone (From date of start) | Time Allowed | Amount to be withheld in case of non-achievement of milestone |
|---|---|---|---|
| 1 | Approval of all associate agency & Supplier | 1 month | 1.00 % of tendered amount |
| 2 | Submission and approval of all E&M Drawings & Materials. | 2 month | 1.00 % of tendered amount |
| 3 | Supply of all materials for water filtration plant and allied E & M works. | 4 months | 1.00 % of tendered amount |
| 4 | Completion of water treatment plant work and allied electrical works related to this plant and its building. | 5 months | 1.00 % of tendered amount |
| 5 | Installation, Testing, Commissioning & Handing over of water treatment plant and E&M systems.<br>Obtaining NOC from concerned authority if necessary and Handing Over the building for all aspects. | 6 Months | 1.00 % of tendered amount |

| | | |
|---|---|---|
| Time allowed for execution of work: | : | **As per Major Component** |

| **Authority to decide:** | | |
|---|---|---|
| Extension of Time | : | **As per Major Component** |
| Rescheduling of Mile stones | : | **As per Major Component** |
| Shifting the date of start in case of delay in handing over of site | : | **As per Major Component** |

| | | |
|---|---|---|
| **PROFORMA OF SCHEDULES Clause 5 - Schedule of handing over of site** | : | **As per Major Component** |
| **Clause 5.2** | : | **As per Major Component** |
| **Clause 5.4** | : | **As per Major Component** |
| **Clause 6:** Computerized Measure Book (CMB) / Electronic Measurement Book (EMB)<br>Mode of Measurement: | | **EMB**<br>**(If any technical problem in EMB then Engineer-in-charge can allow CMB)** |
| **Clause 7**<br>Gross work to be done together with net Payment/adjustment of advances for material collected, if any since the last such payment for being eligible to interim payment | : | **Rs. 14 Lakhs** |
| **Clause 7A**<br>Whether clause 7A shall be applicable: | : | **As per Major Component** |
| **Clause 7B**<br>Whether clause 7B shall be applicable: | : | **As per Major Component** |
| **Clause 8A**<br>Authority to decide compensation on account if contractor fails to submit completion plans | : | **As per Major Component** |
| **Clause 10A**<br>List of testing equipment to be provided by the contractor at site lab. | : | **Megger, Earth Tester, Multi meter or any equipment as directed by the Engineer-in-charge as per site requirement.** |
| **Clause 10 B(ii)**<br>Whether clause 10-B (ii) shall be applicable | : | **Not Applicable** |
| **Clause 10C** | : | **Applicable** |
| Component of Labour<br>Expresses as percent of Total value of work | | **25 %** |
| **Clause 10CC** | : | **Not Applicable** |
| **Clause 11**<br>**Specifications to be followed for execution of work** | : | **As per following specifications as modified & corrected up to date.**<br>**1. CPWD General Specifications for Electrical Works Part-I Internal – 2023.**<br>**2. CPWD General Specifications for Electrical Works Part-II External – 2023.**<br>**3. CPWD General Specifications for** |

| | | |
|---|---|---|
| | | **Electrical Works Part V Wet riser and sprinkler systems – 2020.**<br>**4. CPWD General Specifications for Electrical Works Part VI Fire Detection and Alarm System – 2018.**<br>**5. CPWD General Specifications for Heating, Ventilation & Air-Conditioning (HVAC) 2024.**<br>**6. Additional conditions and Specifications with as modified & corrected upto last date of submission of tender.** |

| | | |
|---|---|---|
| Clause 12: | Type of Work | **Construction work** |
| 12.2 & 12.3 | Deviation limit beyond which clauses 12.2 & 12.3 shall apply for E & M work | **100% (Hundred percent)** |
| 12.4 | Cost index : Latest available cost index at the time of beginning of execution of extra item and deviation shall be used in sub-clauses 12.2(a),12.2(b) and 12.2 (c) for calculation of rates of extra items. | |
| 12.5 | Labour Rates :Labour Rates will be based on latest available circular issued by central govt. or state govt. whichever are higher applicable for the work. | |
| Clause 16 | Competent Authority for deciding Reduced rates. | **As per Major Component** |
| Clause 17 | Contractor Liable for Damages, defects during defect liability Period | **The defect liability / maintenance period shall be 12 months after the date of completion of work for this contract agreement.** |
| Clause 18 | List of mandatory machinery, tools & plants to be deployed by the contractor at site | **As required at site** |

**Clause 19**

| | | |
|---|---|---|
| **Clause 19 C** | Rs. 500/- for each default | **Authority to decide penalty for each default-Engineer in charge** |
| **Clause 19 D** | Rs. 500/- for each default | |
| **Clause 19 G** | Rs. 500/- for each default | |
| **Clause 19 K** | Rs. 1000/- per tradesman per day | |

**Clause 25**

| | |
|---|---|
| Conciliator for settlement of Disputes | **As per major component** |
| Arbitrator Appointment Authority | **As per major component** |
| Place of Arbitration | **As per major component** |

**Clause 32: Requirement of Technical Representative(s) and recovery rates**

| Sl. No. | Requirement of Technical Staff | | Minimum experience (Years) | Designation of technical staff | Rate at which recovery shall be made from the contractor in the event of not fulfilling provision of clause 32 |
|---|---|---|---|---|---|
| | Qualification | Number (Of Major/ Minor Component) | | | |
| **As per Major Component** | | | | | |

**Clause 38**

| | | |
|---|---|---|
| (i) (a) Schedule / statement for determining theoretical quantity of cement & bitumen on the basis of **Delhi Schedule of Rates (E&M) 2025** printed by C.P.W.D. with correction slips up to the last date of submission of bids. | | |
| (ii) Variations permissible on theoretical quantities: | | |
| a) | Cement<br>For works with estimated cost put to tender more than 25 lakhs | ***2% plus/minus*** |
| b) | *Bitumen all works* | ***2.5% plus only & nil on minus Side*** |
| c) | Steel Reinforcement and structural steel sections for each diameter, Section and category | ***2% plus/minus*** |
| d) | *All other materials* | ***NIL*** |

**Executive Engineer (E )**
**CPWD, Calicut**

## SECTION – II

## PARTICULAR SPECIFICATIONS AND SPECIAL CONDITIONS& ELIGIBILITY CRITERIA FOR E&M WORKS

1. **GENERAL**

1. The tenderer should in his own interest visit the sites and familiarize himself with the site conditions before tendering.
2. No T&P shall be issued by the department and nothing extra shall be paid on account of this.
3. Care shall be taken, while handling / installing / maintaining the equipment/ carrying out the work, to avoid damage to the building/ premises. The Contractor shall arrange to repair all damages to the building caused by him so as to bring to the original condition. He shall also arrange to remove all unwanted waste materials from site, arising out of his work.
4. The Contractor shall carry out the work in such a manner so as not to interfere or affect or disturb other works being executed by other agencies if any. No claim in the matter shall be entertained.

2. **RATES TAXES AND DUTIES:**

1. The work shall be treated as on works contract basis and the rates tendered shall be for complete items of works inclusive of all taxes (including works contract tax), duties, and levies etc. and all charges for items contingent to the work, such as packing, forwarding, insurance, freight and delivery, installation, testing, commissioning etc at site i/c temporary constructional storage, risk, overhead charges, general liabilities/ obligations etc.
2. Being an indivisible works contract, sales tax, octroi, excise duty etc. are not payable separately.
3. GST for the work shall be included within the quoted rates for the various items.
4. All statutory deductions like GST, Building and other construction workers welfare cess etc at applicable rates will be made from the Contractors bill.

3. **COMPLIANCE WITH REGULATIONS**

The work shall comply in all respects with this specification and:

1. The Building Regulations applying to the project including requirements of the National Building standard 2026.Wiring rules and regulations including requirements of Central Electricity Authority (Measures Relating to Safety and Electric Supply) Regulations 2023, National Electrical Code of India 2023, the local electricity supply authority and electrical inspectorate.
2. Any other regulations that apply directly or indirectly to such installations in the location. Where conflict arise between this specification and any of the applicable acts, codes or standards the highest standard of materials and workmanship shall prevail.If the contractor proposes to supply finished goods procured directly or indirectly from vendors, from the countries sharing land border with India, such vendor will be required to be registered with the competent authority under Government of India. Such procurement shall be accepted only on furnishing the details of such registration.
3. For materials to be used in work for which Government of India has notified minimum percentage of local content under, Public Procurement (Preference to Make in India) Order 2017 (Amended up to date), it shall be mandatory to supply materials meeting such stipulation.
4. Prior to commencement of work, all applicable statutory clearances required for taking up the work shall be obtained by the contractor.
5. After completion of the work, the completed installation shall be offered for inspection to inspectors of the relevant statutory authorities. This shall include NOC from Kerala Fire and Rescue Services, Energisation approval from Kerala Electrical Inspectorate/ Central Electricity Authority, Consent to Operate Certificate from Kerala Pollution Control Board etc. The contractor shall prepare and submit necessary drawings at his own cost, test certificates, other documents etc. for submission to these bodies. It shall be the responsibility of the contractor to liaison with/ coordinate with such inspecting authorities for obtaining the approval for the installation. The rectifications required by such statutory authorities shall be carried out by the contractor. Nothing extra shall be payable to the

Contractor on this account. The installation shall be commissioned only after obtaining all applicable statutory clearances.

6. It shall be the responsibility of the contractor to liaison with/ coordinate with the electricity supplier for availing power supply and energizing the installation. Statutory fees if any for obtaining statutory clearances/ availing power supply shall be paid by the contractor and the same shall be reimbursed on production of evidentiary proof to the department.

4. **TERMS OF PAYMENT**

Payment will be made against completion of specific stages of work. The percentage of contract rates payable against various stages of work is given below.

**For Internal Electrical Installations:**

| S.N. | Stage of Work | Payment terms in % |
|---|---|---|
| 1 | Supplying and laying/fixing of conduit, switch boxes, DBs etc. | 40% |
| 2 | On completion of wiring | 50% |
| 3 | Supply of fans & fittings | 65% |
| 4 | Installation of equipment, Earthing etc | 85% |
| 5 | Testing & commissioning | 95% |
| 6 | Handing Over | 100% |

**For other E&M packages:**

| S.N. | Item of work | On initial inspection of materials and delivery at site in good condition on pro-rata basis | On completion of pro-rata installation | On completion of testing and commissioning | After obtaining statutory clearances, trial run, training and handing over |
|---|---|---|---|---|---|
| 1 | LT Cable, LT Panel, Water Treatment plant | 60 | 25 | 10 | 5 |

1. No claim for payment shall accrue to the contractor for incomplete stages.
2. The department may at its discretion, allow part payments on written request from the contractor, on account of compelling reasons to be brought on record. In such event, the part rates assessed by the engineer-in-charge will be final and binding.

5. **ASSOCIATION OF OTHER AGENCY(S) FOR EXECUTION OF SPECIALIZED E&M WORKS BY THE BUILDING CATEGORY CONTRACTOR:**

1. If the agency is not possessing a valid electrical license of appropriate class/ Voltage in his name, he shall associate with another agency possessing such license for the execution of all electrical works. The building contractor shall associate with other agency(s) for execution of each of the work(s) listed hereunder, who fulfills the following eligibility criteria. In this effect Main contractor has to submit credentials in the format attached -**Form: G & Form : H** along with supporting documents.
**The Minimum Eligibility Criteria for Associated Agencies For E&M Components**

Should have satisfactorily completed the works as mentioned below during the last Seven years ending last day of the month previous to the one in which tenders are invited. The value of executed works shall be brought to current costing level by enhancing the actual value of work at simple rate of 7% per annum calculated from the date of completion to last date of submission of tender. For other conditions, refer special conditions specified in Part C.

The applicant shall either himself meet the eligibility conditions for the respective E&M packages or otherwise, he will have to associate an agency meeting the eligibility requirements as given in this tender document and submit the details as per Annexure-4A in Part C of this tender document within 30 days of award of work OR before start of minor component of work whichever is earlier.

| S.N. | COMPONENT OF E&M WORKS | ESTIMATED COST (Rs.) | ELIGIBILITY |
|---|---|---|---|
| I | INTERNAL ELECTRICAL INSTALLATIONS | Rs.13,95,128/- | If the main contractor does not possess valid Electrical license of appropriate class/voltage for executing the work then, he shall associate with eligible class registered contractor, possessing valid Electrical Contractor License of appropriate Class/Voltage issued by competent authority and fulfilling the following eligibility criteria of having successfully completed during last seven years ending up to previous day of last date of submission of tender as given below with completion certificate issued by an officer not below the rank of Executive Engineer or equivalent duly attested. |

## The Minimum eligibility criteria for Specialized work for Civil and E& M Works

Should have satisfactorily completed the works as mentioned below during the last Seven years ending last day of the month previous to the one in which tenders are invited. The value of executed works shall be brought to current costing level by enhancing the actual value of work at simple rate of 7% per annum calculated from the date of completion to last date of submission of tender. For other conditions, refer special conditions specified in Part C.

The applicant shall either himself meet the eligibility conditions for the respective E&M packages or otherwise, he will have to associate an agency meeting the eligibility requirements as given in this tender document and submit the details as per Annexure-4A in Part C of this tender document within 30 days of award of work OR before start of minor component of work whichever is earlier.

| Sl. No. | COMPONENT OF E &M WORKS | ESTIMATED COST(Rs.) | ELIGIBILITY |
|---|---|---|---|
| I | Water Treatment plant | Rs. 71,54,794/- | The main contractor shall have to associate with agency fulfilling the following eligibility criteria having successfully completed during last seven years ending up to previous day of last date of submission of tender as given below with completion certificate issued by an officer not below the rank of Executive Engineer or equivalent duly attested.<br>Three similar works each of value not less than **Rs. 28.60 Lakhs.**<br>OR<br>Two similar works each of value not less than **Rs. 42.90 Lakhs.**<br>OR<br>One similar work of value not less than **Rs. 57.20 Lakhs.**<br>Similar work shall mean **"SITC** Water Treatment plant**"** |

6. The value of executed works shall be brought to current costing level by enhancing the actual value of work at simple rate of 7% per annum, calculated from the date of completion to previous day of last day of submission of bid.
7. The building category contractor may carry out himself/herself any or all of the works without associating any specialized agency provided:
   1. He fulfills the prescribed eligibility criteria respectively for these work(s).

      OR
   2. He directly procures the equipment of approved make from manufacturer and gets it installed from authorized agency/service provider of the manufacturer or specialized agency as per criteria mentioned in the NIT.
8. The building contractor and the associated specialized agencies shall submit to the Engineer-in-charge required affidavit to confirm their association.
9. **ADDITIONAL CONDITIONS**

   The work shall be generally carried out in accordance with tender specifications and the following specifications/ rules amended upto date:
   1. Additional conditions and technical specifications for this work.
   2. Drawings for this work.
   3. CPWD General Specifications for Electrical Works -Part-I Internal 2023 and Part- II External 2023.
   4. National Electrical Code of India 2023.
   5. National Building Code 2016.
   6. Relevant IS Codes.
   7. IEC/ ASHRAE/ SMACNA/ ITU/ TIA/ AVIXA standards.
   8. CPWD General Specification for Wet riser & Sprinkler System Part V-2020
   9. CPWD General Specification for Fire Detection and Alarm System Part VI – 2018
   10. CPWD General Specifications for Heating, Ventilation & Air-Conditioning (HVAC) 2024
10. The contractor shall, on demand by the engineer-in-charge, furnish proof to the satisfaction of the engineer-in-charge regarding purchase of materials and equipment from the manufacturer/ manufacturer's authorized outlets.
11. Materials to be used in work are to be ISI marked where available. Prior approval of the engineer-in-charge shall be taken for all the materials required to be used on works. Non-standard quality materials will not be accepted. The engineer-in-charge reserves the right to instruct the contractor to remove any material which, in his opinion, is not acceptable and the same shall be removed from the site of work by the contractor at his cost.
12. All materials used in work shall be supplied with manufacturers test certificates. Samples will be drawn from the supplied materials as per acceptance criterion specified in relevant codes and the same will be got tested through approved third party testing laboratories. The contractor shall make all necessary arrangements and bear all costs towards testing of samples including preparation of samples, packaging, sealing, transportation, loading, unloading, etc. No additional payment will be admissible towards this.
13. Materials shall be brought to site only after taking correct measurements as per actual requirement of work. Excess quantity will not be accepted or paid. Only quantity of materials brought to site and used in work as per actual requirement shall be measured and paid irrespective of quantity mentioned in BOQ/ work schedule. The items brought to site and paid, if not used in the project have to be taken back by the contractor and deductions in the payment shall be made in subsequent bills. The decision of the Engineer-in-charge in this regard shall be final & binding on the contractor.
14. The materials of construction used for various items of work shall be suitable for the environment and intended use of the component. Following general guidelines shall be followed.
    1. Equipment & wiring enclosures, raceways etc used indoor shall be with epoxy powder coated/ hot dipped galvanized finish.
    2. Support structures, fasteners, raceways etc used outdoor shall be of hot dipped galvanized steel or stainless steel.
    3. Paint finish for pipelines used outdoor shall be two coats of epoxy primer with two coats of PU finish. Paint finish for pipelines used indoor shall be two coats of zinc chromate primer with two coats of enamel over coat.

