BID DOCUMENT

Construction of Transit Home at Kaling Vihar in Rourkela on Percentage Rate Basis

2021 –22

ROURKELA
SMART CITY LTD.

June – 2021

Rourkela Smart City Limited
1st Floor, City library Udit Nagar,
Rourkela-769012

INVITATION FOR BIDS (IFB)

NATIONAL COMPETITIVE BIDDING

ROURKELA
SMART CITY LTD.

Bid Id No. RSCL/ 3476-(i) /2021/Dated 23/06/2021

NATIONAL COMPETITIVE BIDDING

(CIVIL WORKS)

	Construction of Transit Home at Kaling Vihar in Rourkela on Percentage Rate Basis
Date of Invitation of Bid	24/06/2021
Pre- bid	02/07/2021 at 12:30 Hrs.
Last date and time for receipt of bids	14/07/2021 at 17:00 Hrs.
Last date of Physical Submission of Bid	19/07/2021 at 15:00 Hrs.
Time and date of opening of bids	19/07/2021 at 16:00 Hrs.
Place of Sale/Receiving of bids	Online mode only
Officer inviting bids	The Chief Executive Officer , Rourkela Smart City Limited, Rourkela, Odisha
Officer of Accepting bids	The General Manager(E&T),Rourkela Smart City Limited, Rourkela, Odisha

CHECK LIST TO BE ENSURED BY THE BIDDER

S.No.	Particular	Reference to DTCN Clause	Whether		Reference to Page no.
			Yes	No	
01	Cost of tender paper Rs.10,000.00 and GST Rs.1,200/- (Scanned copy of financial instrument shall be furnished)	No.4 & 5(i)			
02	E.M.D /Bid Security Declaration	No.5(i) & 20			
03	Copy of valid Registration Certificate	No.5 (i) & 21			
04	Copy of PAN Card	No.5 (i) & 21			
05	Turn over certificate	No. 111 (h)			
06	No Relationship Certificate in Schedule – A	No.35			
07	Information regarding current litigation, debarring /expelling of the tender or abandonment of the work by the tenderer (Schedule-D)	No.49			
08	Affidavit (Schedule-E)	No.49			
09	Works Experience : List of projects under execution/ executed that are similar in nature to the work	Schedule-B & Schedule - C			
10	M.O.U. (Memorandum of Understanding duly notarized) with eligible registered electrical contractor having valid M.V. license;	No. 8 & Schedule - J			
11	Affidavit for Eligible Class of Contractor e-mail ID & Contact no	Schedule K to Schedule-O			

CONTRACT DATA

A.GENERAL INFORMATIONS

S. No.	Item		Detail
1	Name of Work		Construction of Transit Home at Kaling Vihar in Rourkela on Percentage Rate Basis
2	Employer		Rourkela Smart City Limited
3	Employer's Representative		The Chief Executive Officer
4	Estimated Cost		Rs.4,24,16,861/- (Rs. Four Crore Twenty four Lakhs Sixteen thousand Eight hundred and Sixty One Only)
B. BID INFORMATION			
5	Intended completion period/Time		Six (6) Calendar Months
6	Last Date & time of online submission of Bid		Date: 14/07/2021.
			Time 17:00 hours
7	Cost of Bid Document		
	i	Bank draft amount	Rs.10,000/- + Rs.1,200/-(GST) i.e. Rs.(11,200/-)
	ii	in favour of	RSCL(Smart City Mission Grant Fund)
	iii	payable at	Rourkela
8	Earnest Money Deposited		
	i	In Form of Bid Security Declaration	As per Annexure-II
	ii	In favour of	NA
	iii	payable at	NA
	iv	Type of instrument	As specified in the bid document
9	Period of submission of original Bid security Declaration and Demand draft towards cost of Bid documents in the office of the Chief Executive Officer, Rourkela Smart City Ltd, Rourkela		Date: 24/06/2021 to 19/07/2021 15:00 Hours
10	Bid validity period		90 days
11	Currency of Contract		Indian Rupee
12	Language of Contract		English
13	Retention Money		5(five)%

Instruction to Bidders (ITB) e- procurement
(Relevant clauses in the DTCN/Bid document shall be superseded)

1. NOTICE INVITING BID AND OBTAINING BID DOCUMENTS:

1.1. The authority belonging to the major discipline is competent to invite tender of composite bids. He will also nominate the G M (E &T), Rourkela Smart City Limited, who will deal with all matters relating to the bids in the invitation of bids.

1.2. For composite tender, estimated cost of each component should be clearly indicated in addition to combined estimated cost put to tender. The eligibility of bidders will correspond to thee combined estimated cost of different components

1.3. The contractor shall comply with the provisions of the Apprentices Act 1961, and the rules / amendments issued there under from time to time. If he fails to do so, it will be considered a breach of the contract and the GM (E&T) may at his discretion Without prejudice to any other right or remedy available under law, cancel the contract. The contractor shall also be liable for any pecuniayy liability arising on account of any violation of the provisions of the said Act by him.

1.4. The contractor shall be deemed to have satisfied himself as to the correctness and sufficiency of the Tender and of the rates and prices quoted in the Bill of Quantities, all of which shall, except in so far as it is otherwise provided in the Contract, cover all his obligations under the Contract (including those in respect of the supply of goods, materials, plant & services or of contingencies for which there is a Provisional Sum) and all matters and things necessary for the proper execution and completion of the work and the remedying of any defects therein.

1.5. The successful bidder shall complete the works by the intended completion date specified in the Contract data.

1.6. Throughout these bidding documents, the terms “bid and tender” EMD and Bid Security Declaration and their derivatives (bidder / tenderer, bidding / tendering, etc.) are synonymous.

1.7. In case the tender for composite work includes in addition to main work / building work all other ancillary works such as sanitary and water supply installations drainage installation, electrical work, horticulture work, roads, paths ,sculpture and mural paintings etc. , the bidder apart from being a registered civil Contractor of appropriate class must associate himself with agencies of appropriate class those who is eligible to tender for sanitary and water supply drainage, electrical , horticulture works, artistic & sculpture works in the composite tender. Intending Employers are not required to produce any documents viz. copy of Registration, PAN at the time of purchase of tender documents but will be required for verification purpose at later stage.

1.8. PARTICIPATING IN THE BID IN THE E-PROCUREMENT PORTAL: The Contractor/ Bidder intending to participate in the bid is required to register in the Portal with some information about the firm/Contractor. This is a onetime activity for registering in Portal. During registration, the contractor has to attach a Digital Signature Certificate (DSC) to his / her unique user ID. The DSC used must be of appropriate class (Class II or Class III) issued from a registered Certifying Authority such as n-Code, Sify, TCS, MTNL e-Mudra etc.

1.8.1 To log on to the portal the Contractor/Bidder is required to type his/her username and password. The system will again ask to select the DSC and confirm it with the password of DSC. For each login, a user's DSC will validated against its date of validity and also against the Certificate Revocation List (CRL) of respective CAs stored in system database. The system checks the unique ID, password and DSC combination and authenticates the login process for use of portal.

1.8.2 The tender documents uploaded by the Tender Inviting Officer in Website www.tendersodisha.gov.in, will appear in the section of Upcoming Tender" before the due date of tender sale. Once the due date has arrived, the tender will move to "Active Tender" Section of the homepage. Only a small notification will be published in the newspaper specifying the work details along with mention of the specific website for details. The publication of the tender will be for specific period of time till the last date of submission of bids as mentioned in the 'Invitation for Bid' after which the same will be removed from the list of Active tenders. Any bidder can view or down load the bid documents from the web site.

1.8.3 Contractor exempted from payment of EMD will be able to participate the tender directly by uploading documentary evidences towards his eligibility for such exemption.

1.8.4 If the software application has the provision of payment of cost of tender document through payment gateways of authorized bankers by directly debiting the account of the bidders, bidders will be required to avail on-line payment.

1.9 The bidder intending to participate in the bid on-line shall prepare the bid security declaration and demand draft towards cost of bid as per IFB (except for exempted contractors) and up load the scanned copy of the draft and bid security declaration to the portal against the bid where he is participating and the original shall be deposited to the tender inviting officer within the period specified in the "contract data". If the Bidder fails to deposit the original bid security declaration and demand draft towards cost of bid within the stipulated time his bid shall be rejected and action as per prevailing rule shall be taken.

1.10 In the case of any failure, malfunction, or breakdown of the electronic system used during the e-procurement process, the tender inviting officer shall not accept any responsibility for failures or breakdowns other than in those systems strictly within their own control.

1.11 Any third party/company/person under a service contract for operation of e- procurement system in the State or his/their subsidiaries or their parent companies shall be ineligible to participate in the procurement processes

that are undertaken through the e-procurement system irrespective of who operates the system.

2. ELIGIBLE BIDDERS:

2.1 This Bid is open to all Civil Contractors of 'A' Class & 'Special' class contractors as per OPWD Code, registered with the State Governments and Contractors of Equivalent Grade/ Class Registered with Central Government/ MES/ Railways for execution of civil works. The Bidders are required to enclose the proof of registration from the registering authority along with the Bid subject only the registration in the portal using his/her DSC for on-line bids.

Contractors not registered with Govt. of Odisha can participate in the e-procurement after necessary enrolment in the portal but have to subsequently register themselves with the appropriate registering authority of the state Govt. before award of the work as per prevalent registration norms of the state.

2.2 All bidders shall provide a statement that the bidder is neither associated, nor has been associated, directly or indirectly, with the Consultant or any other entity that has prepared the design, specifications, and other documents for the Project or being proposed as Project Manager for the Contract. A firm that has been engaged by the Engineer-in-Charge to provide consulting services for the preparation or supervision of the works, and any of its affiliates shall not be eligible to bid.

2.3 If the bidder has a relative employed as an Officer in the rank of an Assistant Engineer/Under Secretary and above in the Government of Odisha in the concerned Department, he shall inform the same in Schedule-G of the bid document mentioning the exact details in a covering letter along with the tender, failing which his bid will not be considered. Also, if the fact of relationship subsequently comes to light, his contract will be rescinded. The bid security declaration or the performance security will be forfeited, and he shall be liable to make good any loss or damage resulting from such cancellation. In case the bidder has no relationship with any of the officers mentioned above he shall have to furnish with his bid an undertaking to that effect.

2.4 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 concerned Department. Any breach of this condition by the contractor would render him liable for penal action for suppression of facts.

2.5 No Engineer of gazetted rank or other gazetted officer employed in Engineering or Administrative duties in an Engineering Department of the Government of Odisha is allowed to work for contractor for a period of two years after his retirement from Government service, without prior permission of the Government of Odisha in writing. Such a 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 Odisha as aforesaid before submission of the tender for engagement in the contractor's service.

3. QUALIFICATION CRITERIA:

3.1 For submission of Bids through the E-Procurement Portal, the bidder shall up-load the scanned copy/copies of documents listed under clause 3.2 in prescribed format wherever warranted in support of eligibility criteria and qualification information. The L-1 bidder shall have to produce the original documents in support of the scanned copies and statements uploaded in the portal within 5 days of opening of price bid. Bids from Joint ventures are not acceptable.

3.2 The bid shall include following information and documents.

a) Copy of valid contractor's registration certificate, PAN card, GST Registration should accompany the technical bid.
b) Copies of original documents defining the constitution or legal status, place of registration, and principal place of business; written power of attorney of the signatory.
c) The contractor shall furnish ownership documents for those machineries which he is planning to deploy for the tendered work.
d) Details of work under progress as per tender documents.
e) Details of works executed during the last five years and works in hand (list of on-going works) as per bid documents.

3.3 The Bidders are subject to be disqualified if they have:

a) Made misleading or false representations in the forms, statements and attachments submitted in proof of the qualification requirements; and/or
b) Record of poor performance such as abandoning the works, not properly completing the contract, inordinate delays in completion, litigation history, or financial failures etc.; and/or
c) Indulged in unlawful & corrupt means in obtaining bids
d) Been black listed/their registrations by the competent authority.

4. ONE BID PER BIDDER:

4.1 Each bidder shall submit only one bid for one package. A bid is said to be responsive if accompanied by cost of bid document and appropriate bid security declaration. The system shall consider only the last bid submitted through the E-Procurement portal.

5. COST OF BIDDING:

5.1 The bidder shall bear all costs associated with the preparation and submission of his bid, and the Engineer-in-Charge will in no case be responsible and liable for those costs.

5.2 All the rates and prices in the bid shall cover all taxes, viz. or any other local taxes, ferry, tollage charges and royalties and any other charges except GST

5.3 The rate of royalties and taxes prevailing on the date of measurement shall be considered while making deductions in the bills.

5.4 The successful bidder shall make his own arrangement for all materials

unless otherwise specified in the conditions of contract.

6. SITE VISIT :

6.1 Bidders are advised to inspect and examine the site and its surroundings and satisfy themselves before submitting their tenders as to the nature of the ground and sub-soil (so far as 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 not and no extra charges consequent on any misunderstanding or otherwise shall be allowed. The Bidder shall be responsible for arranging and maintaining 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 bidder 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 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 work.

6.2 The bidder, in preparing the bid, shall go through the site Investigation Reports provided in the Contract Data before filling up the Bid document.

6.3 The Officer inviting the bid / Engineer-in-Charge will clarify queries on the Contract Data on requisition by the intending Bidder. The bidder may ask question in the e-procurement portal using his DSC; provided the questions are raised before the date mentioned in the home page under critical dates.

B. BIDDING DOCUMENTS

7. GENERAL INSTRUCTIONS:

7.1 The description of the work is as mentioned under Invitiation for Bid

7.2 The bids uploaded by the Tender Inviting Officer may consist of general arrangements drawings or typical sections of the project. . Bidder may down load these drawings and take out the print for detail study. Any other drawings and documents pertaining to the works available with the officer inviting the Bid as well as in the office of the RSCL) as mentioned in the contract data will be open for inspection during working hours on all working days by the bidders. The bidder is required to down-load all the documents including the drawings for preparation of his bid. It is not necessary on the part of the Bidder to up-load the drawings other Bid documents (after signing) while up- loading his bid. He is required to up load documents related to his qualification information and Bill of Quantities duly filled in. It is assumed that while participating in the bid, the bidder has referred to all the drawings and documents uploaded by the Officer Inviting the Bids. Seeking any revision of rates or backing out of the bid claiming for not having referred to any or all documents provided in the Bid document by the Officer Inviting the Bids will be construed as plea to disrupt the bidding process and in such cases he will suspend/prohibit/debar/blacklist from participating in bidding in any contract of the State for a minimum period of 180 days and /or Cancelation of Empanelment (registration of from OPWD or any other in state) action will be taken RSCL.

7.3 The bidder is expected to examine carefully all instructions, conditions of contract, contract data, forms, terms, scope of work, technical specifications, bill of quantities, forms, Annexes and drawings in the Bid Document. Failure to comply with the requirements of Bid Documents shall be at the bidder's own risk.

8. CLARIFICATION OF BIDDING DOCUMENTS:

8.1 Bid documents consisting of drawings, plans, specifications, the schedule of quantities of the various items of work to be done and the set of terms & conditions of contract to be complied with by the contractor who intends to bid and other necessary Documents can be seen in the office of the officer inviting the Bid during office hours every day except on Sundays & Public Holidays till last date of sale of tender paper.

8.2 No paper copy of the bid shall be sold.

8.3 The Contract Data to bid shall be filled and completed in the office of Officer inviting bid before issue of bid documents. If the documents are issued to the intending bidder without having been so filled in & completed, he shall request the officer inviting the bid to have this done before he completes and delivers his bid.

8.4 The bidder can seek clarification on the bids which he received earlier than 14 days prior to the deadline for submission of bids. The Employer's response will be uploaded in e-tendering portal before deadline for submission of bid.

8.5 PRE-BID MEETING: As scheduled in the NIT As scheduled in the NIT Bidder may also Participated in Pre-bid meeting by Video Conferencing mode through sending request (Name of Firm & Person participated ,email id, Mobile No.)on e-mail id of RSCL i.e. rourkelascl@gmail.com on before 5:00 PM 01.07.2021.

(One request for each interested Participant will be entertained only)

9. AMENDMENT OF BIDDING DOCUMENTS:

9.1 Before the deadline for submission of bids, the officer inviting the Bid may modify the bidding documents by issuing addenda.

9.2 Any addendum thus issued shall be part of the bidding documents and shall be notified in the website www.tendersodisha.gov.in / notice board and through web site of Rourkela Municipal Corporation www.rmc.nic.in.

9.3 To give prospective bidders reasonable time in which to take an addendum into account in preparing their bids, the Officer inviting the Bid if also happens to be the Engineer-in-Charge with the permission of the higher authority may, at his discretion, extend as necessary the dead line for submission of bids.

C. PREPARATION OF BIDS

10. LANGUAGE OF THE BID:

10.1 All documents relating to the Bid shall be in the English language. Bids submitted in

any other language shall be summarily rejected.

11. DOCUMENTS COMPRISING THE BID:

11.1 Following documents will be deemed to be part of the bid even if not submitted with the bid.

i. Invitation for Bids (IFB)
ii. Instructions to bidders (ITB)
iii. Conditions of Contract
iv. Contract Data
v. Specifications
vi. Drawings

11.2 All the volumes/documents shall be provided in the portal by the Officer inviting the bid. The bidder shall carefully go through the document and prepare the required documents and up load the scanned documents in Portable Document Format to the portal in the designated locations of Technical Bid. He will fill up the percentage rate in the BOQ down loaded for the work in designated Cell and up-load the same in designated locations of Financial Bid. Submission of document shall be effected by using DSC of appropriate class.

A. Cost of "Bid document" & "Bid Security Declaration" shall comprise

i. Cost of Bid Document
ii. Bid Security Declaration in prescribed Format.

B. "Technical Bid" shall comprise.

i. Declaration under the Official Secret Act, 1923
ii. Qualification Information and supporting documents,
iii. Certificates, undertakings, affidavits,

C. "Financial Bid "shall comprise"'.

i. Priced Bill of Quantities

12. PROPOSAL BY THE BIDDER:

12.1 In the E-Procurement Portal, an intelligent Bill of Quantity in Microsoft Excel format shall be made available to the bidder.

12.2 Deleted

12.3 In case of percentage rate tender, the bidder will only fill in the designated cell and activate "less" or "excess" to indicate how much his price offer is excess or less (Up to two decimal Place) than the estimated amount.

12.4 The bidder shall bid for the whole works as described in the Bill of Quantities.

12.5 Bidders shall submit offers that fully comply with the requirements of the bidding documents, Minutes of meeting of the Pre-Bid meeting, Including the Conditions of Contract basic technical design as indicated in the drawing and specification. Conditional offer or alternative offers will not be considered in the process of bid evaluation.

12.6 All duties, taxes, excluding GST and other levies including Building and other Construction Workers Welfare Cess @ 1% payable by the contractor under the contract, or for any other cause shall be included in the rates, prices by the bidder. GST, purchase tax, turnover tax or any other tax on material in respect of this

contract shall be payable by the Contractor and Government will not entertain any claim whatsoever in respect of the same.

12.7 The contractor shall be deemed to have satisfied himself as to the correctness and sufficiency of the Tender and of the rates and prices stated in the Bill of Quantities, all of which shall, except in so far as it is otherwise provided in the Contract, cover all his obligations under the Contract (including those in respect of the supply of goods, materials, plant & services or of contingencies for which there is a Provisional Sum) and all matters and things necessary for the proper execution and completion of the work and the remedying of any defects therein.

12.8 The contractor shall conform in all respects, by giving all notices and paying all fees, with the provisions of:

i. Any national or State Statue, Ordinance, or other Law, or any regulation, or bye-law of any local or other duly constituted authority in relation to the execution and completion of the works and remedying of any defects therein, and
ii. The rules and regulations of all public bodies and companies whose property rights are affected or may be affected in any way by the works.

12.9 FOR COMPOSITE BIDS: DELETED.

13. CURRENCIES OF BID AND PAYMENT:

13.1 The estimated unit rates and the prices are in Indian Rupees.

14. VALIDITY:

14.1 Bids shall remain valid for a period not less than 90 days or the period mentioned in the Contract Data, after the deadline date for submission of bid as specified in the notice inviting the Bids. A Bid valid for a shorter period shall be rejected by the Engineer-in-charge as non-responsive.

14.2 In exceptional circumstances, prior to expiry of the original time limit, the Officer inviting the Bid may request the bidders to extend the period of validity for a specified additional period. The request and the bidders' responses shall be made in writing or by cable or by e-mail.

15. BID SECURITY DECLARATION:

15.1 The Bidder shall furnish, as part of his Bid, a Bid security declaration as per format of Annexure II. The bidder shall scan all the written pages of the bid security declaration and up load the same to the system in designated place. The successful lowest bidder will produce the original of all scanned documents for verification within 5 days of opening of the tender (Price Bid) In the eventuality of failure on the part of the successful bidder to produce the original documents, he will be lost her Empanelment (registration of OPWD) and / or suspend/prohibit/debar from participating in bidding in any contract of the State for a minimum period of 180 and will be blacklisted by the competent authority. In such a situation, successful L-2 bidder will be required to produce his original documents for consideration of his/her tender at the negotiated equal to L-1 bidder.