4. Only UV stabilised SMC/ die-cast aluminium/ GI powder coated enclosures with minimum ingress protection of IP65 may be used outdoor.

15. No work shall be initiated without getting the work method statement approved by the Engineer-in-Charge. Work shall be executed only as per the approved work method statement.
16. Bad workmanship will not be accepted. Such work is liable for rejection and shall be rectified by the contractor at his own cost as per the specifications and directions given by the engineer-in-charge.
17. All repairs and patch works shall be neatly carried out to match with the original finish and to the full satisfaction of the engineer-in-charge.
18. On completion of the installation, the contractor shall arrange for conducting pre-commissioning tests as required by the applicable codes. A report of such tests shall be compiled and submitted to the engineer-in-charge for his approval. Such tests shall commence only on the approval of this report by the engineer-in-charge and shall be carried out by those authorized, skilled, experienced and certified permit holders of the supervisor category.
19. The contractor has to make his own arrangement for stores and watch and ward and no extra claim for this will be entertained.
20. The contractor has to make his own arrangement at his own cost for all the general and special T&P required on this work.
21. The contractor has to make his own arrangement for power supply required for execution of the work.
22. The contractor has to make his own arrangement for water supply required for execution of the work.
23. All the debris due to the works shall be removed from the site by the contractor as soon as the work is completed.
24. The materials used in the work shall be of approved make as per the preferred make list stipulated in the agreement.
25. Defect Liability Period*:* All equipments shall be guaranteed for a period of **12 Months** from the date of taking over by the Department. Any defective materials and equipment shall be replaced free of cost at the direction of the Engineer-in-Charge during this period. In case it is felt by the department that undue delay is being caused by the contractor in carrying out these works, the same will be got done by the department at the risk and cost of the contractor. The decision of the Engineer-in-charge in this regard shall be final & binding on the contractor.
26. **Five-year OEM warrantee from the date of commissioning & handing over shall be availed by the contractor for all LED fittings used in the work.** A letter/ undertaking from the OEM shall be submitted in support of this as per **ANNEXURE –X** attached. If this condition is not fulfilled by the contractor, 5% of the cost of LED fittings will be forfeited from the security deposit deducted for the total work and balance amount only will be refunded after completion of defect liability period.
27. Additional conditions and technical specifications for various components of work to be executed are given in the following sections.

28. Not with standing the above, the lift item specifically provides for five (5) years' warranty along with five (5) years' free comprehensive maintenance. The said provision shall prevail over the general Defect Liability Period and shall be treated as a Special Condition of Contract applicable exclusively to the lift.

29. No additional payment or claim on account of the above maintenance and warranty obligations shall be entertained at any stage.

Executive Engineer (E)
CPWD, Calicut

## SECTION -1- TECHNICAL SPECIFICATIONS FOR E&M WORKS

### *A) WIRING SYSTEM*

1. Recessed/ slab wiring shall be done using medium class PVC conduits (except for fire alarm wiring &data cabling for which specifications for open wiring may be followed).
2. Open wiring shall be done using GI conduits.
    1. Surface conduits shall be supported using spacer bar saddles.
    2. Suspended conduit runs shall be supported using GI strut channel support system. Final connections to equipments from rigid wiring shall be made using GI flexible conduits.
    3. All sections of metallic conduits shall be effectively bonded to the earthing system.
3. Perforated/ ladder/ wire mesh cable trays may be used for horizontal and vertical distribution of cables.
    1. Cable trays shall be hot dipped galvanized including all connection/ support accessories.
    2. All cable tray systems shall be complete with factory made bends, tees, reducers etc and other accessories like connectors, earth clamps, support channels & suspenders, stainless steel cable ties etc.
4. Wiring system shall be complete with all necessary clamps, glands, lugs, connectors, labeling ferrules etc. When different systems of wiring are combined in a single feeder/ circuit, the transition shall be made using suitable glands/ adapters. Nothing extra is payable on this account.
5. **All flexible copper wires used shall have Class 2 copper conductor satisfying the resistance requirements of NEC 2023 Part 1 Section 17, Annex B.**
6. **All flexible copper wires used shall be with FR-LSH PVC insulation.**
7. Wherever light fittings/ fire detectors/ response indicators are proposed to be provided on the false ceiling, the respective wiring shall be brought upto the terminal of the light light fittings/ fire detectors/ response indicators. Flexible metal conduits properly glanded to junction boxes shall be used for drawing wires from junctions on ceiling to fittings on false ceiling and nothing extra shall be paid to the contractor for the same.
8. Power cables run under ground with protection shall be laid direct in ground with protection tiles as per IS 5820.
9. Entry of cables into the building shall be through suitable sleeves which shall be sealed after the drawing of cables using waterproof sealing compound/ foam. Nothing extra is payable on this account.

### *B) LABELLING*

1. **GENERAL**
    1. Labelling scheme including sample labels for various equipments forming part of the installation shall be prepared by the contractor and submitted to the engineer-in-charge for his approval. Labelling activities may be taken up only on the approval of this plan by the engineer-in-charge.
2. **CABLES**
    1. All cables shall be labelled showing the fed from/ fed to locations, size of cable and number of runs.
    2. Stamped/ engraved aluminium labels may be used for labelling outdoor enclosures.
    3. Engraved acrylic sheets may be used for labelling indoor enclosures.
    4. Labels shall be connected to the cable/ conduit/ bunched wires using black nylon straps.
    5. Fed to labels shall be used near feeding end.
    6. Fed from label shall be used near fed end.
    7. Both labels shall be used at intermediate locations inside man holes, across openings in walls etc.

3. **PANELS**
   1. All panels shall be provided with labels on the front indicating the switch gear designation, feeding cable size & runs and destination.
   2. Engraved PVC labels may be used for switch gear designation.
   3. Painting may be used for remaining labelling.
4. **DISTRIBUTION BOARDS**
   1. All DBs shall be provided with labels indicating the fed to location of loads & circuit sizes, fed from location & feeder size.
   2. The DB labelling sheets must be computer printed in suitable size paper, laminated and pasted to the inside of the DB door using suitable industrial adhesive.
5. **SWITCH BOARDS**
   1. All switch boards shall be provided with 9mm acid proof labels indicating the DB and circuit designation.
   2. All circuits shall be provided with ferrules on both sides including all loops indicating the circuit, loop and DB designations.
6. **WARNING LABELS**
   1. Approved acid proof graphic labels shall be provided at the following locations.
   a. Near lightning down conductor locations indicating minimum distance of 3m to be maintained in the event of lightning.
   b. In front of panels and DBs warning to keep the area in front of the panel/ DB clear for 1m.
   c. In front of panel incomers warning of the presence of multiple sources of power for panels fed from multiple feeders.
   d. Near earthing points of enclosures and earth buses warning against disconnection of safety earth.

***C) ELECTRICAL PANELS***

**1. GENERAL CONSTRUCTIONAL FEATURES**

   1. Panels shall be:
   a. Compartmentalized as per Form 4a construction.
   b. Dust and vermin proof construction with minimum IP42 ingress protection for indoor panels and IP54 ingress protection for outdoor panels.
   c. Extendable on both sides.
   2. Panel boards which are free floor standing should be erected on suitable M.S. channels across cable trench if the cable entry to the panel is from bottom and ready made cable trenches exist. Panels should be erected on a M.S. angle iron frame if ready made cable trenches do not exist and if the cable entry to the panel is from the bottom. All mountings in flooring / wall etc should be using anchor fasteners and G.I. hardware.
   3. No equipment needing manual operation shall be located less than 250 mm above floor level. Operating levers, handles etc of highest unit shall not be higher than 1700mm.
   4. Cable alleys shall be provided with suitable hinged doors. Adequate number of slotted cable support arms shall be provided for supporting the cables.
   5. Metallic partitions shall be provided between adjacent cubicles, between feeder compartments, between busbar chambers and other compartments.
   6. Panel shall be divided into suitable sections for convenience during shipment.
   7. All doors shall be folded type. All covers and doors may be provided with neoprene gaskets and quarter turn metallic locks (triangular/ square).
   8. Provision shall be made for shrouding the outgoing terminals for protection against accidental touch. All exposed live parts shall be totally covered by shrouds. If spreader bars are required, they shall be separated by phase barriers.
   9. Wherever more than one cable has to be terminated on any incoming/ outgoing feeder the respective incoming/ outgoing terminals has to be designed in such way as to receive the required number of cables.
   10. Bus bars and cable alleys shall be shrouded with FRP sheet for all connections to neighbouring bays.

11. Cable entry shall be provided on top and bottom as per site requirement. All gland plates shall be made out of 3mm thick galvanised iron sheet and bonded to the earth bar using flexible/ braided copper cable with cross section equal to the earth bus.

**2. SHEET METAL WORK**

1. The panel board shall be fabricated using suitable mild steel structural sections or pressed and shaped cold rolled sheet steel of thickness not less than 2 mm. Stiffeners shall be provided wherever necessary.
2. All panel edges and door edges shall be reinforced against distortion by rolling, bending or by the addition of welded reinforced members. Cut-outs shall be true in shape and devoid of sharp edges. The complete structure shall be rigid, self-supporting and free from vibration, twists and bends.

**3. PAINTING**

1. All sheet steel work shall be phosphated with applicable standards. All metal works shall be chemically treated with 7 tank process for degreasing, derusting, phosphating and applied with two coats of Epoxy powder coating.

**4. BUSBARS**

1. Bus bars shall be of sufficient cross-section so that a current density of 130A/sq.cm is not exceeded at nominal current rating for aluminium bus bars, and 160A/sq.cm for copper bus bars.
2. The panel shall be provided with three phase and neutral busbar. Busbar shall be of uniform cross section throughout the length of the bus bar section.
3. All bus bar and bus-taps shall be insulated with color coded heat shrinkable PVC insulation sleeves.
4. Busbar shall be adequately supported and braced to withstand the stresses due to the specified short circuit currents. Busbar supports shall be made of fibre reinforced moulded plastic material, or cast resin.

**5. CONTROL WIRING**

1. The control wiring shall be carried out in single core 1.1 KV grade PVC insulated control cables with stranded copper conductors of minimum cross section 1.5 sq.mm (2.5 sq.mm for CT wiring).
2. Runs of control wires within the switch-board shall be neatly bunched and suitably supported/ clamped. Ferrules shall be provided for easy identification of the control wires.
3. Control wiring shall correspond to the circuits/ sequence of operations and interlocks agreed to with the Engineer-in-Charge.
4. Not more than two connections shall be made at any one terminal
5. The wiring shall be arranged and supported in such a manner that there will be no strain on termination.

**6. LABELLING**

1. All panels shall be provided with labels on the front indicating the switch gear designation, feeding cable size & runs and destination.
2. Engraved PVC labels may be used for switch gear designation.
3. Painting may be used for remaining labeling.

**7. EARTHING/ BONDING**

1. Panel shall be provided with a set of inter connected earth bus bar running along the entire length of the board at top (where cable entry is from the top) and bottom. At either end of the earth bus, one clamp type terminal with nuts, bolts and washers shall be provided for bolting the earthing conductor.
2. The earth bus shall be of tinned copper and with minimum cross section equal to half the cross section of the phase bus bar (size may be reduced by 60% for panels with aluminium bus bars).
3. Earth bus bars shall be supported at suitable intervals. Positive connection between all the metal frames of equipment mounted in the switchboard and earth bus bar shall be provided.
4. All instrument cases shall be connected to the earth using 1100V grade, single core 2.5 sq.mm stranded, copper conductor cable.
5. All non current carrying metal hinged doors shall be bonded to the panel using 1100V grade, single core 2.5 sq.mm stranded, copper conductor cable.

6. All shielded cables used inside panels shall be bonded at both ends to the metallic case/ DIN rails using suitable bonding clamps.

**8. TESTING**

1. All panels shall be offered for inspection at the factory. All defects and deviations pointed out in the inspection report shall be rectified at the factory before dispatch to site. However, the Engineer-in-Charge may exercise discretion for waiving factory inspection in lieu of proper test certificates.
2. Panel shall be subjected to following tests as per relevant standards:

a. Mechanical Operational tests for all movable parts of switch gears, breakers, tripping devices etc.
b. Testing of interlocks, control circuit operation including timing and sequencing.
c. Insulation resistance test.
d. Over voltage withstand test.

***D) LED LUMINARIES***

1. ANSI/IES LM79, ANSI/IES LM-80 & ANSI/IES TM-21 test reports, IES file and datasheets shall be submitted for all luminaries. Only test reports conducted in NABL accredited laboratories will be accepted.
2. All Luminaries supplied shall have serial numbers or batch code.
3. Luminaries shall be ISI marked as per IS 10322 and conform to IS 16101 to 16108 amended upto date.
4. LEDs shall be low power LEDs of the following makes only - Nitchia, Osram, Philips or manufactured by the OEM in the list of approved makes.
5. Luminaire efficacy of not less than the following

1. Streetlights: 120 lumen/watt
2. Panel light, Downlighter, Batten, Industrial fittings, Flood light: 100 lumen/watt.
3. Other: 80 lumen/watt

6. Minimum Color rendering index (Ra) should be

1. 70 for streetlights, flood lights, industrial lights and outdoor lights.
2. 80 for all indoor lights.

7. Correlated Color Temperature (CCT) shall be 5700 K unless otherwise mentioned.
8. The L70B50 life of LED package as per TM-21 report shall be not less than 50,000 Hrs.
9. Light fittings used for outdoor and industrial use shall have minimum IP65 ingress protection, IK08 mechanical impact protection and 4 kV surge protection.
10. OEM accessories and supports shall be used for mounting and suspending luminaries.

## LIST OF PREFERRED MAKES OF MATERIAL

| SL.No. | Product | Make |
|---|---|---|
| 1. | Wires (PVC Insulated copper conductor cable FRLS – ISI marked) | RR Kabel/ Havells / Finolex/ Polycab/Anchor/ /L&T/KEI |
| 2. | XLPE insulated PVC sheathed AI, Cu & Control cables. | Universal/RPG cables/ Finolex/ CCI/ /Havells/ RR Kable/ Gloster/ KEI/ polyab |
| 3. | M S Conduit & Accessories of MS Conduit (ISI Marked) | BEC/ AKG /NIC/Steel Kraft/ Gupta/ VIMCO RMCON/Javeri/ BALCO |
| 4. | PVC Conduits (Colour Gray/Ivory) | Precision/polycab/AKG/Finolex/ Konseal/ BEC/Asian /Nihar/ Anchor Panasonic/ Avonplast/Modi/ asvai/Emjay/Javeri/DEC/ Anchor/ BALCO |