15.1.1 **Deleted**

15.2. The Bid shall be declared non-responsive and shall be rejected if submitted without an acceptable Bid Security Declaration and not secured as indicated in Sub-Clauses 15.1.

15.3. Combined bid security Declaration for more than one work is not acceptable.

15.4. In the case of Government Undertakings, Co-operatives Societies, Diploma or Degree holders in Engineering who are registered with the Government of Odisha, the rules framed by government from time to time about Cost of Bid documents, Bid security Declaration , performance security will apply.

15.5. **Deleted**

15.6. **Deleted**

15.7. The Bidder may be lost her Empanelment (registration of OPWD) and / or suspend/prohibit/debar/blacklist from participating in bidding in any contract of the State for a minimum period of 180 days.

15.7.1. If the bidder withdraws the bid after opening of the bid but within the period of validity.

15.7.2. If the Bidder seeks any revision of rates or backs out of the bid claiming for not having referred to any or all documents provided in the Bid by the Officer Inviting the Bids.

15.7.3 In the case of a successful bidder, if the bidder fails within the specified time limit to

15.7.3.1 Sign the Agreement; or

15.7.3.2 Furnish the required Performance Security including additional performance security if any

16. FORMAT AND SIGNING OF BID:

16.1. The bidder can download the tender of his choice and save it in his system and undertake the necessary preparatory work off-line and upload the completed tender at his convenience within the final date and time of submission. The bidder shall only submit single copy of the required documents and Price Bid in the portal. In the Financial bid, the bidder cannot leave any figure blank. He has to only write the figures; the words will be self-generated. The Bidders are advised to up-load the completed Bid document well ahead of the last date & time of receipt to avoid any last moment problem of power failures etc.

16.2 The Bidder shall go through the Bid carefully and list the documents those are asked for submission. He shall prepare all documents including cost of Bid Document, Bid Security Declaration, Declaration form, price bid etc and store in the

system.

16.3. The bidder shall log on to the portal with his DSC and move to the desired tender for up-loading the documents in appropriate place one by one simultaneously checking the documents. Once the Bidder makes sure that all the documents have been up-loaded in appropriate place, he clicks the submit button to submit the bid to the portal.

16.3.1 Tender cannot be pre-opened and cannot be submitted after due date and time. Therefore, only after satisfying that all the documents been uploaded, the Bidder should activate submit button.

16.3.2 . In the e-procurement process, each process is time stamped. The system can identify each individual who has entered into the portal any bid and the time of entering into the portal.

16.3.3 The Bidder should ensure clarity of the document up-loaded by him to the portal, especially the scanned documents by taking out sample printing. Non-submission of legible documents may render the bid non- responsive. However, the Officer inviting the Bids if so desires, can ask for legible copies for clarification within a stipulated period of 7 days, provided such document in no way alters the Bidder's price bid. If the Bidder fails to submit Such documents with in the stipulated date, his bid shall be evaluated on it's own merit.

D. SUBMISSION OF BIDS

17. SECURITY OF BID SUBMISSION:

17.1 All bid data uploaded by the Bidder to the portal will be encrypted by the DSC of the opener(s). The system shall require all the mandatory forms and fields

filled up by the contractor during the process of submission of the bid/tender.

17.2 The Bid shall be received in encrypted format by the system which can only be time.

18. DEADLINE FOR SUBMISSION OF THE BIDS:

18.1. The online bidding will remain active till the last date and time of the bid submission. Once the date and time (Server date and time) is over, the bidder will not be able to submit the bid. The date & time of bid submission shall remain unaltered even if the specified date for the submission of bids declared a holiday for the Officer inviting the Bid.

18.2. The officer inviting the bid may extend the deadline for submission of bids by issuing an amendment in accordance with Sub-Clause 9.3, in which case all rights and obligations of the officer inviting the bid & Engineer-in-Charge and the bidders previously subject to the original deadline will then be subject to the new deadline.

19. LATE BIDS:

19.1. The system shall reject submission of any bid through portal after closure of the receipt time. For all purpose the server time displayed in the e-procurement portal shall be the time to be followed by the bidder and concerned officers.

20. MODIFICATION AND WITHDRAWAL OF BIDS:

20.1 In the E-Procurement Portal, it is allowed to modify the bid any number of times before the final date and time of submission. The bidder shall have to log on to the system and resubmit the documents as asked for by the system including the price bid. In doing so, the bids already submitted by the bidder will be removed automatically from the system and the latest bid only will be admitted. But the bidder should avoid modification of bid at the last moment to avoid system failure or malfunction of internet or traffic jam or power failure. If the bidder fails to submit his modified bids within the designated time of receipt, the bid already in the system shall be taken for evaluation.

20.2 In the E-Procurement Portal, with-drawl of bid is allowed. But in such case he has to write a letter with appropriate reasons for his withdrawal addressed to the Officer inviting the bid and up load the scanned document to portal in the respective bid before the closure of receipt of the bid. The system shall not allow any withdrawal after expiry of the closure time of the bid.

E. OPENING AND EVALUATION

21. OPENING OF THE BID:

21.1 Bid opening dates are specified during tender creation or can be extended vide corrigendum. These dates are available in IFB, tender document as well as the home

page of portal. Bid opening can be done by the authorized users which are defined during the tender publication / approval stage. The bids are encrypted using there public keys and can be decrypted only on or after the Bid Opening due date. The bid openers private key will be required to open the bids and all the openers have to log on to the portal during that time.

21.1.1. The bidders who participated in the on-line bidding can witness opening of the bid from any system logging on to the portal with the DSC away from opening place. Contractors are not required to be present during the bid opening at the opening location if they so desire.

21.1.2. Each activity is date and time stamped with user details. For time stamping, server time is taken as the reference.

21.2. In the event of the specified date of bid opening being declared a holiday for the Officer inviting the Bid/Engineer-in-Charge, the bids will be opened at the appointed time on the next working day.

21.3. In case bids are invited for more than one package, the order for opening of the "Bid" shall be that in which they appear in the "Invitation for Bid".

21.4 During bid opening, the covers containing original demand draft towards Cost of bid in the form specified in the Invitation for Bid, received after last of receipt of bid and before opening of the bids shall be opened and declared. The original copy of the Bid Security declaration in the form, mention Annex-II and period of validity in conformity with clause 15 shall be checked and announced. The list of bidders who have submitted the original copy of the cost of Bid and Bid Security Declaration shall be prepared and announced.

21.4.1 Combined bid security Declaration for more than one work is not acceptable. If the bid security declartion has not been furnished in the form specified in Clause 15, the bid will be declared non-responsive and rejected.

21.5 The Bid openers; who have been pre-defined shall log on to the portal with their respective DSC. Unless all the Officers who have been declared as Opening officers, log on the portal with their DSC the Tender cannot be opened.

21.5.1 The Opening Officers will systematically check the scanned demand draft towards cost of the bid document and the scanned document of Bid security declaration with that of the original submitted. If found in order, they will continue opening of all other documents in the system provided under

Technical Bid.

21.5.2. The bids accompanied with appropriate bid cost and valid bid security declartion will be taken up for evaluation with respect to the qualification Information and other information furnished in Part - I pursuant to Clause 3.

21.5.3. Immediately on receipt of these clarifications, the Evaluating Officers; predefined in the system for the bid, will finalize the list of responsive bidders. They will log on to the site with their DSC and record their comments on the Technical evaluation page in the system. The Officer Inviting the Bid if also the accepting authority, shall log on to the system with his digital signature and check technical evaluation. He can either accept or pass on to the evaluating officers for re-evaluation. Upon acceptance of technical evaluation by the Accepting authority in the system, the system shall automatically generate letter to all the responsive bidders and the system shall forward the letter to all the responsive bidder that their technical bid has been evaluated responsive with respect to the data/information furnished by him and the letter shall also intimate him the date & time of opening of financial bid. The system shall also inform the non- responsive bidders in their email ID that their bid has been found non- responsive.

21.6 The Technical evaluation of all the bids will be taken up as per the information furnished by the Bidders. If any of the information/ statements/documents/ /certificates furnished by the bidder is found to be false/fabricated/bogus, his registration in the portal shall be blocked and the bidder is liable to be blacklisted.

21.7 After technical evaluation of the bidders and selection of the qualified bidders, the financial bids of the technically qualified bidders shall be opened on the due date of opening. Members of the bid opening committee log on to the system in sequence and open the financial bids for the technically qualified bidders. The opening of financial bid by the opening officer using their DSC shall decrypt the financial bids.

21.7.1 Opening of price bid and evaluation of lowest bidder is subject to satisfaction of other qualification information asked for in the bid pursuant to Clause-3.

21.7.2 The Officer inviting Bid shall ensure that all the Bidders are individually intimated about the date, time & venue of opening of the financial bid along with the responsiveness of the Technical Bid.

21.7.3 The Financial Bid will be opened on the notified date & time in the presence of bidders or their authorized representative who wish to be present.

21.7.4 At the time of opening of "Financial Bid", the names of the bidders whose bids were found responsive in accordance with Sub-Clause 24.1 will be announced. The bids of only those bidders will be opened. The remaining bids will be rejected.

21.7.5 The responsive bidders names, percentage rates, any discounts and withdrawals, and such other details as the officer inviting the tender may consider appropriate, will be announced by him or his authorized representatives at the opening.

21.7.6 Special conditions and/or rebate/discount offer if any uploaded to the system shall be declared and recorded first.

21.7.7 The Financial bid of the bidders shall be opened one by one by the designated officers. The system shall auto-generate the Comparative statement.

21.7.8 The Bidder can witness the principal activities and view the documents/summary reports for that particular work by logging on to the portal with his DSC from anywhere.

22. PROCESS TO BE CONFIDENTIAL:

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

23. CLARIFICATION OF BIDS:

23.1To assist in the examination, evaluation, and comparison of bids, the officer inviting the bid may, at his discretion, ask any bidder for clarification of his rates including breakdowns of unit rates. The request for clarification and the response shall be in writing or by cable or by e-mail, but no change in the bid price or substance of the bid shall be sought, offered.

23.2 Subject to sub-clause 23.1 , no bidder shall contact the officer inviting the bid on any matter relating to his bid from the time of the opening to the time the contract is awarded. If the bidder wishes to bring additional information to the notice of the officer inviting the bid, it should do so in writing.

24. EXAMINATION OF BIDS AND DETERMINATION OF RESPONSIVENESS:

24.1 During the detailed evaluation of "Technical Bids", the officer inviting the bid will determine whether each bid:-

24.1.1 Whether the Bid security Declaration is submitted in proper format.

24.1.2 Has submitted legible documents for evaluation

24.1.3 Meets the eligibility criteria defined in Clause 3 and;

24.1.4 Is substantially responsive to the requirements of the bidding documents.

24.2 During the detailed evaluation of the "Financial Bid", the responsiveness of the bids will be further determined with respect to the remaining bid conditions, i.e., priced bill of quantities, technical specifications and drawings.

24.3 A substantially responsive "Financial Bids" is one, which conforms to all the terms, conditions, and specifications of the bidding documents, without material deviation or reservation. A material deviation or reservation is one

24.3.1 Which affects in any substantial way the scope, quality, or performance of the works.

24.3.2 Which limits in any substantial way, inconsistent with the bidding documents, the right of the officer inviting the bid or the bidder's obligations under the contract or

24.3.3 Whose rectification would affect unfairly the competitive position of other bidders presenting substantially responsive bids.

24.4 If a "Financial Bid" is not substantially responsive, it will be rejected by the officer inviting the bid, and may not subsequently be made responsive by correction or withdrawal of the non-conforming deviation or reservation.

24.5 On opening of the price bid the system shall arrange the financial bids in order of their value (L1 first, followed by L2, L3 ….) for subsequent evaluation. The evaluation status (Sheet) will be visible to all the participating bidders after opening on their respective logins. Each activity is recorded in the system with date and time stamping.

25. EVALUATION OF BIDS:

25.1 If the officer inviting the Bid in his opinion judges that the price quoted by the lowest qualified bidder is high or a special condition imposed by the bidder is to be withdrawn, the

bidder shall be invited for negotiation by the officer inviting the Bid or by an officer authorised by him in writing.

F. AWARD OF CONTRACT

26. AWARD CRITERIA:

26.1 The officer inviting the bid will award the contract to the bidder whose bid has been determined to be substantially responsive to the bidding documents and who has offered the lowest evaluated price.

26.2 On acceptance of the tender, the Contractor shall name in writing his accredited representative(s) who would be responsible for taking instructions from the Engineer-in-Charge.

26.3 Competent Authority reserves to himself the right of accepting the whole or any part of the bid and the bidder shall be bound to perform the same at the rate quoted.

26.4 The successful bidder has to subsequently register themselves with the appropriate registering authority of the state Govt. before award of the work as per prevalent registration norms of the state before signing of the agreement.

27. OPTIONS IF THE BIDDER BACKS OUT FROM BIDDING PROCESS:

27.1 In case the 1st lowest Bidder or even the next lowest Bidder withdraw in series one by one, thereby facilitating a particular Bidder for award, then they shall be penalized with Appropriate action i.e. Cancelled the (registration of OPWD) and / or suspend/prohibit/debar/blacklist from participating in bidding in any contract of the State for a minimum period of 180 days the bidder as per Guiding of OPWD/Govt. of Odisha Guiding.

27.2 The bidding process shall be deemed to be complete after the issue of letter of acceptance. If the bidder fails to sign the agreement within the stipulated period mentioned under clause 29.2, his bid security shall stand forfeited.

28. RIGHT TO ACCEPT OR REJECT ANY OR ALL BIDS:

28.1 The competent authority on behalf of Rourkela Smart city Limited, does not bind him to accept the lowest or any other tender and reserves to him the authority to reject any or all the tenders received without assigning any reason.

28.2 All bids in which any of the prescribed condition is not fulfilled or any condition including that of conditional rebate is put forth by the bidder shall be summarily rejected.

29. NOTIFICATION OF AWARD AND SIGNING OF AGREEMENT:

29.1. In the E-Procurement Portal, the system shall generate the template of award letter and the Officer Inviting the Bid shall mention the amount of Performance Security and additional security required to be furnished in the letter and intimate the bidders in his e-mail ID. The issue of the letter of acceptance shall be treated as closure of the Bid process and commencement of the contract.

29.2 The bidder shall within 15 days of issue of letter of acceptance, furnish the Performance security & additional Performance security (if any) in the form & the work programme & shall sign the agreement in prescribed format, failing which the Engineer-in-Charge shall without prejudice to any other right or remedy available in law, be at liberty to either he will suspend/prohibit/debar/blacklist from participating in bidding in any contract of the State for a minimum period of 180 days or Cancelation of Empanelment (registration of from OPWD) action will be taken or both. The agreement will incorporate all agreements between the officer inviting the bid and the successful bidder. If L1 bidder does not turn up for agreement after finalization of the tender, then he will suspend/prohibit/debar/blacklist from participating in bidding in any contract of the State for a minimum period of 180 days and /or Cancelation of Empanelment (registration of from OPWD) action will be taken . In that case, the L2 bidder, if fulfils, required criteria would be called for drawing agreement for execution of work subject to the condition that L2 bidder

negotiates at par with the rate quoted by the L1 bidder otherwise the tender will be cancelled.

In case a contractor is black listed, it will be widely published and intimated to all departments of Government and also to Govt. of India agencies working in the state.

(Amendment to Para-3.5.14 Note-I of OPWD Code Vol.-I by inclusion).

29.2.1 Following documents shall form part of the agreement.

29.2.1.1 The notice inviting bid, all the documents including additional conditions, specifications and drawings, if any, forming the bid as issued at the time of invitation of bid and acceptance thereof together with any correspondence & documents leading thereto & required amount of performance security including additional performance security as per sub clause 29.2 hereof.

29.2.1.2 Standard Bid Document P.W.D. Form P-1

29.3 The letter to proceed with the work shall be issued by Engineer-in-charge only after signing of the agreement. The notification of award will constitute the formation of the contract subject only to the furnishing of performance security and additional performance security in accordance with the provisions of the agreement.

29.4 On acceptance of the composite bids by the competent authority the letter of award will be issued by the Engineer-in-Charge of the major component of the work.

29.5 Upon signing of the agreement by the successful bidder, the Engineer-in-Charge will promptly notify the other bidders that their bids have been unsuccessful.

30. CORRUPT OR FRAUDULENT PRACTICES:

30.1. The Engineer-in-Charge will reject a proposal for award if he determines that the bidder recommended for award has been engaged in corrupt or fraudulent practices in competing for the contract in question. He will report to the Officer Inviting Bid / next higher authority.

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

DETAILED TENDER CALL NOTICE

Sealed percentage rate bids are invited in double cover system from the Civil Contractors of 'A' Class & 'Special' class contractors registered with the State Government and contractors of equivalent Grade / class registered with Central Government / MES / Railways having registration for Civil, Electrical and P.H works for execution of Civil / E.I. / P.H. works on production of definite proof from the appropriate authority in prescribed form to be eventually drawn in P.W.D. FORM P-1 for the work/Project: "Construction of Transit Home at Kaling Vihar in Rourkela on Percentage Rate Basis." an estimated cost of Rs.4,24,16,861/- (Rs. Four Crore Twenty four Lakhs Sixteen thousand Eight hundred and Sixty One Only)"

Contractors not registered with Govt. of Odisha can participate in the e- procurement after necessary enrolment in the portal but have to subsequently register themselves with the appropriate registering authority of the state Govt. before award of the work as per prevalent registration norms of the state.

a) This tender is of composite nature and consisting of Civil, Electrical and PH works.

b) This detailed Tender Call Notice along with the Pre-Bid Meeting minutes, clauses mentioned herein shall form a part of the contract and agreement.

2. The Bid documents are available on official website of Government: https://www.tendersodisha.gov.in & www.rmc.nic.in, from 24.06.2021 17:00 Hrs to 14.07.2021 17:00Hrs.The last date and time of submission of Bid is as per contract data.
3. The Technical Bid documents (Cover–I) will be opened by the assigned officer in the office of Chief Executive Officer, RSCL at 16:00 Hours on 19.07.2021.in the presence of the bidders or their authorized representatives who wish to attend. After evaluation of the documents contained in Cover-I, the Cover-II containing price bid/s of the technically responsive bidder/s will be opened. The date, time and place of opening the price bid will be intimated to the eligible qualified bidders through system generated E-mails.
4. The cost of Bid documents in shape of demand draft issued from any Nationalized / Scheduled bank may be prepared in the name of RSCL(Smart City Mission Grant Fund), and payable at Rourkela for Rs.11,200/- towards tender paper cost. The online bid must be accompanied with scanned copies of demand draft towards cost of tender paper.
5. The bid is to be submitted in two covers.
   i. Cover-I is to contain scanned copy of Bid Security declaration and Cost of bid document, Registration Certificate, PAN, Profit Loss statement, GST Registration Certificate, List of similar nature of works, work in hand, affidavit, turn over certificate and all other documents required as per the relevant clauses of this DTCN. Before award of final contract, such bidders will have to produce the GST clearance certificate. ii) The similar nature of work are of following types: One or more civil engineering project (s) in any one year during last five years.

   ii. Cover-II is to contain the PRICE BID duly filled in and signed by the bidder.

6. Furnishing scanned legible copy of Original Registration certificate, PAN card & GST Registration Certificate along with the Technical Bid is mandatory otherwise his/ her bid shall be declared as non responsive and thus liable for rejection.
7. Deleted
8. Deleted
9.
   i. The contract will be drawn in P.W.D. P-1 contract form and will constitute all civil, electrical and PH works.

   The contract shall be drawn & signed by Chief Executive Officer on behalf of Rourkela Smart City Limited.

   ii. The entire works of the Agreement shall be supervised measured and

check measured by the Engineer in Charge.

10. If an individual makes the application, the individual should sign (with DSC) above his full type written name and current address.

11. If the application is made by proprietary firm, it shall be signed (with DSC) by the proprietor & furnish full type written name and the full name of his firm with its current address in a forwarding letter.

12. If the application is made by a firm in partnership, it shall be signed (with DSC) by a partner holding power of attorney for the firm in which case a certified copy of the power of attorney shall accompany the application. A certified copy of the partnership deed and current address of all partners of the firm shall also accompany the application.