| | | |
|---|---|---|
| 5. | Steel Conduit ( ISImarked ) | BEC/ AKG /Steel Kraft/ Gupta/ VIMCO RMCON/BALCO |
| 6. | MCB | Legrand- DX3/Siemens 5SX4/Havells/ Eaton/GE/ /Hager/ Schneider –ACT19/ /Panasonic by Anchor/L&T/ABB |
| 7. | MCBs/RCCBs | Legrand/Siemens /Hager/ Schneider Electric/ L&T/ABB |
| 8. | MCCB | Legrand- DX3 /Siemens -5SX4/L&T-dsine/ Schneider –ACT19/ABB |
| 9. | DB/ELCB/RCBO | Legrand, Ekinox3 / Schneider ACT 19 / Siemens Betagard / Myrius /Havells/ ABB/GE/Hager /L&T/Panasonic by Anchor |
| 10. | Modular type switches/GI Boxes/Sockets TV/Telephone /LAN socket Outlet etc for CMS application | Legrand Arteor/Schneider/Zencelo/MK-Elements/ MK-Logic Plus/ Honeywell(Benz Plus) |
| 11. | Modular type switches/GI Boxes/Sockets TV/Telephone /LAN socket Outlet etc for Normal application | Legrand Arteor/Schneider/Zencelo/MK-Elements/ MK-Logic Plus/ Honeywell(Benz Plus) |
| 12. | DLP Trunking | Legrand/ OBO Betterman/ Schneider /MK |
| 13. | Ammeter/Voltmeter/MF Meter/ Energy Meter/Intelligent Meter | AE/MECO/L&T(only digital type to be used)/Scomec( Diris)/ Schneider/ HPL/ C&S/Conserv/ Kaycee/ Cropmton Groves |
| 14. | Selector Switches | BCH /Kaycee/ Rishabh/ Conserv / AE /Crompton Groves |
| 15. | Multi function meter/Load managers | Schneider/Legrand/Secure/socomec(Diris) |
| 16. | LED Indication lights | Schneider/Legrand/L&T/BCH/Eaton/Polycab/ Luker |
| 17. | LED Exit Emergency Light (With 2 Hr battery backup) | Prolite/Bajaj/Schneider /Legrand/Philips |
| 18. | Push buttons | L&T/Siemens/BCH/Eaton/C&S |
| 19. | Connector and Terminal Block | Elmex/Connectwel/Essen |
| 20. | Lugs and Thimbles | Dowells/Multi/Capital/Jainsons /Commet/Prabath/ Schneider Electric |
| 21. | Panel board/Feeder pillar/Meter board | CPRI approved manufacturer. |
| 22. | Indoor lighting Fixtures | Philips/Osram/LT (Lighting Technologies)/ Bajaj/ Halonix / Wipro / Havells/ Crompton |
| 23. | Outdoor lighting Fixtures | Philips/Osram/LT (Lighting Technologies)/ Bajaj Halonix / Wipro /Havells/ Crompton /Trilux |
| 24. | Exhaust fan | Crompton/ Havells /Orient/ Bajaj/ Almonard/ Polycab |
| 25. | Angle holder /Batten holder | ISI Marked Kinjal /Emperor/ Anchor/ K555/ Polycab |
| 26. | Call bell/Buzzer | Anchor/Leader/Rider/Polycab |
| 27. | G.I. pipes | TATA/ JINDAL-Hissar/ ZENITH Birla/Sail |
| 28. | Co-axial TV Cable | Havells/ Anchor/ Finolex/ L & T/ RR Kabel/V-Guard |
| 29. | Telephone/TV/CAT-6 cable | Polycab/Qflex/Finolex |
| 30. | Contactors/ Timers | Legrand / L&T/ Siemens/ Schneider Electric |

| | | |
|---|---|---|
| 31. | Ceiling rose | Antex/ Leader/ Emperor/ Anchor/Lisha |
| 32. | PVC batten/ Angle Holders | Antex/ Leader/ Emperor/ Anchor/Lisha |
| 33. | HDPE Pipe (ISI Marked) | Supreme/ Tele REX/ Ashirvad/ Duraline/ Suriya |
| 34. | GM Valves (ISI marked) | Leader/ Zoloto/ Deepak |
| 35. | Submersible pump set | Kirlosker, KSB, Crompton,Wilo |
| 36. | Street light pole | Philips/Crompton/Havells/Bajaj/Wipro |
| 37. | Capacitor | L&T/ Schneider/ Legrand/ Neptune (Ducati) |
| 38. | Current Transformers | Automatic Electric/ Kappa/ L&T/ Gilbert |
| 39. | Instrument meters | Rishab / Automatic Electric /Prok Devices/ Conzerv/ Secure |
| 40. | Indication lamps and push buttons | BCH/L&T/Telemecanique/Siemens/ Vaishnav/ Emco/ Kaypee |
| 41. | Cable Glands | Dowells/ Jainsons/ Braco/ Comet/ peeco/ Gripwell/Jainsons/peeco/Prabath/Raychem/Grandlay |
| 42. | Ceiling fan (5 star rated) | Crompton / Havells / Orient/ Atomberg/Bajaj |
| 43. | UTP Cable | Legrand/Molex/Finolex/Commscope/Panduit-Pannet/Havells/Batra/Henlay |
| 44. | Geyser | Crompton/Jagur/Recold/Havells/VGuard |
| 45. | All other items not covered above | As per approval of the Engineer-in-charge. |

**ANNEXURE – X**

**UNDERTAKING LETTER FROM MANUFACTIRERES OF LED FITTINGS**

**We hereby agree that**

**a)** All the LED fittings supplied by us are guaranteed for five years including drivers from the date of handing over.

**b)** In case of discontinuation of model and non-availability of spares, we will replace the fittings with equivalent/ high end model in case of manufacturing defect during the warranty period of 5 years.

**For M/S ……..,**

**……**

**(Authorized signatory of manufacturer of LED luminaries)**

**Counter Signature,**

**Major contractor**

**ANNEXURE-Y**

**UNDERTAKING LETTER FROM MANUFACTURERS OF OTHER EQUIPMENT**

**(ON THEIR LETTER HEAD)**

**We hereby agree that:**

**All the Equipment supplied by us are guaranteed for 1 years from the date of handing over.**

**In case of discontinuation of model and non-availability of spares, we will replace the equipment with equivalent/high end model in case of manufacturing defect during the warranty period of 1 years.**

**For M/S……**

**…… (Authorized signatory of manufacturer of Equipment)**

**Counter Signature,**

**Major contractor**

**FORM –G**

**PROPOSAL FOR ELIGIBLE ASSOCIATING AGENCIES FOR MINOR COMPONENTS OF WORK**

I/we hereby propose the following agencies as per mentioned against each for executing corresponding minor components of work. Their consent letters are also attached.

| Sl.No | Name of Associated Contractor | Category/ Class of registration | Enlistment copy/completion certificates attached | Monetary Limit of work | Validity of registration | Consent letter attached (Yes/No) |
|---|---|---|---|---|---|---|
| C1. INTERNAL ELECTRICAL INSTALLATION | | | | | | |
| | | | | | | |
| C2. WATER TREATMENT PLANT | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Note: Self Attested photocopies of enlistment order, valid electrical contractor license, work experience certificates of each agency for each component of E&M work shall be submitted.

Signature of contractor

**FORM –H**

**CONSENT LETTER FROM ELIGIBLE ASSOCIATE AGENCY OF MINOR COMPONENT OF WORK**

**Name of work: Providing Development and Bulk Services to RTC Peringome. SH: C/o 300 KLD Capacity ofwater Harvesting System including Collection sump filtered water distribution lines, UG sump, Sludge Drying bed, and Plant room etc. RTC,Peringome,Kannur, Kerala.**

I / We hereby give my consent to associate with M/s ……., for executing the minor component of work of ……. (Mention category).

1. I / We will execute the work as per specifications and conditions of the agreement and as per directions of the Engineer –in-Charge for the corresponding minor work till the completion of the work.

2. I / We will be responsible for necessary action to handover the installations and for rectification of defects and repair during the maintenance / warranty period.

3. Also I / We will employ full time technically qualified Engineer / supervisor for the minor component of the work as required for the work. I / We will attend inspection of officers of the department as and when required.

Date:

| | |
|---|---|
| Signature with date of Major component Contractor<br>Address | Signature with date of Associate/ Minor Component Contractor<br>Address |
| Witness with address<br>(From major component contractor side) | Witness with address<br>(From minor component contractor side) |

**NOTE: Affidavit to be furnished on a 'Non-Judicial' stamp paper worth Rs.100/-**

**MEMORANDUM OF UNDERSTANDING (MoU) FOR ASSOCIATED CONTRACTOR**

*(To be submitted individually for each package of work for which main agency is not having the prescribed eligibility as per NIT)*

*(On Non Judicial Stamp Paper of Rs.100)*

M/s. (Name of the firm with full address) ……..
(Henceforth called the Main Contractor)

And

M/s. (Name of the firm with full address) ……..
(Henceforth, called the Associated Contractor)

Name of work: **"Providing Development and Bulk Services to RTC Peringome. SH: C/o 300 KLD Capacity of water Harvesting System including Collection sump filtered water distribution lines, UG sump, Sludge Drying bed, and Plant room etc. RTC, Peringome,Kannur, Kerala.**

NIT No: 23/SE/EE-Knr/2026-27

This Memorandum of Understanding (MOU) is made at ..... on ..... **Between** .....(herewith called the main contractor) having its registered office at ..... which expression shall unless repugnant to the subject or context include its administrators, successors and assigns.

and

..... (herewith called the Associated contractor) having its registered office at ..... which expression shall unless repugnant to the subject or context include its administrators, successors and assigns.

Whereas the main contractor has agreed to entrust the ..... (NAME OF THE PACKAGE) only to the associated contractor.

We state that MoU between us will be treated as an agreement and has legality as per Indian Contract Act (amended up to date) and the department (CPWD) can enforce all the terms and conditions of this agreement for execution of the ..... (NAME OF THE PACKAGE) only in respect of above work. Both of us shall be responsible for the execution of ..... (NAME OF THE PACKAGE) as per the agreement to the extent this MoU allows. In case of any delay in the payment by the main contractor, the associated contractor can apply to the CPWD to release the payment under Clause 7B and deduct the same from the bills of the main contractor. In case of any dispute, either of us will go for mediation by the CE or SE (as the case may be) and his decision shall be final and binding on both of us.

We have further agreed as under:

1. The Associated Contactor will execute ..... (NAME OF THE PACKAGE) works as per terms and conditions of this agreement.
2. All the machinery and equipment, tools and tackles required for execution of the ..... (NAME OF THE PACKAGE) works, as per this MoU, shall be the responsibility of the Associated Contractor.
3. The site staff required for the execution of ..... (NAME OF THE PACKAGE) work shall be arranged by the Associated Contractor as per terms and conditions of this MoU.
4. All the correspondence regarding execution of the ..... (NAME OF THE PACKAGE) work shall be done by the department with the main contractor. In case of non-compliance of the provisions of agreement of the work by the associated contractor, the main contractor shall be held responsible and action will be taken against him as per agreement provisions.
5. In case of non-performance, associated contractor will be debarred from participation or association in the CPWD tenders by the CPWD.

| | |
|---|---|
| (Authorized Signatory) | (Authorized Signatory) |
| SIGNATURE OF THE MAIN CONTRACTOR | SIGNATURE OF ASSOCIATED CONTRACTOR |
| Date : ..... | Date : ..... |
| Place : ..... | Place : ..... |
| 1. Witness with address | Witness with address |
| (From main contractor side) | (From associated contractor side) |

**Executive Engineer (E)**
**CPWD, Calicut**

## ADDITIONAL CONDITIONS AND TECHNICAL SPECIFICATIONS FOR RAINWATER HARVESTING WATER TREATMENT PLANT

**Scope and design basis**

The scope of work comprises design, supply, installation, testing and commissioning of the complete rainwater harvesting water treatment plant, including all equipment and accessories covered by the BOQ. The attached functional schematic drawing is indicative and shall form the basis for the proposed system arrangement, subject to the approved detailed design, BOQ, applicable CPWD specifications and instructions of the Engineer-in-Charge. The system shall comprise two treatment and supply portions: the first for treated water for general/non-potable use, and the second for further treatment to produce drinking water.

**Treated water quality**

1. First Stage – Filtration and Ultra filtration (UF): The collected rainwater shall first undergo the required filtration process, followed by ultra filtration (UF), to achieve the specified treated-water quality suitable for general/non-potable use. The treated water shall then be pumped to the designated service areas for general use. The numerical quality limits and testing parameters shall be proposed by the Contractor and approved by the Engineer-in-Charge before commissioning.
2. Second Stage – Reverse Osmosis (RO) Treatment: The water subjected to the first-stage treatment shall thereafter undergo reverse osmosis (RO) filtration to achieve the required drinking-water quality. The RO-treated water shall be stored in the designated treated drinking-water tank and subsequently pumped to the designated external distribution points. The final drinking-water quality at the supply outlet shall comply with IS 10500 and all applicable statutory requirements.

The Contractor shall ensure that the complete treatment system, including filtration, UF, RO, storage tanks, pumps and associated accessories, is suitably designed to achieve the specified water quality and required output under the Agreement. Necessary water-quality tests shall be carried out before commissioning, and the system shall be commissioned only after satisfactory test results and approval by the Engineer-in-Charge.

**Functional Schematic and Scope of Integration**

The entire plant, including both treatment portions, water storage and pumping arrangements, shall be supplied, installed, interconnected, tested and commissioned as per the attached functional schematic drawing and the approved BOQ.

The contractor shall provide all necessary piping, valves, pumps, controls, instrumentation, electrical connections, backwash/reject/sludge disposal connections and allied accessories for complete and satisfactory operation of both the general-use treated-water supply and drinking-water supply systems, to the extent covered by the BOQ and approved drawings.

For every equipment item scheduled as two pumps (or two blowers), the quantity of two represents one working unit plus one standby unit, each independently capable of meeting the specified duty. The design shall not add their capacities together for normal operation. The control system shall permit duty selection, manual/automatic modes, changeover upon trip, and suitable level/pressure/dry-run interlocks. Single-quantity pump items remain single units unless the approved BOQ expressly specifies standby.

Before commencement of work, the contractor shall submit detailed plant layout and equipment arrangement drawings, process flow diagram, piping and instrumentation diagram (P&ID), hydraulic calculations, pump and equipment selection data, electrical single-line and control diagrams, interconnection details, civil interface requirements and complete technical data sheets for review and approval of the Engineer-in-Charge. The contractor shall incorporate comments and obtain approval of the detailed plans and drawings before commencing installation or related execution. Any subsequent changes shall also require prior approval.

**Equipment-wise Technical Specifications**

1. **Twin-lobe air blowers**

   Supply and install two twin-lobe rotary air blowers (one working, one standby), minimum 130 $m^3$/h, discharge pressure stated as 0.4 bar / 3 m water column in BOQ, TEFC 3 HP motor, CI construction, SS dial pressure gauge, inlet filter, safety/relief valve, NRV, flexible connections, anti-vibration mounts, diffusers and complete pipework. Automatic/manual selection and protection shall be provided. Two blowers shall be one working and one standby, with only one operating at a time and provision for automatic/manual changeover.

2. **Effluent transfer pumps**

   Provide two open-well submersible pumps for transfer from pond to aeration tank, each rated 15,000 LPH at 15 m head, 3 HP, 415 V three-phase 50 Hz, including cable, controls, level protections, valves and piping. Final selection shall be supported by manufacturer performance curves. Two pumps shall be provided, comprising one duty (working) pump and one standby pump. Only one pump shall operate at a time; the standby shall be available for automatic/manual changeover on duty-pump failure. The two pumps shall not be interpreted as two simultaneous operating duties.

3. **Filter feed pumps**

   Provide two open-well submersible pumps, one working and one standby, for transfer from aeration tank to PSF/ACF, each 15,000 LPH at 15 m head, 3 HP, 415 V three-phase 50 Hz, including suction/delivery accessories, valves, cables, level controls, overload and dry-run protection. Only one duty pump shall operate at a time. Of the two pumps, one shall be working and the other standby. Provide selector, automatic changeover on failure, dry-running protection and interlock with downstream filtration. Only one pump shall run at a time.

4. **Backwash pump**

   Provide one open-well submersible pump, 15,000 LPH at 15 m head, 3 HP, 415 V three-phase 50 Hz, complete with piping, isolation/check valves, control and protection. Verify backwash flow and pressure against actual filter media and vessel requirements.

5. **Sludge transfer pumps**

   Provide two monoblock slurry-type sludge transfer pumps, each 12,000 LPH at 15 m head, 2 HP, 415 V three-phase 50 Hz, with appropriate solids-handling construction, connections, valves, starters and protective devices. The two sludge pumps shall operate as one working and one standby, not as parallel duty pumps. Provide manual/automatic duty selection, suitable level interlocks and standby changeover.

6. **UF feed pumps**

   Provide two monoblock centrifugal UF feed pumps (one working, one standby), 3 HP, 415 V three-phase 50 Hz, stated head range 6–14 m, including CPVC delivery piping, valves, power/control cables, pressure gauges and interlocks. Verify required flow against UF module and pretreatment. The two UF feed pumps shall be one working and one standby, with duty selection, failure changeover, level and pressure interlocks. Only one pump shall operate at a time.

7. **RO feed pumps**

   Provide two centrifugal RO feed pumps (one working, one standby), 1.5 HP, 415 V three-phase 50 Hz, head range 10–25 m, with associated piping, valves, controls, cables and protection; confirm duty with RO supplier. The two RO feed pumps shall be one working and one standby with suitable low/high-pressure and tank-level interlocks and duty/standby changeover; not both simultaneously.

8. **Storage water transfer pumps**

   Provide two open-well submersible storage transfer pumps delivering not less than 210 L/min at 76 m head, subject to the BOQ pump curve range, complete with level control, non-return/isolation valves, cabling, protection and commissioning. The two storage transfer pumps shall be one working and one standby. Provide alternate duty selection and automatic changeover on trip/failure, with tank level protections.

9. **RO treated-water transfer pump**

   Provide one horizontal monoblock pump with float control, not less than 10,000 LPH at stated head range 15–19 m, 2 HP, three-phase 415 V 50 Hz, complete with valves, controls, wiring and accessories.