13. If the application is made by a limited company or a corporation, it shall be signed (with DSC) by a duly authorized person holding power of attorney for signing the application in which case a certified copy of the power of attorney shall accompany the application. Such limited company or corporation will be required to furnish satisfactory evidence of its existence along with the technical bid.
14. The tender should be strictly in accordance with the provisions as mentioned in the tender schedule. Any change in the wordings will not be accepted.
15. The work is to be completed (Construction work) in all respects within Six(6) calendar months from the date of issue of work order. Before acceptance of tender, the successful bidder will be required to submit a work programme and milestone basing on the financial achievement so as to complete the work within the stipulated time and in case of failure on the part of the agency to achieve the milestone liquidated will be imposed (Amendment to Para-3.5.18 Note-VIII of OPWD Code Vol.-I).
16. All tenders received will remain valid for a period of 90 days from the last date prescribed for receipt of tenders and validity of tenders can also be extended if agreed by the tenderers and the Department
17. The tenderer shall carefully study the tentative drawings and specifications applicable to the contract and all the documents, which will form a part of the agreement to be entered in to, by the accepted tenderer and detailed specifications for Odisha, and other relevant specifications and drawings, which are available. Complaint at a future date that the tenderers have not seen plans and specifications cannot be entertained.
18. The drawings furnished with the tender are tentative and subject to revision or modification as tendered during the execution as per actual necessity and detail test conducted. But the tendered rates quoted by the tenderer will hold good in case of such modification of drawings during the time of execution and shall in no way invalidate the contract and no extra monetary compensation will be entertained. The work shall however be executed as per final approved drawing to be issued by the Engineer-in- Charge as and when required.

19. By admission of a tender for the work, a tenderer will be deemed to have satisfied himself by actual inspection of the site and locality of the work, about the quality and availability of the required quantity of material, and that rates quoted by him in the tender will be adequate to complete the work according to the specifications attached there to and that he had taken in to account all conditions and difficulties that may be encountered during its progress and to have quoted rates including labour and materials with taxes, octroi, other duties, lead, lifts, loading and unloading, freight for all materials and all other charges necessary for the completion of the work, to the entire satisfaction of the Engineer-in Charge of the work and his authorized subordinates. After acceptance of the contract rate Government will

not pay any extra charges for any reason in case the contractor claims later on to have Misjudged as regard availability of materials, labour and other factors. For the purpose of estimate, the approved quarry lead is to be provided judiciously. Engineers in charge would be responsible for ensuring the quality of the materials supplied. The contractors would, however, be responsible for procurement of material from authorized sources and voluntarily disclose the source of procurement for the purpose of billing. Besides, the bidder would be required to submit the details of quarry for procurement while submitting the bids.

(Amendment to Para-3.4.16 (a) (vii) of OPWD Code Vol.-I by substitution). Design,

20. The bid must be accompanied by Bid security declaration accepting, that if the bidder withdraw or modify its bid during the period of validity .i.e. not less than 90(Ninety) days from the bid due date or if the bidder is awarded the contract and fail to sign the contract or to submit a performance security and Addition Performance Security. Tender Not accompanied with Scanned copy of Bid security declaration shall be declared as non-responsive and thus liable for rejection. The bid security Declaration should remain valid minimum of 45(Forty-five)days beyond the bid validity period

21. The tender should be accompanied with the Scanned copies of the valid Registration certificate of Class of Contractor , GST Registration Certificate and PAN card which are mandatory, otherwise his/her bid shall be declared as non-responsive and thus liable for rejection.
22. The tender containing extraneous conditions not covered by the tender notice are liable for rejection and quotations should be strictly in accordance with the items mentioned in the Tender Call Notices. Any change in the wording will not be accepted.
23. The department reserves the right of authority to reject any or all tenders received without assigning any reason whatsoever.
24. **Deleted**.
25. The Engineer-in-charge will notify the bidder / tenderer whose bid has been accepted of the award prior to expiration of the validity period by cable, telex or facsimile confirmed by registered letter. This letter (hereinafter and in the conditions of Contract called the "Letter of Acceptance") will state the sum that the Engineer-in-charge will pay the contractor in consideration of the execution and completion of the Works by the contractor as prescribed by the contract (Hereinafter and in the contract called the "Contract Price").

    The Notification of award will constitute the formation of the contract, subject only to the furnishing of a performance security (Initial Security Deposit) in form of Deposit receipt of Schedule Bank / Kissan Vikash Patra / Post Office Savings Bank Account/National Savings Certificate/ Post Office Time Deposit Account/Bank Guarantee of Nationalised Bank /Schedule Bank of India counter guaranteed by local Branch at Rourkela with validly of One year / duly pledged in favour of the Chief Executive Officer Rourkela Smart City Limited. Rourkela & payable at Rourkela and in no other form, which including the amount already deposited as bid security (earnest money) shall be 2% of the value of the tendered amount and sign the agreement in the P.W.D. form No. P-1 (Schedule XLV No. 61) for the fulfilment of the contract in the office of the Chief Executive Officer and payable at Rourkela or as directed. The security deposit together with the earnest money and the amount withheld according to the provision of P-1 agreement shall be retained as security for the due fulfilment of this contract and additional performance security in accordance with the provisions of the agreement.

The agreement will incorporate all agreements between the officer inviting the bid/ Engineer-in Charge and the successful bidder within 15 days following the notification of award along with the Letter of Acceptance. The successful bidder will sign the agreement and deliver it to the Engineer-in Charge. Following documents shall form part of the agreement.

a) The notice-inviting bid, all the documents including additional conditions, specifications and drawings, if any, forming the bid as issued at the time of invitation of bid and acceptance thereof together with any correspondence leading thereto & required amount of performance security including additional performance security.
b) Standard P.W.D. Form P-1 with latest amendments. Failure to enter in to the required agreement and to make the security deposit as above shall entail either he will suspend/prohibit/debar/blacklist from participating in bidding in any contract of the State for a minimum period of 180 days or Cancelation of Empanelment (registration of from OPWD) or both. .No contract (tender) shall be finally accepted until the required amount of initial security money is deposited The security will be refunded after 12 (Twelve) months of completion of the work and payment of the final bill and will not carry any interest. As concurred by Law Department & Finance Department In their U.O.R. No 848, dt.21.05.97 .O.R.No.202 W.F.D. dt.06.03.98 respectively the E.M.D. will be forfeited case, where tenderers back out from the offer before acceptance of tender by the competent authority.

26. The contractor should be liable to fully indemnify the Department for payment of compensation under workmen compensation act. VIII of 1923 on account of the workmen employed by the contractor and full amount of compensation paid will be recovered from the contractor.

27. Tenderers are required to liable by fair wages clause as introduced by Govt. of Odisha Works Department letter No.VII (R&B) 5225, dt.26.2.55 and No.II, M-56/61-28842 (5), dt.27.9.61.

28. The contractor shall bear cost of various incidentals, sundries and contingencies necessitated by work in full within the following or similar category.

a) Rent, royalties, cess and other charges of materials, Octroi and all other taxes except prevailing GST from time to time. Ferry tolls, conveyance charges and other cost on account of land buildings including temporary building required by the tenderer for collection of materials, storage, housing of staff or other purpose of the work are to be borne by the contractor at his own cost. No rent will be payable to Govt. for temporary occupation of land owned by govt. at the site of the work for bonafide use of the land for work and all such construction of temporary nature by the contractor shall be done after obtaining written permission from the Engineer-in-Charge of Civil portion of the work and all such construction shall have to be demolished and debris removed and ground made good and cleared after completion of the work at no extra cost.
b) Royalty will be recovered from each bill as notified by Govt. from time to time unless K Forms are enclosed. Refund of royalty at later date after passing of the bills cannot be entertained as the recovery of royalty is being credited to revenue.
c) Labour camps or huts necessary to a suitable scale including conservancy sanitary arrangements therein to the satisfaction of the local labour laws

and health authorities shall have to be provided by the Contractor.

d) Arrangement of suitable water supply including pipe water supply where available for the staff and labour as well as for the execution of the work is sole responsibility of the Contractor and no extra cost for carriage of water will be entertained.

e) All fees and dues levied by Municipal, Canal or Water Supply Authorities are to be borne by the Contractor.

f) Suitable safety equipments and dresses, gloves, life belts etc. for the labour engaged in risky operations are to be supplied by the contractor at his own cost.

g) Suitable fencing barriers, signals including paraffin and electric signals where necessary at work and approaches in order in project the public and employees from accident has to be provided by the Contractor at his own cost.

h) Compensation including cost of any legal suit for injury to persons or property arising out of execution of the work and also any sum, which may become payable due to operation of the workmen compensation act, shall have to be borne by the contractor.

i) The contractor has to arrange adequate lighting arrangements for the work wherever necessary at his own cost.

29. No payment will be made for layout, benchmark, level pillars, profiles and benching and levelling the ground required, which has to be carried out by the contractor at his own cost. The rates to be quoted should be for finished items of work inclusive of carriage of all materials and all incidental items of work.

30. After the work is finished all surplus materials should be removed from the site of work, preliminary work such as vats, mixing platforms, etc. should be dismantled and all materials removed from the site and premises left neat and his should be inclusive in the rates. No extra payment will be made to the Contractor in this account.

31. It should be understood clearly that no claim what-so-ever will be entertained to extra items of works quantity of any item besides estimate amount unless written order is obtained from the competent authority and rate settled before the extra items of work or extra quantity of any items of work is taken up.

32. The tenderers shall have to abide by the C.P.W.D. safety code rules introduced by the Govt.of India, Ministry of Works and Housing & Supply in their standing order No.44150, dt.25.11.57.

33. No part of the contract shall be sublet without written permission to the concerned Engineer In Charge or transfer to be made by the power of attorney authorizing others to receive payment on contractor's behalf.

34. Bid documents consisting of plans, specifications, the schedule of quantities and the set of terms and conditions of contract and other necessary documents can be seen in all he offices issuing the documents and office of the under signed during office hours every day except on Sundays and Public Holidays till last date of sale and receipt of tender papers. Interested bidders may obtain further information at the same address. But it must be clearly understood that tenders must be received in order and to instructions in complete shape. Incomplete tender is liable for rejection.

35. No Relation Certificates.

The contractor shall furnish a certificate along with the tender to the effect that he is not related to any officer in the rank of an Assistant Engineer & above Rourkela Smart City Limited. or Assistant/Under Secretary & above in the

Department. If the fact subsequently proved to be false, the contract is liable to be rescinded. The earnest money & the total security willbe forfeited & he shall be liable of make good to damages the loss or damages resulting for such cancellations. The proforma for no relationship certificate is contained in a separate sheet vide Schedule-A

36. Payment for variation in price – As per latest guideline of OPWD after schedule Completion Period

36(a) (i) REIMBURSEMENT / RECOVERY DUE TO VARIATION IN PRICE OF MATERIALS OTHER THAN (STEEL, CEMENT, BITUMEN, PIPES & P.O.L.).

36.(a) (ii) REIMBURSEMENT / RECOVERY OF DIFFERENTAL COST DUE TO VARIATION IN PRICES OF PRINCIPAL MATERIALS (STEEL, CEMENT, BITUMEN, PIPES & P.O.L) NOT ISSUED BY DEPARTMENT, AFTER SUBMISSION OF TENDER: As per latest guideline of OPWD after schedule Completion Period.

36.(b) REIMBURSEMENT / REFUND DUE TO STATUTORY RISE IN COST OF MINIMUM WAGES BY GOVERNMENT: As per latest guideline of OPWD after schedule Completion Period.

36(c) REIMBURSEMENT / REFUND DUE TO VARIATION IN PRICES OF P.O.L (Fuel And Lubricant) COMPONENT: As per latest guideline of OPWD after schedule Completion Period.

36(d) ADJUSTMENT FOR PLANT AND MACHINEY SPARES COMPONENT

36(e) APPLICATION OF ESCALATION CLAUSE: Contract price shall be adjusted for increase or decrease in rates and price of Labour, Cement, Steel, Bitumen, Pipes, POL & other material component in accordance with the principles and procedure as per formula to be finalized by Government in Works Department latest Guideline after schedule Completion Period.

37. If any advance / Secured advance is granted by the Department the same will bear Interest at the rate of 18% P.A.

38. All items of work as per schedule of quantities of this tender should confirm to Odisha Detailed Standard Specification. I.R.C. & I.S.I. Codes & Bridge code section I, II, III, IV & VII & latest design criteria for pre-stressed concrete bridge specially for Roads & Bridges issued by MoRT&H, Government of India, Compacting shall have to be carried out with help of mechanical vibrators from the range of I.S.:2505, I.S.:2006, I.S.:2514. I.S.:4656.

39. Centring & Shuttering shall be with suitable steel shutters in side of which shall be lined with suitable sheeting and made leak proof and watertight. All joints in formwork shall be properly sealed preferably with P.V.C. joints sealing tapes & compounds.

40. Form work including complete false work shall be designed by the Contractor without any extra cost to employer and the Department will have the right to inspect scaffolding, centering and shuttering made for the work and can reject partly of fully such structures, if found defective in their opinion. Any eventually such as loss of lives or properly due to failure of centering and shuttering shall be the responsibility of the Contractor regarding compensation of all claims thereof.

41. Cement shall be used by bags and weight of one bag of Cement should be 50 (fifty) Kg. net & the Engineer-in-Charge or his representative shall have the right to test the weight & quality from time to time.

42.The tenderers shall make all arrangements for proper storage of materials but no cost for raising shed for store and pay of security guard etc. will be borne by the Department. The department is not responsible for any theft or loss of materials at site. It is contractor's risk. Under any such plea, if the tenderer stops the work he shall have

to pay the full penalty as per clauses of the contract.

43. Approach road to site of work for transport of materials to site of work is sole responsibility of the Contractor. Statutory traffic restriction in the town area for Transport of construction material to site of work is to be taken in to consideration before tendering and no consideration for extra time or compensation thereof shall considered.
44. The contractor should at his own cost arrange necessary tools and plants required for efficient execution of work and the rates quoted should be inclusive of transportation, hire and running charges of such plant and cost of consumables.
45. The contractor shall properly co-ordinate with the execution of P.H. and Electrical works and take care of the safety of workers.
46. The machineries if available, with the department may be supplied on hire as per charges noted in the enclosed statement and may be changed from time to time subject to the condition that the contractor will execute in advance an agreement with the Engineer-in-Charge.
47. No claim whatsoever will be entertained for supply of machineries. No extension of time will be granted to the contractor under this ground under any circumstances.
48. The tenderer should furnish along with their tender a list of works executed during the last five years duly certified by the concerned Engineer-in-charge indicating the satisfactory completion for Civil, P.H. & Electrical works as per the Performa enclosed in a separate sheet of Schedule-C.
49. The tenderer or any of its constituent partners of whose contract for any work has been rescinded or who has abandoned any work in the last five years prior to the date of Bid shall be debarred from qualification. The tenderer is to furnish an affidavit at the time of submission of tender paper about the authentication of tender documents. An affidavit to this effect is to be furnished in Schedule-E and information in Schedule-D.
50. It should be clearly understood that:

    a) The joints of the bars are to be provided with lapping, welds or bolts nuts as well be directed by the Engineer-in-charge.

    b) Concrete test specimens 150mm × 150mm × 150mm in size (whether plain or reinforced concrete) for the testing shall be taken for each structural member by a representative of the contractor in the presence of responsible officer of the rank not lower than that of an Assistant Engineer or sub-Divisional Officer. The contractor shall bear the cost so involved in testing. The test specimen in cube should be carried out in the Departmental Control and Research Laboratory Cuttack or Rourkela. Test should be carried out in accordance with the stipulation in Bridges code section-III.

    c) Test specimens shall be formed carefully in accordance with the standard method of taking test specimen and no plea shall be entertained later on the grounds that the casting of the test specimen was faulty and that the result of the specimen did not give a correct indication of the actual quality of concrete.
    d) Plain concrete and reinforced concrete specimens will be tested in Quality Control and Research Laboratory as per direction of Engineer-in-charge. Cost of testing of all specimens and samples will be borne by the Contractor.

51. The rates quoted should be inclusive of carriage of water required in connection with execution of the work. No claim for carriage of water whatsoever will be entertained.

52. The contractor shall employ one or more Engineering Graduate or Diploma holders as apprentice at his cost if the work as shown in the tender exceeds Rs.2,50,000.00. The apprentices may be selected by the Chief Executive Officer, Rourkela

Smart City Limited. The period of employment will commence within one month after the date of work order and would last till the date, when 90% of the work is completed. The fair wage to be paid to the apprentices should not be less than the emolument of personnel of equivalent qualification employed under Government.

53. List of tool & plants in running condition in possession of contractor is to be furnished in a separate sheet.

54. It is the responsibility of the contractor to procure and store explosive required for blasting operation if necessary. Department may render necessary possible help for procuring license.

55. For submission of a tender for the work, the tenderer will be deemed to have satisfied himself by actual inspection of the site and locality of the work about the quality and availability of the required quantity of materials, Medical aid, labour and Flood stuff etc and that the rates quoted by him in the tender will be adequate to complete the work according to the specifications attached thereto and that he had taken in to account all conditions and difficulties that may be encountered during its progress and to have quoted labour rates and materials with taxes, Octroi and other duties lead, lifts, loading and unloading freight for materials and all other charges necessary for the completion of the work to the entire satisfaction of the Engineer-in-charge of the work and his authorized subordinates. After acceptance of the contract rates RSCL will not pay any extra charges for any reason in case the contractor finds later on to have misjudged the conditions as regards the availability of materials, labour and other factors. The contractor will be responsible for any misuse, loss or damages due to any reasons whatsoever of any departmental material during the execution of work. In case of loss, damage or misuse, recovery at the rate at 5 times the cost of the materials will be deducted from the bills or his other dues.

56. The prevailing percentage of I.T. Department of the gross amount of the bill towards income tax will be deducted from the contractor's bill.

57. Deleted.

58. It must be clearly understood that under no circumstances any interest is chargeable for the dues or additional dues if any payable for the work executed and final bill pending disposal due to any reason whatsoever.

59. No extra payment will be made for removing spreading and consolidating salvaged metals and materials.

60. Under section 12 of contractors labour (Regulation and Abolition) Act. 1970 the contractor who undertakes execution of work through labour should produce valid license from licensing authorities of labour Department.

61. Performance Security:

61.1 If the rate quoted by the bidder is less than 15% of the tendered amount, then such a bid shall be rejected and the tender shall be finalized basing on merits of rest bids. But if more than bid is quoted at 14.99% (Decimals up to two numbers will be taken for all practical purpose) less than the estimated cost, the tender accepting authority will finalize the tender thorough a transparent lottery system where all bidders / their authorized representatives, the concerned CEO and CFO will remain present.

(Amendment to Appendix-IX, Clause-36 of OPWD Code Vol.-II by inclusion).

61.2 Additional performance security shall be obtained from the bidder when the bid amount is less than the estimated cost put to tender. In such an event, the bidders who have quoted less bid

price/rates than the estimated cost put to tender shall have to furnish the exact amount as per mentioned in below table i.e.

S.No	Range of Difference between the estimated cost put to tender and Bid amount	Additional Performance Security to deposited by the Successful Bidder
i	Below 5%	No Additional Performance Security
ii	From 5% and above and below 10%	50% of (Difference between Estimated cost put to tender and Bid Amount)
iii	From 10% and above	150% of (Difference between estimated cost put to tender and Bid Amount)

as Additional Performance Security in shape of Demand draft/ Bank Guarantee from Nationalised Bank, Schedule Bank for validly of one year/ Term Deposit Receipt of Schedule Bank/ Nationalized Bank pledged in favour of the Chief Executive Officer, Rourkela Smart City Limited and payable at Rourkela before signing the Agreement. The additional performance security in any other from will not be accepted. If the Contractor fails to complete the work, the amount so furnished as additional performance security will be forfeited in addition to the other penal clauses, if any to be imposed.

RSCL has already been appointed Project Management Consultant to supervise "Construction of Transit Home at Kaling Vihar in Rourkela on Percentage Rate Basis" and his role & responsibility as follows :

- Project Planning and Construction Supervision
- Supervision Manual
- Design, drawings and tender specifications
- Material Testing Quality Control
- Environmental Protection and Safety during Construction
- Certification of Interim and final payments
- Contract Administration
- Operation & Maintenance Manual Approval
- As Built Drawing approval
- Certification in Defect Liability Period
- Any Contract Dispute and assist in case of Arbitration.

The contractor has to assist and obey the technical assistants and guidance's of the consultant.

62. Sample of all material - The contractor shall supply sample of all materials fully before procurement for the work for testing and acceptance as may be requiring by the concerned Engineer in Charge.
63. All reinforced cement work should conform to Odisha Detailed specification and should be of proportion as per Contract Agreement having desired compressive strength (in work test) in 15 Cm cubes at 28days, after mixing and test conducted in accordance with IS 456 and IS 516.
64. Bailing out of water from the foundation, pipeline trenchess. Tanks / Soak pits/ Sumps/ M.H. etc. either rainwater or sub-soil water if necessary should be borne by the contractor. No payment will be made for benchmarks. Level pillars, profiles and benching and levelling the ground wherever required. The rates quoted should be fo r finished items of works inclusive of these incidental items of work. It sh ould be understood clearly that no claims whatsoever would be entertained.
65. The tenderer shall have to abide by the C.P.W.D. safety code rules introduced by the

Government of India, Ministry of work Housing and Supply in their standing order No-44150 dt .25.11.57.