**10. Chemical dosing system**

Provide three chemical dosing sets as BOQ, suitable for polyelectrolyte and sodium hypochlorite, dosing range 6–10 LPH, each with 100 L HDPE tank and compatible metering pump, suction strainer, injection quill, NRV, calibration arrangement, isolation valves, tubing, controls and wiring. Chemical compatibility and dosing setpoints shall be confirmed from process design.

**11. Pressure sand filter**

Provide one pressure sand filter unit of 12.5 $m^3$/h nominal flow, vessel stated as FRP with bobbin hood, 900 mm diameter × 1600 mm height, with graded silex/sand, anthracite and pebbles, multiport valve, SS pressure gauge, inlet/outlet/backwash connections, valves, drain, media filling, support and commissioning. Submit media grading, bed depth and pressure-drop calculations.

**12. Activated carbon filter**

Provide activated carbon filtration units at nominal 12.5 $m^3$/h, with graded silex, activated carbon iodine value 900 or above, pebbles, pressure gauges, valves, piping, media and commissioning. BOQ mentions MS vessel and 100 mm diameter × 1600 mm height; these require approval/clarification before procurement. Quantity shown as two.

**13. UF plant 3000 LPH**

Provide one fully automatic skid-mounted UF drinking-water treatment plant with 3,000 LPH treated-water output, 5-micron 20-inch jumbo cartridge filter, PVDF/PES hollow-fibre membranes, SS304/FRP housings as applicable, automatic backwash, CIP tank and cleaning pump, UV sterilizer, chlorination system, feed/permeate/reject flow meters, pressure gauges, PLC panel, UPVC/CPVC/SS pipe work, coated MS or SS304 skid, cabling, instrumentation and all commissioning consumables.

**14. RO system**

Provide one RO system described as 50 KLD and 3,000 LPH, including 5-micron cartridges, 10 LPH dosing set with 200 L LDPE tank, RO main pump, FRP membrane pressure vessels, 8-inch × 40-inch brackish-water membranes, CIP pump and 500 L tank, MCC and control panels, skid, SS304 high-pressure piping, UPVC low-pressure piping, flow meters, pressure gauges/switches, 5 $m^3$/h multi grade and activated carbon pretreatment filters, RO filtration pump and complete interconnections. Verify actual recovery, feed-water analysis, membrane count, operating pressure and guaranteed permeate capacity prior to approval.

**15. RWH control panel**

Provide cubicle-type 415 V three-phase four-wire 50 Hz RWH control panel with approximately 6.2 $m^2$ front area as BOQ, 100 A 25 kA four-pole incoming MCCB, multifunction meter with RS485, phase lamps, 200 A copper TPN busbars, specified MCCB/MCB/DOL outgoing feeders, interlocks, earth bar, cable terminations, control wiring, labels, protection, testing and commissioning. Detailed feeder schedule shall match connected loads.

**16. Outdoor pump control panel**

Provide outdoor cubicle pump panel, 415 V three-phase four-wire 50 Hz, approximately 1.705 $m^2$ front area, with 63 A 25 kA four-pole incomer, multifunction meter, 200/5 A CTs, phase indicators, 200 A tinned copper TPN bus bars, 63 A 10 kA TP MCB outgoing feeders, automatic star-delta starter for 15 HP open-well submersible pumps with dry-run, single-phasing and overload protections, and complete earthing/cabling.

**General Conditions, Testing and Handover**

**Testing and handover**

Perform pressure/leak testing, insulation/earthing checks, motor rotation and protections, duty/standby changeover, backwash/CIP operation, dosing calibration and plant performance trials. Demonstrate required flow and water quality, train CPWD/client operators and submit as-built drawings, manuals, test certificates, equipment warranties and three copies of standard operating procedures.

## WATER QUALITY STANDARDS FOR TREATED RAINWATER AND RO-TREATED WATER

The standard quality of water to be maintained after treatment shall conform to the specified parameters and permissible limits for treated rainwater and RO-treated water, as detailed in the water quality specifications below.

**RAINWATER QUALITY AFTER TREATMENT**

| Parameter | Specified Water Quality |
|---|---|
| pH Value | 6.5 - 8.5. |
| Turbidity | < 1 NTU. |
| Colour | <5 Hazen units. |
| Odor/Taste | Should be agreeable. |
| Total Dissolved Solids (TDS) | < 500 mg/l. |
| Total Hardness | < 200 mg/l. |
| Iron | < 0.3 mg/l. |
| Nitrate | < 45 mg/l. |
| E. coli or Coliform bacteria | Must be absent (0 per 100 ml). |

**RO WATER QUALITY**
**BIS DRINKING-WATER SPECIFICATION IS 10500:2012**

| Parameter | BIS Acceptable Limit |
|---|---|
| pH | 6.5–8.5 |
| TDS (total dissolved solids) | <500 mg/L |
| Total hardness (as $CaCO_3$) | <200 mg/L |
| Turbidity | <1 NTU |
| Chloride | <250 mg/L |
| Fluoride | <1.0 mg/L |
| Nitrate | <45 mg/L |
| Iron | <1.0 mg/L |
| Sulphate | <200 mg/L |
| Total alkalinity (as $CaCO_3$) | <200 mg/L |
| Arsenic | <0.01 mg/L |
| E. coli | Absent in 100 mL |
| Total coliform bacteria | Absent in 100 mL |

**Inclusions and measurement**

Unless separately scheduled, each BOQ item shall include accessories, media, valves, gauges, fittings, interconnecting cables, local supports, consumables, calibration and commissioning needed for complete functional operation. Payment/measurement shall remain strictly as per approved schedule of quantities and agreement conditions.

The contractor shall submit manufacturer technical literature, dimensional drawings, process flow diagram, hydraulic calculations and equipment schedules for approval of the Engineer-in-Charge before procurement. Equipment shall be installed and tested in accordance with the approved BOQ and applicable CPWD specifications. The system shall be demonstrated under working and standby arrangements wherever provided. The agency shall provide operator training and three copies of the operating procedure.

## ADDITIONAL TERMS AND CONDITIONS FOR COMPREHENSIVE OPERATION AND MAINTENANCE OF RAINWATER HARVESTING WATER TREATMENT PLANT

### 1. Scope of Operation and Maintenance

1.1 The contractor shall undertake comprehensive operation and maintenance of the complete Rainwater Harvesting Water Treatment Plant for twelve months from the date certified by the Engineer-in-Charge.

1.2 The scope includes operation, inspection, preventive maintenance, servicing, cleaning, lubrication, chemical dosing, backwashing, membrane cleaning, testing, minor repairs and routine consumables for all equipment installed under the work.

1.3 The contractor shall maintain both the general/non-potable-use treatment and supply system and the further UF/RO drinking-water treatment, storage and distribution system.

1.4 All work shall follow the approved BOQ, approved drawings, OEM recommendations, applicable CPWD specifications and Engineer-in-Charge instructions.

### 2. Operation of Treatment Systems

2.1 Operate raw-water transfer, aeration, chemical dosing, pressure sand and activated carbon filtration, treated-water storage and distribution systems as required.

2.2 General-use water shall comply with the project-approved quality criteria for non-potable supply. Drinking water shall pass through the specified UF/RO and disinfection systems and comply with applicable IS 10500 requirements at the final outlet.

2.3 Maintain physical segregation of potable and non-potable networks; no untreated or noncompliant water shall be released for drinking.

2.4 Adjust operating hours to raw-water availability and demand; maintain process records and report abnormalities promptly.

### 3. Pumps and Blowers

3.1 Operate and maintain all raw-water, filter-feed, backwash, sludge-transfer, UF-feed, RO-feed and treated-water transfer pumps and blowers as installed.

3.2 Where two units are scheduled, one shall be duty and the other standby; alternate periodically and verify automatic/manual changeover and dry-run, level, pressure and overload protections.

3.3 Check vibration, noise, discharge, leakage, seals, bearings, lubrication, valves and electrical connections. Attend abnormal conditions immediately.

### 4. Pressure Sand and Activated Carbon Filters

4.1 Operate and maintain pressure sand and activated carbon filters; monitor differential pressure and outlet quality, and backwash as required.

4.2 Inspect valves, gauges, filter beds and associated piping; replenish or replace media where required to meet specified performance, subject to the defined BOQ maintenance coverage.

### 5. UF and RO Systems

5.1 Operate UF and RO plants as per OEM manuals, recording feed/permeate/reject flows, pressure, differential pressure, conductivity/TDS and recovery.

5.2 Perform UF backwash and membrane cleaning and RO clean-in-place when performance indicates; maintain cartridge filters, UV units, disinfection and interlocks.

5.3 Replace clogged cartridges and provide cleaning chemicals. Premature membrane damage caused by negligent operation shall be rectified at contractor cost; normal complete membrane replacement shall be governed by the BOQ.

### 6. Chemicals and Consumables

6.1 The O&M rate shall include required chemicals, disinfectants, coagulants/poly electrolytes where needed, pH correction, antiscalants where applicable, membrane cleaning chemicals, cartridges, lubricants, cleaning materials, calibration solutions and laboratory reagents.

6.2 Use only process-compatible approved chemicals, maintain adequate stock, observe safe storage and record actual consumption.

**7. Water Quality Testing**

7.1 Monitor pH, turbidity, TDS/conductivity, disinfectant residual and relevant process parameters during operation.

7.2 Arrange testing of both general-use and drinking-water outlets at least monthly through an appropriately recognised/accredited laboratory, or more frequently if prescribed. Submit reports with the monthly bill.

7.3 If results fail the specified standards, isolate the affected supply, rectify the cause and retest; contractor bears the cost where failure is attributable to deficient O&M.

**8. Preventive Maintenance**

8.1 Submit an OEM-based preventive maintenance schedule for Engineer-in-Charge approval and maintain service records.

8.2 Inspect and service pumps, blowers, filters, dosing sets, UF/RO systems, electrical panels, starters, relays, sensors, instruments, valves, pipework and protective devices.

**9. Breakdown Maintenance and Spares**

9.1 Attend breakdowns immediately upon intimation and arrange qualified staff, tools and routine spares.

9.2 Minor repairs and routine consumable replacement are included in O&M rates. Major equipment replacement and normal membrane replacement shall be included only to the extent expressly stated in the BOQ.

9.3 Damage caused by improper operation, negligence or inadequate maintenance shall be rectified at contractor cost. Maintain breakdown and downtime records.

**10. Cleaning, Sludge and Reject Management**

10.1 Keep the plant, equipment rooms, chemical stores and accessible tanks and piping hygienic. Clean screens, strainers and filters as needed.

10.2 Handle sludge, backwash waste and RO reject through approved facilities; do not discharge indiscriminately. Off-site disposal cost allocation shall follow the BOQ.

10.3 Any confined-space entry shall follow an approved permit, isolation, gas testing and rescue procedure.

**11. Manpower and Safety**

11.1 Deploy adequate trained personnel for required operating hours, with suitable technical backup for emergencies. The staffing pattern and shift coverage shall be as per instruction of engineer in charge.

11.2 Comply with applicable wages, EPF, ESI and labour requirements. Provide PPE, electrical isolation/lockout procedures, chemical handling precautions and safe working practices.

11.3 The contractor shall deploy required manpower as per instruction of engineer in charge. In case of absences or non deployment of any required staff necessary recovery will be deduct from the bill.

**12. Electricity and Water**

12.1 Normal electricity and water shall be supplied by the department subject to availability unless the BOQ provides otherwise.

12.2 Operate equipment economically and maintain level and protection interlocks to avoid wastage and dry running.

**13. Non-Availability of Rainwater**

13.1 Plant throughput depends on collected raw-water availability. During shortage, operate only to the extent feasible and as instructed by the Engineer-in-Charge.

13.2 During idle periods preserve UF/RO membranes, flush and periodically test equipment as required by OEM; keep the plant ready for restart. Raw-water shortage does not waive preventive maintenance obligations.

**14. Performance and Payment**

14.1 Maintain performance within the approved design capacity and raw-water design characteristics, with general-use water meeting project-approved criteria and potable water meeting applicable IS 10500 limits.

14.2 Monthly payment shall follow satisfactory service, submission of logbooks, attendance, maintenance records and required laboratory results, and certification by the Engineer-in-Charge.

14.3 Any deduction or compensation shall be governed by the express contract and applicable GCC provisions.

**15. General Conditions and Handover**

15.1 The contractor shall inspect the site and familiarise themselves with installed equipment before quoting. All tools, testing instruments, supervision and routine consumables shall be arranged within the quoted rate.

15.2 No change in process, equipment arrangement or controls is permitted without prior written approval.

15.3 At expiry of twelve months, hand over the plant in satisfactory operating condition, subject to normal wear and agreed exclusions, with operation, testing and maintenance records.

**16. Equipment-wise Maintenance Schedule**

| Equipment | Maintenance | Frequency |
|---|---|---|
| **Twin-lobe air blowers** | Pressure, vibration, lubrication, inlet filter | Daily / OEM |
| **Raw-water and filter-feed pumps** | Flow, current, leakage, standby changeover | Daily |
| **Backwash and sludge pumps** | Operation, suction, valves | As required |
| **Pressure sand / carbon filters** | Pressure differential, backwash, media condition | As required |
| **UF system** | Flow, pressure, backwash, integrity and CIP | Daily / OEM |
| **RO system** | TDS, recovery, pressure, CIP | Daily / OEM |
| **Chemical dosing sets** | Tank levels, dose, tubing, calibration | Daily / monthly |
| **Cartridge filters** | Differential pressure and replacement | As required |
| **UV / disinfection** | Lamp status, intensity and dose | Daily / OEM |
| **Transfer pumps** | Discharge, level controls and changeover | Daily |
| **Electrical panels and instruments** | Protection, terminals, calibration | Monthly / OEM |
| **Storage tanks and piping** | Cleanliness, leakage and contamination | Periodically |

**17. Registers and Reports**

Maintain daily operation and flow records, pump/blower running hours, chemical consumption, UF/RO readings, backwash/CIP records, preventive maintenance and breakdown registers, attendance, monthly laboratory reports and a consolidated monthly performance statement.

**18. Special Comprehensive O&M Provision**

The quoted rate shall include all labour, supervision, preventive and breakdown maintenance, chemicals, routine consumables, lubricants, filter cartridges, cleaning materials, testing reagents, laboratory testing, membrane cleaning and minor spare parts necessary for satisfactory operation of both treatment systems for twelve months. Major equipment and complete membrane replacements arising from normal wear, and off-site sludge disposal, shall be governed by the express BOQ provisions. Damage arising from negligence or improper operation shall be made good by the contractor at no extra cost.

# LIST OF APPROVED MAKE OF MATERIALS
# (FOR ELECTRICAL WORKS)

**Note:**

1. The contractor shall obtain prior approval from the Engineer-in-Charge before placing order for any specific material or engaging any of the specialized agencies. The contractor shall make a detailed submittal with catalogues and highlighted proposed specification as well as full details of the works executed by the specialized agencies, as specified.
2. Unless otherwise specified, the brand / make of the material as specified in the item nomenclature, in the particular specification and in the list of approved materials attached in the tender, shall be used in the work.
3. In case of non-availability of the brand specified in the contract the contractor shall be allowed to use alternate equivalent brand of the material subject to submission of documentary evidence of non-availability of the specified brand. The necessary cost adjustments on account of above change shall be made for the material.

| S. No. | Name of the Product | Approved Makes |
|---|---|---|
| 1 | Blower | ABL blowers/Everest/A1 blowers |
| 2 | Dosing Tank | Cantex/E dose/ I dose/Supreme |
| 3 | Filter Unit with pressure sand filter media | CAP/Thermax/IEL |
| 4 | Filter Unit with Activated carbon filter | CAP/Thermax/IEL |
| 5 | Micron Cartridge | 3M/Eaton/Pentair/ Equivalent OEM |
| 6 | UF membrane Module | Dupont/ Pentair/Toray/ Equivalent OEM |
| 7 | UF membrane Housing | Dupont/ Pentair/Toray/ Equivalent OEM |
| 8 | UV Sterilizer | Hitech UV/Trajan UV/Aquafine |
| 9 | Membrane pressure Vessel | Dupont/ Pentair/Toray/ Equivalent OEM |
| 10 | Storage Water Transfer Pump | Grundfoss/ CRI/KSB/Kirloskar / CG |
| 11 | Water Treatment Pumps Set (all category) | Wilo / Grundfos / Xylem / CRI / Kirloskar / KSB |
| 12 | GI Pipe | Jindal (Hissar) / TATA / SAIL |
| 13 | Ball Valve, Butterfly Valves, NRV, PRV, Y Strainer | L&T / Zoloto / Sant / Advance / Honeywell |
| 14 | Resin | Thermax / Ion-Exchange / Du Pont |
| 15 | Pressure Switch | Indofos / System Sensor / Danfos |
| 16 | Pressure Gauge | Emerald / Fiebig / H.Guru / Danfoss |
| 17 | Chemical Doser | ASIA LMI / Prominent / E-Dose / Milton Roy / Ion Exchange / Thermax / Aquanomics |
| 18 | Flow Meter | Zest / Adept / Aster / Honeywell |
| 19 | pH Sensor | W2K TEK / Aster / Volant / Digital Shukrut / Alfa / Ion-Exchange / Thermax / Aquanomics |
| 20 | UV | Thermax / Ion-Exchange / Aquanomics |
| 21 | Ultra filtration | Thermax / Ion-Exchange / Aquanomics |
| 22 | LT Cable / Control Cable | Havells / RR Kable / Polycab / Finolex |

| | | |
|---|---|---|
| 23 | Potential Transformer | AE / Pragati / Gilbert & Maxwell / Matrix / Rishabh / Kappa |
| 24 | Current Transformer (Cast Resin) | AE / Pragati / Gilbert & Maxwell / Matrix / Rishabh / Kappa |
| 25 | Electronic Digital Meter | Enercon System Pvt. Ltd. / CG Schlumberger / L&T / Rishabh |
| 26 | Miniature Circuit Breakers (MCB) and Moulded Case Circuit Breaker (MCCB) | Legrand / Siemens / Schneider / Lauritz Knudsen Electrical And Automation (L&T) |
| 27 | Power / Aux. Contactor | Schneider / Lauritz Knudsen / Siemens / ABB / Legrand |
| 28 | Protection Relay (Numeric Type) | Areva / Siemens / Lauritz Knudsen / Schneider |
| 29 | Indication lamp and push button | GE / Lauritz Knudsen / Siemens / Schneider |
| 30 | Electronic meter and logger | L&T / Conzerv / Siemens / Schneider |
| 31 | Selector Switch | Siemens / Lauritz Knudsen / Schneider / ABB |
| 32 | Single Phase Preventor | Lauritz Knudsen / Minilec / Schneider / ABB |
| 33 | Bimetallic Cable Lug | Dowell / Comet / Jainson |
| 34 | Cable Glands Double Compression | Dowell / Comet / Jainson |
| 35 | Electrical Control Panel | Infinity / ABAK / Prestine / Sterling Wilson / Adlec Mundka / Advance / Rainbow Energy |
| 36 | PVC / HDPE Tank | Sintex / Supreme / Astral / Ashirwad |
| 37 | UPVC Pipe & Fittings | Astral / Finolex / Ashirwad/Supreme |
| 38 | Submersible Cable | Havells / RR Kable / Polycab / Finolex |
| 39 | Pressure Switch | Indofos / Danfos / System Sensor |
| 40 | Electronic meter and logger | L&T / Conzerv / Siemens / Schneider |
| 41 | Selector Switch | Siemens / Lauritz Knudsen / Schneider / ABB |
| 42 | Single Phase Preventor | Lauritz Knudsen / Minilec / Schneider / ABB |
| 43 | Bimetallic Cable Lug | Dowell / Comet / Jainson |
| 44 | Cable Glands Double Compression | Dowell / Comet / Jainson |
| 45 | Electrical Control Panel | Manufacturer Having In-House 7 Tank Process, Powder Coating Facility, CNC Machine Having CPRI Approval For Relevant Bus Bar Rating (The Decision Of The Engineer-in-Charge Will Be Final And Binding). |
| 46 | Effluvant Transfer Pumps | Grundfoss/ CRI/KSB/Kirloskar/Lubi |
| 47 | Backwash Pump | Grundfoss/ CRI/KSB/Kirloskar/Lubi |
| 48 | Sludge Transfer Pumps | Grundfoss/ CRI/KSB/Kirloskar / Lubi |
| 49 | UF Feed Pump | Kirloskar/Wilo/KSB/Grundfos |
| 50 | RO Feed Pump | Kirloskar/Wilo/KSB/Grundfos |

# PART - D

# Schedule of Quantities

**SCHEDULE OF QUANTITIES - (Civil)**

**Name of Work:Providing Development and Bulk Services to RTC Peringome.SH: C/o 300KLD Capacity of Rain water Harvesting System including Collection sump filtered water distribution lines,UG sump, Sludge Drying bed, and Plant room etc. RTC,Peringome,Kannur, Kerala.**

| Sl. No. | Description of Item | Qty | Unit | DSR 23 | Amount |
|---|---|---|---|---|---|
| 1 | Preparation and submission of a complete design and execution proposal for the rainwater harvesting system, including assessment of site conditions and catchment areas, process design, structural analysis and design for all civil construction works, MEP designs, design calculations, process flow diagrams, equipment selection and sizing, layout drawings, piping and interconnection details, instrumentation and control systems, and detailed shop drawings. The design documents shall be vetted by a recognised institution such as IIT/NIT or a reputed Government Engineering College and submitted to the Engineer-in-Charge for approval before commencement of the work. The contractor shall submit three (3) sets of all drawings in suitable sizes as hard copies, along with the relevant design calculations, technical specifications and other supporting documents. The item shall include all necessary surveys, architectural and structural and MEP drawings, calculations, technical vetting, printing, submission and revisions required for approval, complete in all respects. | 1 | job | 100000 | 100000 |
| 2 | **EARTH WORK** | | | | |
| 2.1 | Earth work in excavation by mechanical means (Hydraulic excavator)/ manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including getting out and disposal of excavated earth lead upto 50 m and for all lift, as directed by Engineer-in-charge. | | | | |
| 2.1.1 | All kinds of soil | 60.00 | cum | 177.50 | 14300 |
| 2.2 | Earth work in excavation by mechanical means (Hydraulic excavator) / manual means over areas (exceeding 30 cm in depth, 1.5m in width as well as 10 sqm on plan) including getting out and disposal of excavated earth, lead up to 50 m and lift up to 1.5m, as directed by Engineer-in-Charge. | | | | |
| 2.2.1 | Ordinary rock including Hard laterite/ Narikkal | 343.00 | Cum | 498.90 | 229772 |
| 2.3 | Filling available excavated earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift up to 1.5 m. | 124.00 | Cum | 196.00 | 32634 |
| 3 | **CONCRETE WORK** | | | | |
| 3.1 | Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level : | | | | |
| 3.1.1 | 1:2:4 (1 cement : 2 coarse sand(zone-III) derived from natural sources : 4 graded stone aggregate 20 mm nominal size derived from natural sources) | 20.00 | Cum | 7878.50 | 211576 |
| 3.1.2 | 1:5:10 (1 cement : 5 coarse sand(zone-III) : 10 graded stone aggregate 40 mm nominal size) | 22.00 | Cum | 6518.60 | 192561 |

| Sl. No. | Description of Item | Qty | Unit | DSR 23 | Amount |
|---|---|---|---|---|---|
| 4 | **REINFORCED CEMENT CONCRETE** | | | | |
| 4.1 | Centering and shuttering including strutting, propping etc. and removal of form for : | | | | |
| 4.1.1 | Foundations, footings, bases of columns, etc. for mass concrete | 17.00 | Sqm | 392.15 | 8952 |
| 4.1.2 | Walls (any thickness) including attached pilasters, butteresses, plinth and string courses etc. | 589.00 | Sqm | 842.50 | 666312 |
| 4.1.3 | Suspended floors, roofs, landings, balconies and access platform | 212.00 | Sqm | 927.25 | 263953 |
| 4.1.4 | Lintels, beams, plinth beams, girders, bressumers and cantilevers | 2.00 | Sqm | 736.40 | 1978 |
| 4.1.5 | Columns, Pillars, Piers, Abutments, Posts and Struts | 6.00 | Sqm | 961.30 | 7745 |
| 4.1.6 | Edges of slabs and breaks in floors and walls | | | | |
| 4.1.6.1 | Under 20 cm wide | 62.00 | Metre | 208.55 | 17362 |
| 4.2 | Steel reinforcement for R.C.C. work including straightening, cutting, bending, placing in position and binding all complete upto plinth level. | | | | |
| 4.2.1 | Low alloy steel reinforcement bars of grade Fe-500D or more. It shall comply with latest version of IS 1786 and additional requirements mentioned in the NIT | 18700.00 | Kg | 122.50 | 2290750 |
| 4.3 | Steel reinforcement for R.C.C. work including straightening, cutting, bending, placing in position and binding all complete above plinth level. | | | | |
| 4.3.1 | Low alloy steel reinforcement bars of grade Fe-500D or more. It shall comply with latest version of IS 1786 and additional requirements mentioned in the NIT | 130.00 | Kg | 122.50 | 15925 |
| 4.4 | Providing and laying in position ready mixed or site batched design mix cement concrete for reinforced cement concrete work; using coarse aggregate and fine aggregate derived from natural sources, Portland Pozzolana / Ordinary Portland /Portland Slag cement, admixtures in recommended proportions as per IS: 9103 to accelerate / retard setting of concrete, to improve durability and workability without impairing strength; including pumping of concrete to site of laying, curing, carriage for all leads; but excluding the cost of centering, shuttering, finishing and reinforcement as per direction of the engineer-in-charge; for the following grades of concrete. | | | | |
| | Note: Extra cement up to 10% of the minimum specified cement content in design mix shall be payable separately. In case the cement content in design mix is more than 110% of the specified minimum cement content, the contractor shall have discretion to either re-design the mix or bear the cost of extra cement | | | | |
| 4.4.1 | All works upto plinth level | | | | |
| 4.4.1.1 | Concrete of M30 grade with minimum cement content of 350 kg /cum | 170.00 | Cum | 9655.70 | 2204065 |
| 4.1.2 | All works above plinth level upto floor V level | | | | |
| 4.1.2.1 | Concrete of M30 grade with minimum cement content of 350 kg /cum | 1.00 | Cum | 10011.35 | 13443 |

| Sl. No. | Description of Item | Qty | Unit | DSR 23 | Amount |
|---|---|---|---|---|---|
| 5 | **STONE WORK** | | | | |
| 5.1 | Dry randum rubble masonry using hard stones properly filled with stone chippnigs in voids including provindg bond stones as per the requirements of the specifications all complete as per the directions of the Engineer-in-Charge in foundation and plinth | 109.00 | Cum | 5275.20 | 772071 |
| 6 | **STEEL WORK** | | | | |
| 6.1 | Structural steel work riveted, bolted or welded in built up sections, trusses and framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer all complete. | 960.00 | Kg | 133.70 | 172339 |
| 6.2 | Steel work in built up tubular (round, square or rectangular hollow tubes etc.) trusses etc., including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer, including welding and bolted with special shaped washers etc. complete. | | | | |
| 6.2.1 | Hot finished welded type tubes. | 4100.00 | Kg | 194.40 | 1070223 |
| 6.3 | Steel work welded in built up sections/ framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer using structural steel etc. as required. | | | | |
| 6.3.1 | In gratings, frames, guard bar, ladder, railings, brackets, gates and similar works. | 1091.00 | Kg | 172.60 | 252850 |
| 6.4 | Providing and fixing hand rail of approved size by welding etc. to steel ladder railing, balcony railing, staircase railing and similar works, including applying priming coat of approved steel primer. | | | | |
| 6.4.1 | G.I. pipes | 160.00 | Kg | 203.05 | 43622 |
| 7 | **FLOORING** | | | | |
| 7.1 | 52 mm thick cement concrete flooring with concrete hardener topping, under layer 40 mm thick cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) and top layer 12 mm thick cement hardener consisting of mix 1:2 (1 cement hardener mix : 2 graded stone aggregate 6 mm nominal size) by volume, hardening compound mixed @ 2 litre per 50 kg of cement or as per manufacturer's specifications. This includes cost of cement slurry, but excluding the cost of nosing of steps etc. complete. | 230.00 | Sqm | 978.45 | 302174 |
| 7.2 | Providing and fixing glass strips in joints of terrazzo/ cement concrete floors. | | | | |
| 7.2.1 | 40 mm wide and 4 mm thick. | 339.00 | Metre | 91.75 | 41765 |

| Sl. No. | Description of Item | Qty | Unit | DSR 23 | Amount |
|---|---|---|---|---|---|
| 8 | **ROOFING** | | | | |
| 8.1 | Providing and fixing precoated galvanised iron profile sheets (size, shape and pitch of corrugation as approved by Engineer-in-Charge) of total coated thickness 0.50 mm (base metal of minimum 0.45 mm thickness with total coating thickness of 0.05mm) with zinc coating 120 grams per sqm as per IS: 277, in 240 mpa steel grade, 5-7 microns epoxy primer on both side of the sheet and polyester top coat 15-18 microns. Sheet should have protective guard film of 25 microns minimum to avoid scratches during transportation and should be supplied in single length upto 12 metre or as desired by Engineer-in-charge. The sheet shall be fixed using self drilling /self tapping screws of size (5.5x 55 mm) with EPDM seal, complete upto any pitch in horizontal/ vertical or curved surfaces, excluding the cost of purlins, rafters and trusses and including cutting to size and shape wherever required. | 278.00 | Sqm | 738.65 | 275723 |
| 8.2 | Providing and fixing precoated galvanised steel sheet roofing accessories of total coated thickness 0.50 mm (base metal of minimum 0.45 mm thickness with total coating thickness of 0.05 mm) with Zinc coating 120 gram per sqm as per IS: 277, in 240 mpa steel grade, 5-7 microns epoxy primer on both side of the sheet and polyester top coat 15-18 microns using self drilling/ self tapping screws complete : | | | | |
| 8.2.1 | Ridges plain (500 - 600mm) | 17.00 | Metre | 532.35 | 12152 |
| 9 | **FINISHING** | | | | |
| 9.1 | 12 mm cement plaster finished with a floating coat of neat cement of mix : | | | | |
| 9.1.1 | 1:3 (1 cement: 3 fine sand) | 607.00 | Sqm | 439.25 | 358009 |
| 9.2 | 6 mm cement plaster of mix : | | | | |
| 9.2.1 | 1:3 (1 cement: 3 fine sand) | 97.00 | Sqm | 300.45 | 39133 |
| 9.3 | Extra for providing and mixing water proofing material in cement plaster work in proportion recommended by the manufacturers. | 116.00 | Per bag of cement | 22.10 | 3442 |
| 9.4 | Finishing walls with ready mixed Premium acrylic emulsion paint (Company Depot Tinted) having VOC less than 50 gm/litre and UV resistance as per IS 15489:2004, Alkali & fungal resistance, dirt resistance exterior paint of required shade with silicon additives. | | | | |
| 9.4.1 | New work (Two or more coats applied @ 1.43 litre/ 10 sqm over and including priming coat of exterior primer applied @ 0.90 litre/10 sqm. | 97.00 | Sqm | 181.25 | 23607 |
| 9.5 | Painting with synthetic enamel paint of approved brand and manufacture to give an even shade : | | | | |
| 9.5.1 | Two or more coats on new work. | 250.00 | Sqm | 155.90 | 52333 |
| 10 | **ROAD WORK** | | | | |
| 10.1 | Providing and fixing G.I. chain link fabric fencing of required width in mesh size 50x50 mm including strengthening with 2 mm dia wire or nuts, bolts and washers as required complete as per the direction of Engineer-in-charge. | | | | |
| 10.1.1 | Made of G.I. wire of dia 4 mm | 91.00 | Sqm | 1017.80 | 124364 |

| Sl. No. | Description of Item | Qty | Unit | DSR 23 | Amount |
|---|---|---|---|---|---|
| 11 | **WATER SUPPLY** | | | | |
| 11.1 | Providing and fixing Chlorinated Polyvinyl Chloride (CPVC) pipes, 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 : External work | | | | |
| 11.1.1 | 32 mm nominal outer dia. Pipes. | 50.00 | Metre | 438.60 | 29447 |
| 11.1.2 | 50 mm nominal outer dia. Pipes. | 205.00 | Metre | 794.25 | 218626 |
| 11.1.3 | 62.50 mm nominal inner dia. Pipes. | 900.00 | Metre | 1674.40 | 2023452 |
| 11.1.4 | 100mm nominal inner dia. Pipes. | 65.00 | Metre | 3271.70 | 285548 |
| 11.2 | Providing and placing on terrace (at all floor levels) polyethylene water storage tank, IS : 12701 marked, with cover and suitable locking arrangement and making necessary holes for inlet, outlet and overflow pipes but without fittings and the base support for tank. | 20000.00 | Litre | 11.00 | 295400 |
| 12 | **DRAINAGE** | | | | |
| 12.1 | Supplying and fixing C.I. cover with frame for manholes : | | | | |
| 12.1.1 | 455x610 mm rectangular C.I. cover (light duty) the total weight of cover and frame to be not less than 38 kg (weight of cover 23 kg and weight of frame 15 kg) : | 5.00 | Each | 2339.60 | 15707 |
| 13 | **RAIN WATER HARVESTING & TUBE WELLS** | | | | |
| 13.1 | Supplying, filling, spreading & leveling stone boulders of size range 5 cm to 20 cm, in recharge pit, in the required thickness, for all leads & lifts, all complete as per direction of Engineer-in-charge. | 49.00 | Cum | 1509.80 | 99336 |
| 13.2 | Supplying, filling, spreading & leveling gravels of size range 5 mm to 10 mm, in the recharge pit, over the existing layer of boulders, in required thickness, for all leads & lifts, all complete as per direction of Engineer-in-charge. | 34.00 | Cum | 1538.25 | 70226 |
| 13.3 | Supplying, filling, spreading & leveling coarse sand of size range 1.5 mm to 2 mm in recharge pit, in required thickness over gravel layer, for all leads& lifts, all complete as per direction of Engineer - in-charge. | 1.00 | Cum | 1538.25 | 2065 |
| | **Total** | | | | **12854942** |