66. The Contractor will have to submit to the PMC monthly return of labour both skilled and unskilled employed by him on the work.
67. All fittings for doors and windows P.H. & Electrical works as supplied by the Contractor should be of best quality and conform to relevant I.S. specification and should be got approved by the Engineer-in-charge/PMC of the respective wing before they are used on the work.
68. After completion of the work the contractor shall arrange at his own cost all requisite equipments for testing buildings, if found necessary and bear the entire cost of such test, including the inspection of Electrical Inspectorate.
69. The Tenderer should furnish along with their tender 1. A list of works, which are at present in their hand Schedule-F 2. List of work executed (Schedulele-C) in the prescribed proforma(s) enclosed herewith in appropriate place of bid document.

70. All reinforced cement concrete works should be finished smooth Extra charges for plastering if required to any R.C.C. structures like roof slab, Columns, Chajjas, fins, parapets, shelves etc. shall not be paid.
71. Deleted
72. Deleted
73. The tenderer may at his option quote reasonable rate for each item of work carefully so that the rate for one item should not be unworkable low and for others too high.
74. The contractor has to arrange the samples of materials required for execution to be got tested and approved by the Department before taking up the work and during course of execution required from time to time. All such samples will be tested at any of the Govt. of Odisha /Govt. Of India accredited Laboratory, at the cost of the Contractor with no extra cost to the Department.

75. If there is any damage to the work due to natural calamities like flood or cyclone or any other cause during the course of execution of work or up to 12 months after completion of work or if any, imperfection becomes apparent to the work within 12 months from the date of final certificate of completion of work the contractor shall make good of all such damages at his own cost with no extra cost to the Department. No claims, whatsoever, in this regard will be entertained.

76. The K. B. Bricks should be well burnt and of good qualities. The bricks should be approved by the Engineer-in-Charge before use in the work and should confirm to the minimum strength and other criteria as per National Building Code. Flyash bricks can also be used. Prior test and approval has to be taken for the brick vendors.

77. Under Section 1 of contract labour Regulation and Abolition Act 1970 the contractor who undertakes execution of work through labour should produce valid license from the licensing authority of labour Department.

78. Standard co-efficient for linear measurement will be adopted while calculating consumption of steel and no claim whatsoever regarding difference in co-efficient of steel will be entertained. The rates quoted shall be inclusive of any eventuality of difference for co-efficient for linear measurements.

79. Engineer Contractor desirous to avail the facility of exemption of E.M.D is required to submit an affidavit to the effect that he has not yet availed the facility / participated in the tender for more than two works (Excluding this work) during the current financial year. The name of work for which participated and the authority to whom the tender

was submitted must be mentioned in the affidavit, failing which the tender will be rejected.

80. That for the purpose of jurisdiction in the event of disputes if any of the contract would be deemed to have been entered in to within the State of Odisha and it is agreed that neither party to the contract will be competent to bring a suit in regard to the matter by this contract at any place outside the State of Odisha.

81. SPECIAL CONDITIONS (PART OF THE CONTRACT)

(I) All materials before they are being used in the items of work s as per this Schedule of quantities and also the finished items of work where tests are applicablee shall have to be tested through the Engineer-in-charge of the respective wing at appropriate Laboratories according to the relevant I.S. specifications of the materials and the said items of works and the cost of all such tests shall have to be borne by the Contractor and the rates of the items of works should be inclusive of cost of such tests.

(II) The tests have to be planned & carried out such that the progress of work is not hampered

(III) The tests are mandatory as per the prescribed frequencies and I.S specifications. However, these are not exhaustive and the Engineer-in-charge/PMC has the right to prescribe other required test if any as will be considered from time to time.

82. In case of ambiguity between clauses of this D.T.C.N. and the P-1 contract form, the relevant Clauses of the P-1 contract form shall prevail over the D.T.C.N. The clauses not covered under P-1 contract form shall be governed by the clauses of the D.T.C.N.

83. Schedule of quantities is accompanied in Cover-II (Price Bid). It shall be definitely understood that the Government does not accept any responsibility for the correctness or completeness of this schedule and that this schedule is liable for alternation or omissions, deductions or alternations set forth in the conditions of the contract and such omissions, deductions, additions or alternations shall no way invalidate the contract and no extra monetary compensation, will be entertained.

84. In case of any complaint by the labour working about the non-payment or less payment of his wages as per latest minimum Wages Act, the Engineer in Charge will have the right to investigate and if the contractor is found to be in default, he may recover such amount due from the contractor and pay such amount to the labour directly under intimation to the local labour office of the Govt. The contractor shall not empl oy child labour. The decision of the Engineer in Charge is final and binding on the contractor.

85. The contractor should arrange the materials like Steel, Cement, paint and bitumen etc. of approved quality and specification at his own cost for completion of the work with the time schedule. No extension of time will be granted on the application of the contractor due to delay in procurement of materials.

86. Wastage of bars and unnecessaryary lapping will not be considered for measurement and payment as per OPWD Code.

87. The contractor is required to pay royalty to Govt. as fixed from time of time and produce such documents in support of their payment to the concerned Engineer in Charge with their bills, falling which the amount towards royalties of different materials as utilized by them in the work will be recovered from their bills and deposited in the

revenue of concerned department.

88. Trial Boring - The foundation level as indicated in the body of the drawings are purely Tentative and for the general guidance only. The RSCL has no responsibility for the suitability of actual strata at the foundation level. The contractor has to conduct his own boring before starting the work and get the samples tested at his own cost to ascertain the S.B.C. and credibility of the strata at founding level while quoting his rates for tender the contractor shall take in to account of the above aspects.

89. Any defects, shrinkage or other faults which may be noticed within 12 (Twelver) months from the completion of the Construction work arising out of defective or improper materials or workmanship timing are upon the direction of the Engineer-in-Charge to be amended and made good by the contractor at his own cost unless the Engineer for reasons to be recorded in writing shall be decided that they ought to be paid for and in case of default Department may recover from the contractor the cost of making good the works. The RSCL will deduct retention money which will be Retention Money (5%) five percent from each running bill after correction if any by RSCL + Additional percentage to be deducted & withheld from each payment in voice after correction , if any by RSCL for repair/replacement of the work during defect liability period of 365 days from the date of completion of original work. Performance Security or additional Performance security will be release after the Completion of Defect Liability Period (DLP).

90. From the commencement of the works to the completion of the same, they are to be under the contractors charge. The contractor is to be held responsible to make good all injuries, damages and repairs occasioned or rendered necessary to the same by fire or other causes and they hold the RSCL harmless for any claims for injuries to person or structural damage to property happening from any neglect, default, want of proper care or misconduct on the part of the contractor or any one in his employment during the execution of the work. Also no claim shall be entertained for loss due to earthquake, flood, cyclone, epidemic, riot or any other calamity whether natural or incidental damages so caused will have to be made good by the contractor at his own cost.

91. Gradation of ingredients: The coarse and fine aggregate shall meet the grade requirement as per the latest provision of relevant. I.S. Code / I.R.C. code / MoRT&H specifications.

92. Where it will be found necessary by RSCL, the Officer-in-Charge of the work shall issue an order book to the contractor to be kept at the site of the work with pages serially numbered. Orders regarding the work whenever necessary are to be entered in this book by the Rourkela Smart City Corporation Limited Officer-in-Charge with their dated signatures and duly noted by the contractor or his authorized agents with their dated signature. Orders entered in this book and noted by the contractor's agent shall be considered to have been duly given to the contractor for following the instructions of the Department. The order Book shall be the property of the Rourkela Smart city Limited and shall not be removed from the site of work without written permission of the Engineer In Charge and to be submitted to the Engineer-in charge every month.

93. The contractor should attach the certificate in token of payment deposit with the registration authority as per recent circular of the Government relating to his registration.

94. In case of any discrepancy in printing or omissions of statutory specifications or any other part or portion of the approved document during download of the bid document, the decision of the officer inviting the bid will be binding on the bidder.

95. The rates quoted by the contractor shall cover the latest approved rates of SOR excluding GST i.e., Labours, Materials, P.O.L. and Royalties. Arrangement of borrow areas i.e. Land, Approach Road to the building site etc. are the responsibility of the contractor.

96. The rate for each work of concrete items wherever dewatering is imperatively necessary the term dewatering shall mean the execution or operation of the items due to standing water as well as due to percolation of water. The quoted rates will be inclusive of this.

97. The contractor shall make requisition of claim book from the date of commencement of the work from the RSCL and shall maintain in proper P.W.D. form with pages serially numbered in order to record items of works are not covered by his contract and claimable as extra. Claims shall be entered regularly in this book under the dated signature of the contractor or his duly authorized agents at the end of each month. A certificate should be furnished along with the claim to the effect that he has no other claim beyond this claim up-to-date. If in any month there are no claims to record, a certificate to that effect should be furnished by the contractor in the claim book. Each claim must be defined and should be given as for as possible regarding the quantities as well as the total amount claimed. The claim book must be submitted by the contractor regularly by 10th and 16th days of each month for orders of the Engineer-in- Charge or competent authority. Claims not made in this manner or the claim book not maintained from the commencement of the work is liable to be summarily rejected. The claim book is the property of the Rourkela Smart city Limited and shall be surrendered by the contractor to the Engineer-in-charge after completion of the work or before recession of the contract by the Department whichever is earlier for record.

98. Number of tests as specified in I.R.C. / MoRT&H / I.S.I specification required for the construction of roads / bridges / buildings or any other structural works will be conducted in any Govt. of Odisha /Govt. Of India accredited Laboratory to be decided by the Engineer-in-charge. Testing charges including expenditure for collection / transportation of samples /specimens etc. will be borne by the contractor. The collection of samples and testing are to be conducted for both prior to execution and during execution as may be directed by the Engineer-in-charge and on both the accounts the cost shall be borne by the contractor.

99. Even qualified criteria are met, the bidders can be disqualified for the following reasons, if enquired by the Department

a) Making a false statement or declaration.
b) Past record of poor performance.
c) Past record of abandoning the work half way/ recession of contract.
d) Past record of in-ordinate delay in completion of the work.
e) Past history of litigation.

100. In case the 1st lowest tenderer or even the next lowest tenderers withdraw in series one by one, thereby facilitating a particular tender for award, then they shall be penalized with adequate

disincentives with Blacklisting unless adequate justification for such back out is furnished. Appropriate action for black listing the tenderers shall also be taken apart from disincentives against the tenderer.