**SCHEDULE OF QUANTITIES (Electrical )**

**Name of work:Providing Development and Bulk Services to RTC Peringome. SH: C/o 300KLD Capacity of Rain water Harvesting System including Collection sump filtered water distribution lines,UG sump, Sludge Drying bed, and Plant room etc. RTC,Peringome,Kannur, Kerala.**

| S.No | Description of Item | Qty | Unit | Rate | Amount |
|---|---|---|---|---|---|
| | **SH-I Rain Water Harvesting.** | | | | |
| 1 | **Electromechanical Items :** | | | | |
| 1.1 | **Air Blower with Electric Motor for Equalization Tank and Aeration tank along with diffuser** | | | | |
| | SITC of Air cooled Twin Lobe Type rotary Air Blowers of following capacity with TEFC motor with accessories, MS base plate, safety valves,GI/CPVC pipes, suction filter, NRV, PRV, antivibration pad expantion chamber, header drive assembly including Diffuser 90mmx1000mm EPDM with tube membrane etc. as required. | | | | |
| | Type : Twin Lobe Rotary | | | | |
| | Capacity : 130 Cu.M/Hr (Minimum) | | | | |
| | Discharge Pressure : 0.4 Bar / 3 metre of water column | | | | |
| | Electric Motor : TEFC 3 hp | | | | |
| | MOC ; Cast Iron | | | | |
| | Pressure Guage : SS Dial Type | | | | |
| | Quantity : 2 Nos(1W+1S) | 2 | Nos | 311925.00 | 623850.00 |
| 2 | **EFFLUVANT TRANSFER PUMPS (from pond to Aeration tank) :** Providing open well submersible type Pump set suitable for pumping 15000 Litres per hour at head of 15 Mtrs., at 3.0 bar presure (3Hp) suitable for operation on three phase, 415V, 50Hz, AC supply including necessary CPVC piping,valves,accessories, power / control cable connections etc. as required -2 Nos (Duty + Standby). | 2 | Nos | 56070.00 | 112140.00 |
| 3 | **FILTER FEED PUMP (from aeration tank to filter PSF&ACF) :** Providing open well submersible type Pump set suitable for pumping 15000 Litres per hour at head of 15 Mtrs., at 3.0 bar presure (3Hp) suitable for operation on three phase, 415V, 50Hz, AC supply including necessary CPVC piping,valves,accessories, power / control cable connections etc. as required -2 Nos (Duty + Standby). | 2 | Nos | 56070.00 | 112140.00 |
| 4 | **BACKWASH PUMP :** Providing open well submersible type Pump set suitable for pumping 15000 Litres per hour at head of 15 Mtrs., at 3.0 bar presure (3Hp) suitable for operation on three phase, 415V, 50Hz, AC supply including necessary CPVC piping,valves,accessories, power / control cable connections etc. as required -1 No . | 1 | No | 56070.00 | 56070.00 |
| 5 | **SLUDGE TRANSFER PUMPS**: Providing Mono block slerry type Sludge Transfer Pump having capacity of 12000 Litres per hour at head of 15 meters, suitable for operation on three phase, 2HP, 415V, 50Hz, AC supply including necessary CPVC piping,valves,accessories, power / control cable connections etc. as required - 2 Nos (Duty + Standby). | 2 | Nos | 57355.00 | 114710.00 |
| 6 | **UF FEED PUMP:-**Monoblock pumpset with suitable for following specifications for pumping including necessary CPVC delivery pipe connections,valves,accessories, c, power / control cable connctions etc. complete as required. | | | | |

| S.No | Description of Item | Qty | Unit | Rate | Amount |
|---|---|---|---|---|---|
| | Type : Mono block Centrifugal | | | | |
| | Delivery Head :6 -14 Mtr | | | | |
| | Rated Power : 3 HP, 415V, 50 Hz, 3 Phase, AC Supply | | | | |
| | Quantity : 2 Nos(1W+1S) | 2 | Nos | 63740.00 | 127480.00 |
| | | | | | |
| 7 | **RO FEED PUMP:-**Monoblock pumpset with suitable for following specifications for pumping including necessary CPVC delivery pipe connections,valves,accessories, c, power / control cable connctions etc. complete as required. | | | | |
| | Type : Centrifugal | | | | |
| | Delivery Head :10 - 25 Mtr | | | | |
| | Rated Power : 1.5 HP, 415V, 50 Hz, 3 Phase, AC Supply | | | | |
| | Quantity : 2 Nos(1W+1S) | 2 | Nos | 44494.00 | 88988.00 |
| | | | | | |
| 8 | **STORAGE WATER TRANSFER PUMP**: Providing new Open well submersible type Pump set having a discharge of not less than 210 Ltr/Minite at a head of 76 mtrs with a discharge range of 7.4 -3.5 lps & 52 mtr-76mtr head (15 Hp) , suitable for operation on three phase, 415V, 50Hz, AC supply for pumping from treated water tank to sump which is way from the treated water tank complete with connections etc as required - -2 Nos (Duty + Standby). | 2 | Nos | 109016.00 | 218032.00 |
| 9 | **RO TREATED WATER TRANSFER PUMP:-** Horizontal mono block type Pump set with flot control having a discharge of not less than 10000 Ltr/Hour ( head range 15 to 19 mtr (2Hp), suitable for operation on three phase, 415V, 50 Hz, AC supply for pumping from treated water tank to Existing RCC trated water tank/PVC tank which away from the treated water tank including delivery pipe connections, power / control cable connections etc complete with connections etc as required- - 1 No . | 1 | No | 50295.00 | 50295.00 |
| 10 | **CHEMICAL DOSING SYSTEM :** The chemical dosing system suitable for use of Poly electrolyte and sodium Hypo Chlorite at required flow rate of 6 to 10LPH with each set comprising 100 Litre capacity HDPE tanks, dosing pump sets, Agitator made of SS 304 for PE dosing tank including necessary piping, power / control cable connections etc. complete as required - 3 Sets | 3 | Nos | 25886.00 | 77658.00 |
| 11 | **Filter Unit with Pressure Sand Filter Media** | | | | |
| | Providing graded pebble / sand / media in the filter unit,providing inlet & outlet connections complete withall accessories, providing SS pressure guage with FRP vessal Bobbin hood and its fittings multy port valve etc., complete as required.<br>Foundation Of PCC: 1:4:8 25 CM, 2.25 M2 | | | | |
| | Flow Rate : 12.5 Cu.M / Hr | | | | |
| | Dimension of the filter : 900mm Dia x 1600mm Height | | | | |
| | Filtering Media. : Graded Siles, Anthracite, Pebbles | | | | |
| | | | | | |
| | Quantity : 1 SET | 1 | No.s | 342505.00 | 342505.00 |
| 12 | **Filter Unit with Activated Carbon Media** | | | | |
| | Providing &filling activated carbon of Iodine value 900 or above inthe filter unit, providing inlet & outlet connections,complete with all accessories, providing SS pressureguage MS vessels 5mm gage sheet with all fittings etc.complete as required. | | | | |

| S.No | Description of Item | Qty | Unit | Rate | Amount |
|---|---|---|---|---|---|
| | Flow Rate : 12.5 Cu.M / Hr | | | | |
| | Dimension of the Filter : 100mm Dia x 1600mm Height | | | | |
| | Filtering Media : Graded Siles, Carbon, Pebbles | | | | |
| | Quantity : 1 SET | | | | |
| | | 2 | No.s | 464829.00 | 929658.00 |
| 13 | **Ultra Filteration Plant** | | | | |
| | Supply, installation, testing, and commissioning of a fully automatic Ultrafiltration (UF) based drinking water treatment plant of 3,000 LPH output capacity, skid-mounted design, conforming to IS 10500:2012 / IS 19197:2025 standards, complete with all accessories, interconnected piping, instrumentation, and control panel. | | | | |
| | The complete system specification includes: | | | | |
| | Raw Water Feed Pump: SS/CI centrifugal pump of ~ 3 to 5 HP rating. | | | | |
| | Micron Cartridge : Filter 5 micron, 20" jumbo housing | | | | |
| | UF Membrane Module : 3,000 LPH rated UF system, PVDF/PES hollow fibre | | | | |
| | UF Membrane Housing/Skid :SS 304 / FRP, as applicable | | | | |
| | UF Backwash System : Automatic backwash arrangement | | | | |
| | Chemical Cleaning System : CIP tank + dosing/cleaning pump | | | | |
| | UV Sterilizer : Suitable for 3,000 LPH | | | | |
| | Chlorination System : Dosing pump with chemical tank | | | | |
| | Flow Meters : Feed / permeate / reject lines | | | | |
| | Pressure Gauges : Feed and UF pressure monitoring | | | | |
| | Control Panel :Automatic PLC/control panel | | | | |
| | Piping & Valves : UPVC/CPVC/SS as required | | | | |
| | Skid : MS epoxy-coated / SS304 option | | | | |
| | Ultrafiltration (UF) based drinking water treatment plant of 3,000 LPH output capacity as above | 1 | Job | 845895.00 | 845895.00 |
| 14 | **RO SYSTEM :-** Providing 50 KLD - Reverse Osmosis system with pressure filtration with a capacity of 3000lph with following specifications | | | | |
| | 1) Micron +G22:H34Filter- 3M³ / Hr, SS 304, 20" Length * 10 Nos, 5 Microns | | | | |
| | 2) Dosing System-10 LPH, PP, 200 Ltr LDPE Tank, | | | | |
| | 3)RO Main Pump-VMS, 3 M³ / Hr @ 15 m head, 1.5 kW. 415v, SS 304 | | | | |
| | 4)Membrane Pressure Vessel- FRP, 80160, Side Port | | | | |
| | 5)Membrane Brackish Water Membrane, 8” diameter * 40” long, 600 psi @ 40 Bar, 95% Salt rejection | | | | |
| | 6)CIP System - SS 304 Pump, Horizontal Centrifugal Pump, 15 M³ / Hr @ 20m head, 3.0 HP/2.25 Kw / 3 Phase, SS 304, 500 Ltr LDPE tank, Pre Filter, etc. | | | | |
| | 7) MCC Panel is Electrical based and made up MS Fabricated. It consists of 3 phase indicators, LP/HP indicator, Pump ON-OFF, Main Switch, Contactor with Overload relay, Fuse fittings, Interconnecting wires etc. Electrical Make : Schneider / LT, Instruments : TDS / Conductivity | | | | |
| | 8)Control Panel - MS Epoxy, Support panel, membrane, pump and pipeline | | | | |

| S.No | Description of Item | Qty | Unit | Rate | Amount |
|---|---|---|---|---|---|
| | 9) RO Skid | | | | |
| | 10)pipeline - UPVC Sch40 pipe and fittings in non-pressure line, SS 304 pipeline and fittings in pressure lines | | | | |
| | 11) Electrical - Interconnecting instruments & equipment, Flexy, | | | | |
| | Rota meter - Online, 20 KLH, Acrylic, 2" BSP | | | | |
| | 12) Pressure Gauge - 2.5" / 4.0", SS Glycerine filled, | | | | |
| | 13) Pressure Switch - High / Low, Don Foss, Online | | | | |
| | 14) Multi Graded Filter - MSEP, 5M³ /Hr, uPVC frontal pipeline with b/f valves, Sand Media | | | | |
| | 15)Activated Carbon Filter - MSEP, 5M³ /Hr, uPVC frontal pipeline with b/f valves, Activated Carbon Media | | | | |
| | 16)RO FILTERATION PUMP:-Submersible type open well pumpset with float switch /water level controller for automatic operation, suitable for following specifications connections, power / control cable connctions etc. complete as required. Feed Pump - 5 M³ / Hr @ 25m head, 1.5 HP/ 4.0 Kw / 3 Phase,2.0 Kw4.0 Kw / 3 CI, Base Plate, Coupling, Valves, etc. | | | | |
| | RO System as above | 1 | Each | 1958363.00 | 1958363.00 |
| 15 | **RWH Control Panel** | | | | |
| | Supply ,Installation, testing & commissioning of cubicle type, RWH control Panel board suitable for 415V,3 phase, 4 wire 50 Hz AC supply system having suitable size front surface area 6.2 Sq. m (Approx.) and 350mm depth fabricated in compartmentalised design from CRCA Sheet steel of 2mm thick for frame work and covers, 3mm thick for gland plates i/c cleaning and finishing complete with 7 tank process powder coating in approved shade, having suitable capacity **TPN** copper bus bar of high conductivity, DMC/SMC bus bar supports, with short circuit withstand capacity of 31MVA for 1 sec., bottom base channel of section not less than 100mm X 50mm X 5mm thick. | | | | |
| | Fabrication shall be done in transportable sections, entire panel shall have a common Al earth bar of size 25mm x 6mm at the rear with 2 nos. earth stud, solid connections for main bus bar to switch gears with required size of copper bus bars and control wiring with 1.5 /2.5 sq.mm. FRLS PVC Insulated copper conductor single core cable, cable alleys, cable gland plates in half, MV danger notice board i/c providing following switch gears complete as required ( All the outgoing switches shall be with compartmentalisation ) | | | | |
| | **INCOMING.** | | | | |
| | 1) 100 Amps, 25KA (Ics = 100% Icu ), 415 Volts, 50Hz, 4 pole MCCB with thermal-magnetic based release for OL / SC release, extended rotary handle etc. - 1 No. | | | | |
| | 2) Load monitor of class 1.0 accuracy with RS 485 communication capability and with suitably rated CT's of 15 VA burden, giving 3 phase display of different parameter like voltage, current, power, power factor, frequency, active power, reactive power, total power, energy, Maximum Demand etc - 1 No. | | | | |
| | 3) 3 Nos. Phase indicating LED lamps with HRC fuses for protection - 1 Set. | | | | |

| S.No | Description of Item | Qty | Unit | Rate | Amount |
|---|---|---|---|---|---|
| | **Bus Bars** | | | | |
| | TPN copper bus bars of minimum 200 Amps capacity with heat shrinkable coloured sleeves, DMC /SMC bus bar supports at required intervals complete for cross section, size supports and their spacing etc., for with standing the fault level of the installation | | | | |
| | **OUTGOINGS.** | | | | |
| | 1) 63 Amps, 25KA (Ics = 100% Icu ), 415Volts, 50Hz, 4 pole MCCB with extended rotary handle etc. - 2 Nos. | | | | |
| | 2) 32 Amps, 10KA, C-curve, 3 pole MCB, DOL starter with Thermal Overload relay with Built-in Single Phasing protection, ON / OFF Push button assembly and LED 'ON' indication lamp etc suitable for three phase, 3 HP pump set. - 7 set | | | | |
| | 3) 25 Amps, 10KA, C curve, 3 pole MCB, DOL starter with Thermal Overload relay with Built-in Single Phasing protection, ON / OFF Push button assembly and LED 'ON' indication lamp etc suitable for three phase, 2 HP pump set. - 3set | | | | |
| | 4) 16 Amps, 10KA, C curve, 3 pole MCB, DOL starter with Thermal Overload relay with Built-in Single Phasing protection, ON / OFF Push button assembly and LED 'ON' indication lamp etc suitable for three phase, 1/1.5 H.P pump set. - 2 set | | | | |
| | 5) 6 Amps, 10KA, C curve, 2 pole MCB, DOL starter with Thermal Overload relay with Built-in Single Phasing protection, ON / OFF Push button assembly and LED 'ON' indication lamp etc suitable for single phase, fractional HP pump set . - 2 set | | | | |
| | 6) 20 Amps, 25KA (Ics = 100% Icu ), 415Volts, 50Hz, 3 pole MCCB with extended rotary handle etc. - 2 Nos. | | | | |
| | 7) 20 Amps, 10KA, C-series, 3 pole MCB - 2 Nos. | | | | |
| | 8) 6 Amps, 10KA, C-Series, 2 pole MCB - 3 Nos. | | | | |
| | RWH Control Panel as above | 1 | Job | 680780.00 | 680780.00 |
| 16 | Supplying installation, testing and commissioning cubicle outdoor type pump control panel suitable for 415 V, 3phase, 4 wire 50Hz AC supply system having front surface area 1.705 sq mtr( aprox) fabricated in CRCA sheet steel of 2mm thick, with hinged double leaf shutters with pad locking arrangement , gaskets etc. including powder coat painting in approved shade, entire panel shall have a common tinned copper earth bar of size 20 mm x 3mm at the rear with 2 nos earth stud, connections from switch gears with required size of copper wire, control wiring with 1.5 sq mm PVC insulated copper conductor cable including following switch gears along with Suitable size C- shaped foundation of 1:3:6 (1 cement, 3coarse sand : 6 graded stone aggregate 40 mm nominal) including plastering. | | | | |
| | I. Incomings | | | | |
| | a) 1 No. 63 Amp 25KA (Ics = 100% Icu ), 415 Volts, 50Hz, 4 pole MCCB with thermal-magnetic based release for OL / SC release, extended rotary handle etc. - 1 No. | | | | |
| | b) Combined Digital type display meter suitable for measuring AC voltage,Current, KWH, KW, PF ,Frequency etc.-1No | | | | |

| S.No | Description of Item | Qty | Unit | Rate | Amount |
|---|---|---|---|---|---|
| | c) 3 Nos CT's of ratio 200 / 5 Amps for metering | | | | |
| | d) 3 Nos. phase indication LED lamps with 2 Amp back up HRC fuse / MCB - 1 set. | | | | |
| | II) Bus Bars : | | | | |
| | TPN Tinned Copper bus bars of minimum of 200 Amps capacity with heat shrinkable colored sleeves and i/c DMC/ SMC bus bars supports at required intervals complete etc. | | | | |
| | III) Outgoings : | | | | |
| | a) 63 A , 10 KA TP MCB - 2 No.s | | | | |
| | b) Fully Automatic Star-Delta Starter suitable for three phase 15 HP open well submersible pump set with current sensing single phasing cum overloading and dry running preventer , ON/ OFF push button assembly and LED ON indication lamp with necessary automation arrangement etc as required -2 set. | | | | |
| | Pump control panel as above | 1 | Set | 180842.00 | 180842.00 |
| | **SH-II: Wiring for Internal Electrical Installations.** | | | | |
| 17 | Wiring for light point/ fan point/ exhaust fan point/ call bell point with 1.5 sq.mm FRLS PVC insulated copper conductor single core cable in surface / recessed medium class PVC conduit, with modular switch, modular plate, suitable GI box and earthing the point with 1.5 sq.mm. FRLS PVC insulated copper conductor single core cable etc as required. | | | | |
| 17.1 | Group C | 22 | Each | 2283.00 | 50226.00 |
| 18 | Wiring for circuit/ submain wiring along with earth wire with the following sizes of FRLS PVC insulated copper conductor, single core cable in surface/ recessed medium class PVC conduit as required | | | | |
| 18.1 | 2 X 1.5 sq. mm + 1 X 1.5 sq. mm earth wire | 60 | Metre | 358.00 | 21480.00 |
| 18.2 | 2 X 4 sq. mm + 1 X 4 sq. mm earth wire | 50 | Metre | 500.00 | 25000.00 |
| 18.3 | 2 X 6 sq. mm + 1 X 6 sq. mm earth wire | 15 | Metre | 646.00 | 9690.00 |
| 19 | Supplying and fixing suitable size GI box with modular plate and cover in front on surface or in recess, including providing and fixing 3 pin 5/6 amps modular socket outlet and 5/6 amps modular switch, connection etc. as required. | 2 | Each | 730.00 | 1460.00 |
| 20 | Supplying and fixing suitable size GI box with modular plate and cover in front on surface or in recess, including providing and fixing 6 pin 5/6 & 15/16 amps modular socket outlet and 15/16 amps modular switch, connection etc. as required. | 4 | Each | 883.00 | 3532.00 |
| 21 | Providing and fixing M.S. fan clamp type I or 11 of 16 mm dia M.S. bar,bent to shape with hooked ends in R.C.C. slabs or beams during laying,including painting the exposed portion of loop, all as per standard design complete. | 2 | Each | 295.00 | 590.00 |

| S.No | Description of Item | Qty | Unit | Rate | Amount |
|---|---|---|---|---|---|
| | **SH-III: Fans and Fittings** | | | | |
| 22 | Supply, Installation, Testing and Commissioning of ceiling fan with Brush Less Direct Current (BLDC) Motor, class of insulation: B, 3 nos. metal( Aluminium alloy) blades, 30 cm long down rod, 2 nos. canopies, shackle kit, safety rope, copper winding, steel/Al body Power Factor not less than 0.9, Service Value (CM/M/W) minimum as below, 350 RPM (tolerance as per IS : 374-2019), THD (Total Harmonic Distortion) less than 10%, suitable for operation with regulator for speed control and all remaining accessories including safety pin, nut bolts, washers, temperature rise=75 0C (max.), insulation resistance more than 2 mega ohm, suitable for 230 V, 50 Hz, single phase AC supply, Ceiling Fan compliant to IS 374:2019 fan i/c external connections with 1.5 sq.mm FRLS/HFFR, PVC insulated copper conductor single core cable and earthing etc. as required. | | | | |
| 22.1 | 1200mm, service value ≥ 6.0 CM/Min/Watt, air delivery 210 CM/Min (Minimum) | 2 | Each | 3611.00 | 7222.00 |
| 23 | Supply, installation, testing and commissioning of 450 mm sweep, 1400 rpm heavy duty exhaust fan with louver in existing opening including making good the hole to suit the size of the above fan complete with connections etc as reqd. | 4 | Each | 7858.00 | 31432.00 |
| 24 | Supply, Installation, Testing and Commissioning of following surface mounting type light fittings complete with all accessories etc. directly on the ceiling/wall/steel structure including providing 2 nos anchor fastener/ fancy chain, connections using 1.5 sq.mm FRLS PVC insulated copper conductor single core cable as required. | | | | |
| 24.1 | SITC of IP65 weatherproof batten type integrated LED fitting having color temperature not less than 5700K, system lumen output not less than 2400 and system wattage not less than 20 W, CRI not less than 80, high transmittance diffuser, in-built electronic driver with surge protection not less than 2 kV etc. as required. | 16 | Each | 2944.00 | 47104.00 |
| 25 | Supplying, installation, Testing & Commissioning of Street light LED fixture powder coated pressure die cast aluminium body with driver as per the requirement with Driver efficiency >85%, Input voltage: 140-270 Volt AC, frequency 50/60 hz, Operating temp range -5$^0$C to 50$^0$C, internal surge protection of 5 KV L,N,E as per IEC 61000-4-5, Driver efficiency >85%,THD < 10% as per IEC 61000-3-2, P. F.≥0.95, IP-66,IK-10, CRI >70, under voltage and over voltage protection, EMI EMCAs per CISPR -15, lenses for beam angle as per IESNA type I/II/III as per the width of the road and the project requirement., suitable to fit in up to 65mm dia pipe, life time (LED, Driver & electrical circuitry) of minimum 50000 Burning Hours with 70% of initial | | | | |

| S.No | Description of Item | Qty | Unit | Rate | Amount |
|---|---|---|---|---|---|
| | Lumen maintained till life ends as per LM80 extrapolation IES TM-21-11 report, CCT 5700°K /6500°K (As per ANSI Bin),SDCM (Standard Deviation Colour Matching) <5, Maximum power consumption should not more than the specified rating and Fixture shall be of relevant BIS standard complete in all respect i/c external connections with 1.5 sq.mm FRLS/HFFR, PVC insulated copper conductor single core cable and earthing etc. as required with Minimum 5 year OEM warranty. System lumen efficacy ≥105 <120 lm/Watt output .LM79 & LM80 Test report and all testing required for LED fixtures as per BIS shall be submitted. Shape size and CCT shall be as approved by Engineer-in-Charge as per requirement. (Thermal management: heat sink of aluminium housing such that LED junction temperature shall not rise above 90°C) | | | | |
| 25.1 | 50 Watt LED Street Light Fitting | 6 | Each | 2388.00 | 14328.00 |
| 26 | SITC of wall bracket of 1mtr long, made of 32mm dia GI Pipe for fixing outdoor type LED light fitting on building outer wall surface complete as required including bending and welding of GI Pipe to get the required shape as needed. | 6 | Each | 952.00 | 5712.00 |
| 27 | Providing and fixing suitable size out door type PVC/Syntex cable entry box (IP 65) of size 200 mm X 140 mm on wall surface with all accessories like 6Amps SP MCB "C" series- 1 No , din channel- 1 No, 10 A connector set - 1 No, including connection etc.as required. | 6 | Each | 1363.00 | 8178.00 |
| | **SH-IV DBs & MCBs** | | | | |
| 28 | Supplying and fixing following way, single pole and neutral, sheet steel, MCB distribution board, 240 V, on surface/ recess, complete with tinned copper bus bar, neutral bus bar, earth bar, din bar, interconnections, powder painted including earthing etc. as required. (But without MCB/RCCB/Isolator) | | | | |
| 28.1 | 16 way, Double door | 1 | Each | 4512.00 | 4512.00 |
| 29 | Supplying and fixing ,following in the existing MCCB/MCB DB complete with connections, testing and commissioning etc. as reqd.(same make of DB) | | | | |
| 29.1 | 25 Amp, 30mA,2P RCCB | 1 | Each | 2869.00 | 2869.00 |
| 29.2 | 40 A 2P Isolator | 1 | Each | 632.00 | 632.00 |
| 29.3 | 6-32 A SP MCB C series | 6 | Each | 382.00 | 2292.00 |
| | **SH-V:-EARTHING AND CABLING** | | | | |
| 30 | Supply and fabrication of suitable frame work for supporting the perforated Galvanised Iron cable tray made of suitable size GI C channels / Angle , GI sections, bolts & nuts along with all required accessories including painting with one or more coats of epoxy primer followed by two or more coats of epoxy paint, complete as required. | 60 | Kg | 252.00 | 15120.00 |
| 31 | Supplying and installing following size of perforated Hot Dipped Galvanised Iron cable tray (galvanisation thickness not less than 50 microns) with perforation not more than 17.5% in convenient sections, joined with connectors, suspended from the ceiling with G.I. suspenders including G.I. bolts & nuts/angle iron support etc. as required. | | | | |
| 31.1 | 300 mm width X 50 mm depth X 1.6 mm thickness | 25 | Mtr | 1423.00 | 35575.00 |

| S.No | Description of Item | Qty | Unit | Rate | Amount |
|---|---|---|---|---|---|
| 32 | Supplying of XLPE insulated, PVC sheathed armoured aluminium conductor power cable of 1.1 KV grade conforming to IS: 7098 ( Part-1) with latest amendments of following size as | | | | |
| 32.1 | 3.5x120 sq.mm | 200 | Mtr | 1856.00 | 371200.00 |
| 32.2 | 3.5x50 sq.mm | 50 | Mtr | 858.00 | 42900.00 |
| 32.3 | 3.5x25 sq.mm | 50 | Mtr | 498.00 | 24900.00 |
| 32.4 | 4 x 16 Sq.mm | 20 | Mtr | 452.00 | 9040.00 |
| 33 | Supplying of XLPE insulated, PVC sheathed armoured Copper conductor power cable of 1.1 KV grade conforming to IS: 7098 ( Part-1) with latest amendments of following size as required. | | | | |
| 33.1 | 3x6 sq.mm | 50 | Mtr | 759.00 | 37950.00 |
| 33.2 | 3x4 sq.mm | 50 | Mtr | 524.00 | 26200.00 |
| 34 | Laying of one number PVC insulated and PVC sheathed/ XLPE cable of 1.1 KV grade of following size in the existing RCC/ HUME/ Stone ware/Metal /DWC pipe as required. | | | | |
| 34.1 | Up to 35sq.mm | 45 | Mtr | 63.00 | 2835.00 |
| 34.2 | Above 35 sq. mm and upto 95 sq. mm | 25 | Mtr | 96.00 | 2400.00 |
| 34.3 | Above 95 sq. mm and upto 185 sq. mm | 180 | Mtr | 130.00 | 23400.00 |
| 35 | Laying and fixing of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade of following size on wall surface as required. | | | | |
| 35.1 | Upto 35 sq. mm (clamped with 1mm thick saddle) | 25 | Mtr | 86.00 | 2150.00 |
| 35.2 | Above 35 sq. mm and upto 95 sq. mm (clamped with 25x3mm MS flat clamp) | 25 | Mtr | 202.00 | 5050.00 |
| 35.3 | Above 95 sq. mm and upto 185 sq. mm (clamped with 25x3mm MS flat clamp) | 20 | Mtr | 241.00 | 4820.00 |
| 36 | Laying and fixing of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade of following size on cable tray as required. | | | | |
| 36.1 | Upto 35 sq. mm (clamped with 1mm thick saddle) | 100 | Mtr | 71.00 | 7100.00 |
| 37 | Supplying and making end termination with brass compression gland and aluminium lugs for the following size of PVC insulated and PVC sheathed /XLPE aluminium conductor cable of 1.1 KV grade as required. | | | | |
| 37.1 | 3½ X120 sq. mm (35mm) | 2 | Set | 951.00 | 1902.00 |
| 37.2 | 3½ X 50 sq. mm (35mm) | 2 | Set | 649.00 | 1298.00 |
| 37.3 | 3½ X 25 sq. mm (28mm) | 2 | Set | 497.00 | 994.00 |
| 37.4 | 3 X 6 sq. mm (16mm) | 3 | Set | 157.00 | 471.00 |
| 37.5 | 3 X 4 sq. mm (16mm) | 6 | Set | 157.00 | 942.00 |
| 37.6 | 3 X 2.5 sq. mm (10mm) | 8 | Set | 157.00 | 1256.00 |
| 37.7 | 4 X 16 sq. mm (28mm) | 2 | Set | 490.00 | 980.00 |
| 38 | Supplying and laying of following size DWC HDPE pipe ISI marked along with all accessories like socket, bend, couplers etc. conforming to IS 14930, Part II complete with fitting and cutting, jointing etc. in the existing trench, complete as required. | | | | |
| 38.1 | 63 mm dia (OD-63 mm & ID-51 mm nominal) | 250 | Mtr | 182.00 | 45500.00 |
| 39 | Excavation of the cable trenches in hard rock not exceeding 1.5 metres in width, and lift upto 1.5 metres, including getting out the excavated soil and disposal of excavated soil as directed within a lead of 50 metres | 53 | CUM | 2068.00 | 109604.00 |

| S.No | Description of Item | Qty | Unit | Rate | Amount |
|---|---|---|---|---|---|
| 40 | Supplying and drawing following size PVC insulated copper conductor flat submersible cable in pipe/along with the delivery pipe line from the pump set to panel board i/c connections, etc as reqd. | | | | |
| 40.1 | 3 x 6 sq mm | 50 | Mtr | 418.00 | 20900.00 |
| 40.2 | 3 x 4 sq mm | 150 | Mtr | 295.00 | 44250.00 |
| 40.3 | 3 x 2.5 sq mm | 50 | Mtr | 200.00 | 10000.00 |
| 41 | Earthing by machine boring in hard laterite with G.I. earth pipe 4.5 meter long, 40 mm dia including accessories, and providing masonry enclosure with cover plate having locking arrangement and watering pipe etc. with charcoal/ coke and salt as required. | 6 | Each | 12842.00 | 77052.00 |
| 42 | Providing and laying earth connection from earth electrode with 4.00 mm dia copper wire in 15 mm dia G.I. pipe from earth electrode including connection with copper thimble excavation and re-filling as required. | 60 | Mtr | 536.00 | 32160.00 |
| 43 | Providing and fixing 4.00 mm dia copper wire on surface or in recess for loop earthing as required. | 270 | Mtr | 232.00 | 62640.00 |
| | **SH-VI: Borewell Water Pump** | | | | |
| 44 | Supply, installation, testing and commissioning of 5 HP capacity bore well submersible pump set having a discharge of not less than 150 ltr/minute at a head of 90 mtrs ( Head range 61 to 159 mtrs) with suitable impeller, strainer on suction side etc suitable for operation on three phase, 415V, 50 Hz AC Supply in the existing borewell including submersible cable joint connection to the existing delivery line, complete as required. | 1 | Each | 44837.00 | 44837.00 |
| 45 | Providing and fixing following dia UPVC medium duty column pipe having minimum delivery pressure of 12.5 kg/cm2 from the brewell pump to the existing common delivery line with all accessories like, elbows, tees, male threaded adapters, flanges, bottom and top stainless steel pump adaptors etc as required. | | | | |
| 45.1 | 50 mm dia | 100 | Mtr | 281.00 | 28100.00 |
| 46 | Supplying and fixing 2"(50mm dia) Stainless Steel Column pipe connector along with necessary accessories as required. | 1 | Each | 2421.00 | 2421.00 |
| 47 | Supplying and fixing following valves in the existing UPVC column pipe line with accessories as reqd. | | | | |
| 47.1 | 50 mm dia ISI marked GM/bronze gate valve | 1 | Each | 7229.00 | 7229.00 |
| 47.2 | 50 mm dia ISI marked CI Non-Return valve | 1 | Each | 5166.00 | 5166.00 |
| 48 | Supplying installation, testing and commissioning cubicle outdoor type pump control panel suitable for 415 V, 3phase, 4 wire 50Hz AC supply system having front surface area 0.36 sq mtr( aprox) fabricated in CRCA sheet steel of 2mm thick, with hinged double leaf shutters with pad locking arrangement , gaskets etc. including powder coat painting in approved shade, entire panel shall have a common tinned copper earth bar of size 20 mm x 3mm at the rear with 2 nos earth stud, connections from switch gears with required size of copper wire, control wiring with 1.5 sq mm PVC insulated copper conductor cable including following switch gears. | | | | |
| | I. Incomings | | | | |
| | a) 32 Amps, 10 KA (ics = 100% icu ), 415 Volts, 50Hz, 4 pole MCB – 1 Nos. | | | | |
| | b) LED indicating light with MCB's and control wiring for RYB indication - 1 set | | | | |

| S.No | Description of Item | Qty | Unit | Rate | Amount |
|---|---|---|---|---|---|
| | c) Digital type, class 1 accuracy, VAF meter for measurement of voltage in three phases, current opto 60 Amps, with selector switches, CT's etc- 1 no.-1 set | | | | |
| | II. Outgoings | | | | |
| | a) DOL starter suitable for three phase 5 HP submersible type pump set with current sensing single phasing cum overloading and dry running preventer , ON/ OFF push button assembly and LED ON indication lamp etc as required -1sets. | | | | |
| | Pump control panel as above | 1 | Set | 44427.00 | 44427.00 |
| 49 | Providing, laying and fixing following dia G.I. pipe (medium class) in ground complete with G.I. fittings including trenching (75 cm deep)and re-filling etc as required | | | | |
| 49.1 | 25 mm dia | 10 | Mtr | 610.00 | 6100.00 |
| | **SH-VII: Maintenace & Operation** | | | | |
| 50 | Contractor shall operate the Rainwater Harvesting System plant for one year from the date of commissioning of the Plant including the cost ofconsumables. Contractor shall give the training to the personnel of the employer for operation and maintenanceof the plant. Contractor shall perform the maintenance of the plant commencing immediately after the | 12 | Month | 52949.00 | 635388.00 |
| | | | | **Total** | **85,49,922.00** |

# Central Public Works Department

**NIT. NO. 23/SE/EE-Knr/2026-27**

**Name of Work**: ***Providing Development and Bulk Services to RTC Peringome. SH: C/o 300KLD Capacity of Rain water Harvesting System including Collection sump filtered water distribution lines,UG sump, Sludge Drying bed, and Plant room etc. RTC,Peringome, Kannur, Kerala.***

## ABSTRACT OF COST

| **Name of the Contractor** | | | | | |
|---|---|---|---|---|---|
| **Sl.No.** | **Name of Component** | **Estimated Cost (Rs.)** | **Percentage above or below the estimated cost** | **% in Figures** | **Total Cost (Rs.)** |
| 1 | For Major Component- **Civil works- Rs. 1,28,54,942/-** and for Minor Component- **E&M- Rs. 85,49,922/-** | **Rs. 2,14,04,864/-** | | | |
| | **GRAND TOTAL** | **Rs. 2,14,04,864/-** | | | |

**Important Note:**

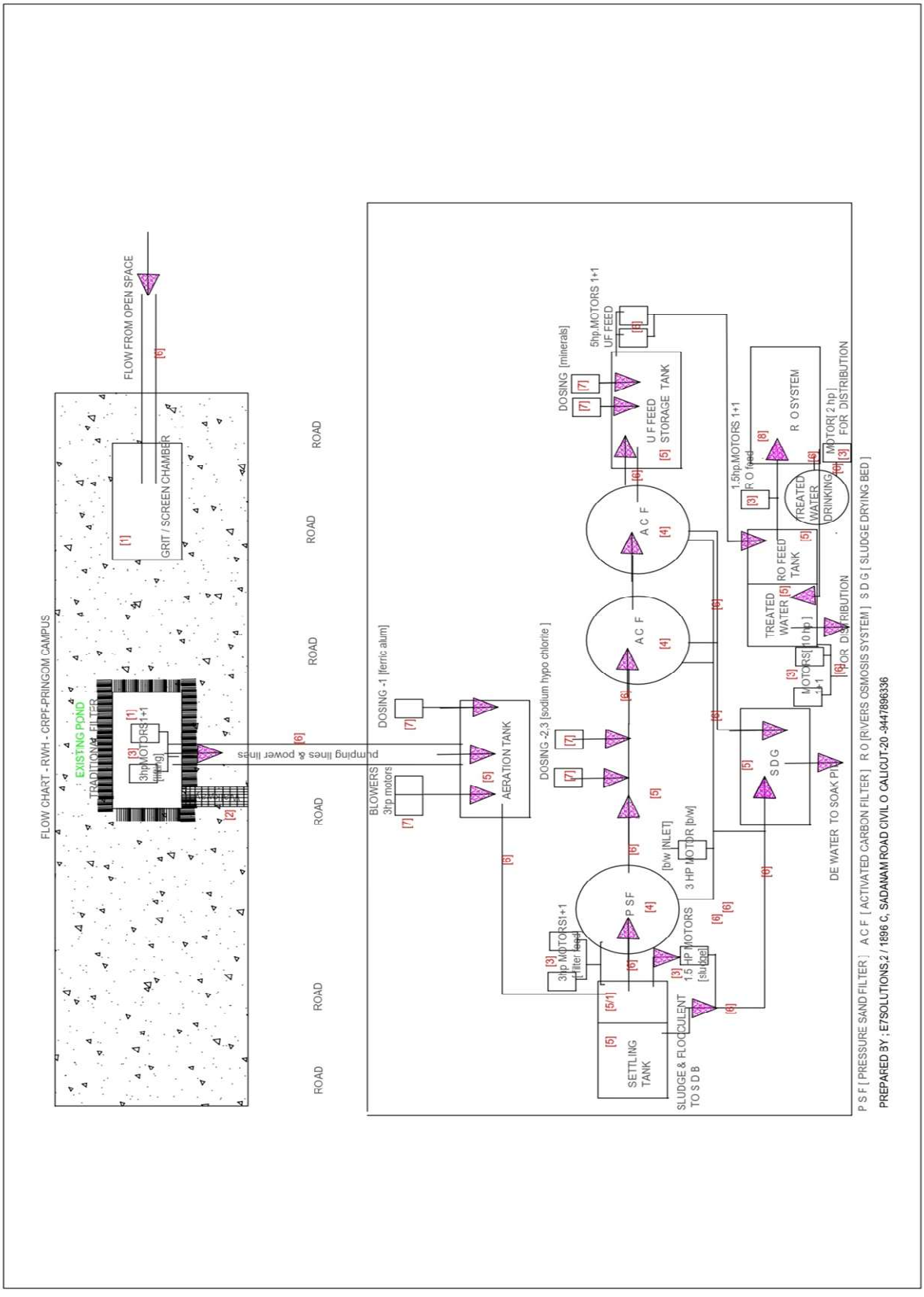
1. The estimated cost of tender has been worked out by taking into consideration the cost index of **Kannur District** for DSR 2023 (Civil) &DSR 2025 (E&M) items and market rates for NSR items; therefore are adjusted accordingly.
2. The tenderer is to quote a single consolidated percentage only at par/above/below estimated cost to cover all the rates of all the items under the schedule of composite tender.
3. If the percentage quoted is not clear, or if the rate is not quoted in percentage, the tender shall be treated as invalid and will not be considered as lowest tenderer.
4. The rates quoted by the tenderer shall be inclusive of all taxes including GST and levies applicable in respect of this contract. Government will not entertain any claim whatsoever in respect of the same.

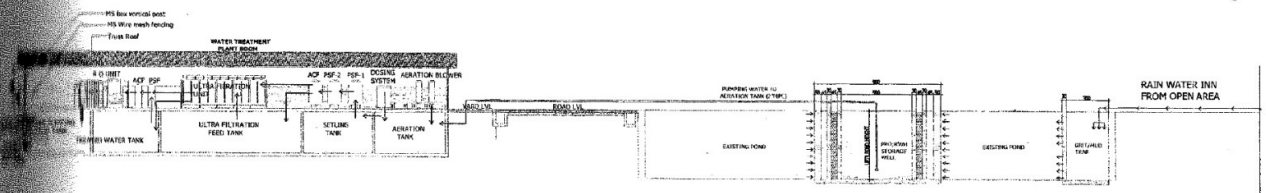
**Contractor**

**Executive Engineer**
**CPWD, Kannur**

# PART - E

## Tender Indicative Drawings


FLOW CHART - RWH - CRPF-PRINGOM CAMPUS
EXISTING POND
TRADITIONAL FILTER
FLOW FROM OPEN SPACE
GRIT / SCREEN CHAMBER
pumping lines & power lines
ROAD
BLOWERS 3hp motors
DOSING -1 [ferric alum]
AERATION TANK
DOSING -2,3 [sodium hypo chlorite ]
P S F
A C F
A C F
SETTLING TANK
SLUDGE & FLOCCULENT TO S D B
3 HP MOTOR [b/w]
[b/w INLET]
SDG
DOSING [minerals]
5hp.MOTORS 1+1
UF FEED
U F FEED STORAGE TANK
1.5hp.MOTORS 1+1
R O SYSTEM
RO FEED TANK
TREATED WATER
MOTOR[ 2 hp ]
FOR DISTRIBUTION
DE WATER TO SOAK PIT
P S F [ PRESSURE SAND FILTER ] A C F [ ACTIVATED CARBON FILTER ] R O [RIVERS OSMOSIS SYSTEM ] S D G [ SLUDGE DRYING BED ]
PREPARED BY ; E7SOLUTIONS,2 / 1696 C, SADANAM ROAD CIVIL O CALICUT-20 -9447896336




# RWH STORAGE DETAILS

**NOTE:-**

(1) THIS DRAWING IS THE PROPERTY OF : E7 SOLUTIONS

(2) REPRODUCING ITS CONTENTS IN ANY FORM EXCEPT FOR THE PURPOSE OF WHICH IT IS INTENDED, IS PROHIBITED.

(3) THIS DRAWING IS NOT TO BE SCALED, STATED DIMENSIONS ARE ONLY TO BE CONSIDERED.

(4) ALL DIMENSIONS ARE TO BE VERIFIED ON SITE AS PER ACTUAL SITE CONDITION PRIOR TO COMMENCEMENT

| REV. | DATE | DESCRIPTION |
|---|---|---|
| | | |
| | | |
| | | |

☒ CONCEPT ☐ TENDER

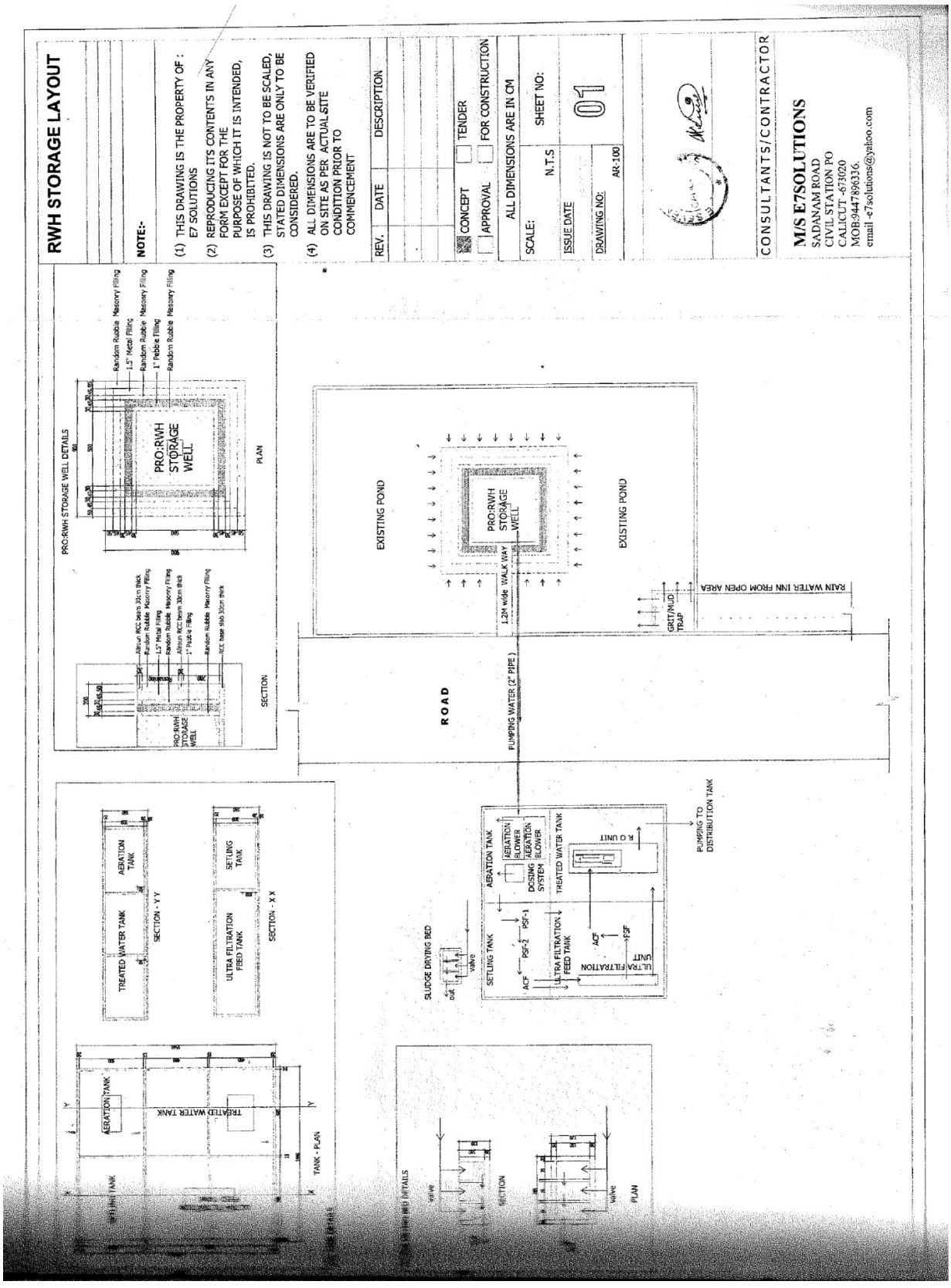
☐ APPROVAL ☐ FOR CONSTRUCTION

ALL DIMENSIONS ARE IN CM

| SCALE: N.T.S | SHEET NO: |
|---|---|
| ISSUE DATE | 02 |
| DRAWING NO: AR-100 | |

CONSULTANTS/CONTRACTOR

**M/S E7SOLUTIONS**
SADANAM ROAD
CIVIL STATION PO
CALICUT -673020
MOB:9447896336.
email -e7solutions@yahoo.com


RWH STORAGE LAYOUT
NOTE:-
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REV. DATE DESCRIPTION
CONCEPT TENDER
APPROVAL FOR CONSTRUCTION
ALL DIMENSIONS ARE IN CM
SCALE: N.T.S
SHEET NO: 01
ISSUE DATE
DRAWING NO: AR-100
CONSULTANTS/CONTRACTOR
M/S E7SOLUTIONS
SADANAM ROAD
CIVIL STATION PO
CALICUT -673020
MOB:9447896336,
email -e7solutions@yahoo.com
PRO:RWH STORAGE WELL DETAILS
Random Rubble Masonry Filling
1.5" Metal Filling
1" Pebble Filling
PRO:RWH STORAGE WELL
PLAN
SECTION
Alltrun RCC beam 30cm thick
RCC base slab 30cm thick
EXISTING POND
1.2M wide WALK WAY
GRIT/MUD TRAP
RAIN WATER INN FROM OPEN AREA
ROAD
PUMPING WATER (2" PIPE)
TREATED WATER TANK
AERATION TANK
SETLING TANK
ULTRA FILTRATION FEED TANK
SECTION - Y Y
SECTION - X X
TANK - PLAN
SLUDGE DRYING BED
valve
out
ACF
PSF-1
PSF-2
AERATION BLOWER
DOSING SYSTEM
R O UNIT
ULTRA FILTRATION UNIT
PSF
PUMPING TO DISTRIBUTION TANK
SECTION
PLAN