101. The following documents which are not submitted with the Bid, will be deemed to be part of the Bid:

S.No.	Particular
1	Notice Inviting tender
2	Instruction to the Bidder
3	Conditions of Contract
4	Contract data
5	Specifications
6	Drawings
7	Pre-Bid Meeting Minutes

102. ELIGIBILITY CRITERIA:

I. To be eligible for qualification, applicant s shall furnish the followings. Non-furnishing of the following particulars shall be treated as ineligible. The facility for exemption of ISD , either in full or in part ,as per instruction/guidelines of Govt. of Odisha / OPWD Code/Govt. of India/direction of Hon'ble Courts in India(with specified limitation and liberty) can be availed by intending and eligible class/category of Bidder(Contractors with Physical Disabilities/Engineer Contractors/ ST or SC Contractors/Such other Agency(s) conferred with this exemption facility if any). However this facility availed by any bidder for the above mentioned work shall be treated as genuine and admissible / Acceptable subject to submission of required documentary evidence/support in hard copy as described in DTCN and subsequent Verification of the same by RSCL..

II. Scanned copy of required Bid security diclartion as per the Clause No. 5 (i) and Clause No.20 of DTCN.

III. Scanned copy of demand draft towards cost of tender paper as per Clause No.4 and 5(i) of DTCN.

IV. After the date & time of receipt of bid is over, the original Bid security and Demand draft towards cost of Bid documents shall be submitted in the office of the undersigned on or before date & time of opening of Bid as specified at Contract data above, and as per date mentioned in contract Data during office hours on working days failing which the bid will be rejected.

V. Scanned cop y of valid Registration Certificate, PAN card along with the tender documents and the originals of all scanned documents & VAT clearance certificate in form VAT 612/GST Clearance Certificate of the successful lowest bidder only are to be produced within 5(five) days after opening of Cover-II of the tender in the office of the Chief Executive Officer, RSCL otherwise his/her bid shall be declared as non-responsive he will suspend/prohibit/debar/blacklist from participating in bidding in any contract of the State for a minimum period of 180 days and /or Cancelation of Empanelment (registration of from OPWD) action will be taken by the competent authority. In such a situation , successful L-2 bidder will be required to produce his original documents for consideration of his tender at the negotiated rate equal to L-1 bidder

VI. License criteria as per Clause No.8 of DTCN and Schedule-H need to be furnished

VII. Joint Ventures are not accepted

2.2.1 Bidder/ Firm should furnish list of similar works executed during last five years stating the Agreement No., date of commencement and completion, actual date of completion duly certified by the employer. The certificate to that effect has to be obtained from an officer not below the rank of Executive Engineer concerned with the work under report. The bidder must have completed /Substantial Completed (80% of awarded cost) any one or more Civil Project(s) in any one year during last five years up to value of **Rs. 4.24 Cr.(Rs. Four Crore and Twenty Four Lakhs).**

Bidder should submit all the credentials along with all experience certificates. Copy of Completion Certificate / Work order / Agreement any other document in support of successful completion of job along with Reference of person under whom jobs are executed. Substantial Completion shall be based on 80 (eighty) percent value wise or more works completed under the contract and Completed value must be equal or more of **Rs. 4.24 Cr.(Rs. Four Crore and Twenty Four Lakhs).**

2.2.2 The Bidder should have annual turnover of Civil Engineering works equal to the estimated cost of the Project i.e. **Rs. 4.24 Cr.(Rs. Four Crore and Twenty Four Lakhs)** in any one year during last five (5) financial years.

Turnover of previous year will be escalated @10% per financial year (on compound basis) shall be considered on the value of "annual turnover of the proceeding years. The cost of completed / substantial Completed similar nature of work shall be given additional weightage of percentage per year to bring them to current price level to account for price escalation as illustrated below:

Year	Turnover/Similar work	Effective cost executed work at previous completed financial year's price level
2016-17	E	1.61 x E
2017-18	D	1.46 x D
2018-19	C	1.33 x C
2019-20	B	1.21 x B
2020-21	A	1.10 x A

The Turn over need to be certified with 'UDIN' by a registered Chartered Accountant

Note: 1.Technical Bud must be accompanied by the annual turnover Certificate of the Bidder for the last 5 (five) financial years, preceding the year in which the bid is submitted. In case the annual accounts for the latest financial year i.e. 2020-21 is not audited and therefore the bidder cannot make it available, the Bidder shall give an undertaking to this effect and the statutory auditor/Chartered Accountant shall certify the same. In such case, the Bidder shall provide the annual turnover for 5

(five) years preceding the year for which the Audited Annual Report is not being provided. i.e.

2015-16	2016-17	2017-18	2018-19	2019-20

I. Scanned copy for information regarding current litigation, debarring / expelling of the applicant or abandonment of work by the applicant in schedule "D" and scanned copy of affidavit to that effect including authentication of tender documents in schedule "E" & furnish the original affidavit in Schedule-E within 5 (five) working days of opening of Cover-II as per clause 49.

II. No Relationship Certificate in Schedule – A

III. List of projects under execution in Schedule-F

IV. List of projects executed that are similar in nature to the work as per Schedule-C

V. Affidavit of eligibility from schedule –K to O

VI. Certificate of employment of unemployed Engineering Graduate as per format Schedule-G for 'A' Class and above Regd. Contractor

VII. Undertaking of Bidder as per format Schedule G.

VIII. Declaration of relation in the Dept. if any in Schedule I

IX. MOU with Electrical Contractor in Schedule –J

X. List of equipment on Owned/lease basis in Schedule K

XI. Affidavit for SC/ST Bidder in format Schedule-L

XII. Affidavit for Physically Handicapped Bidder in format Schedule-M

XIII. Affidavit for Engineering Contractor in format Schedule-N

XIV. Affidavit for Bidder not registered in EPFO in format Schedule-O

XV. Bid Security Declaration (Vide Works Department Office Memorandum "OM No.07556900052021 (pt)-5984/ w dated 27-04-2021- Annex-IV.

XVI. BID CAPACITY Declaration:- (Vide Works Department Office Memorandum No.6300 dtd. 16.06.2011)

Applicants who meet the minimum qualification criteria will be qualified only if their available bid capacity at the expected time of bidding is more than the total estimated cost of the Project.

The available Bid Capacity will be calculated as under.

Assessed Available Bid Capacity= (A*N*2-B), where

A = Maximum value of Civil Engineering works executed in any one year during

the last five years (updated to the current price level) rate of inflation may be taken as 10% per year(escalation factor) which will taken into account the completed as well as works in Progress.

N = 0.50 Year (In word half Year) Number of years prescribed for completion of the works for which the bids are invited.

B = Value of Current price level of the existing commitments and on-going works to be completed during the next years(Period of completion of work for which Bids are invited. The Statement showing the value of existing commitments and on-going works as well as the stipulated period of completion remaining for each of the works listed should be countersigned by the Engineer-In-Charge not below the rank of an Executive Engineer. Escalation factor: Following enhancement factors will be issued for the Cost of works executed and the financial figures to a common base value for works completed in India.

Year Before	Multiplying Factor
One	1.10
Two	1.22
Three	1.33
Four	1.46
Five	1.61

(Applicant should indicate actual figures of costs and amounts for the works executes by them without accounting for the abovementioned factors)

In case the financial figures and value of completed works are in foreign currency the above enhanced multiplying factors will be applied . Instead , current market exchange rate (State Bank of India BC selling rate as on the last date of submission of the Bid) will be applied for the purpose of conversion of amount in foreign currency into Indian Rupees.

- **Note:2** Bidder must be submit Photographs / Video evidences of the completed works and lighting work in CD form along with Bid document.

103. Time Control :- (Vide Works Department Office Memorandum No.24716 dtd.24.12.2005 and No.8310 dtd.17.05.2006) Progress of work and Re-scheduling programme.

a)

i. The Engineer-in-Charge shall issue the letter of acceptance to the successful contractor.

The issue of the letter of acceptance shall be treated as closure of the Bid process and commencement of the contract.

ii. Within 15 days of issue of the letter of acceptance, the contractor shall submit to the Engineer-in- Charge for approval a Programme showing the general methods, arrangements, and timing for all the activities in the Works along with monthly cash flow forecast.

iii. To ensure good progress during the execution of the work the contractors shall be bound in all cases in which the time allowed for any work exceeds

one month to complete, 1/4th of the whole time allowed under the contract has elapsed, ½ of the whole of the work before ½ of the whole time allowed under the contract has elapsed, 3/4th of the whole of the work before 3/4th of the whole time allowed under the contract has elapsed.

iv. If at any time it should appear to the Engineer-in-Charge that the actual process of the work does not conform to the programme to which consent has been given the Contractor shall produce, at the request of the Engineer-in-Charge, a revised programme showing the modifications to such programme necessary to ensure completion of the works within the time for completion. If the contractor does not submit an updated Programme within this period, the Engineer-in-Charge may withhold the amount of 1% of the contract value from the next payment certificate and continue to withhold this amount until the next payment after the date on which the overdue Programme has been submitted.

v. An update of the Programme shall be a programme showing the actual progress achieved on each activity and the effect of the progress achieved on the timing of the remaining work including any changes to the sequence of the activities.

vi. The Engineer-in-Charge's approval of the Programme shall not alter the Contractor's obligations. The Contractor may revise the Programme and submit it to the Engineer-in- Charge again at any time. A revised Programme is to show the effect of Variations and Compensation Events

c) Extension of the Completion Date.

If the contractor fails to maintain the required progress in terms of clause-2 of P-1 Contract or to complete the work and clear the site on or before the contract or extended date of completion, he shall, without prejudice to any other right or remedy available under the law to the Government on account of such breach, pay as agreed compensation the amount calculated at the rates stipulated below as the Municipal Commissioner (whose decision in writing shall be final and binding) may decide on the amount of tendered value of the work for every completed day / month (as applicable) that the progress remains below that specified in Clause-2 of P-1 Contract or that the work remains incomplete. This will also apply to items or group of items for which a separate period of completion has been specified. Compensation @ 1.5% per month of for delay of work, delay to be completed on per Day basis. Provided always that the total amount of compensation for delay to be paid under this condition shall not exceed 10% of the Tendered Value of work or to the Tendered Value of the item or group of items of work for which a separate period of completion is originally given. The amount of compensation may be adjusted or set-off against any sum payable to the Contractor under this or any other contract with the Government. In case, the contractor does not achieve a particular milestone mentioned in contract data, or the rescheduled milestone(s) in terms of Clause-2.5, the amount shown against that milestone shall be withheld, to be adjusted against the compensation levied at the final grant of extension of time. Withholding of this amount on failure to achieve a milestone shall be automatic without any notice to the contractor. However, if the contractor catches up with the progress of work on the subsequent milestone(s), the withheld amount shall be released. In case the contractor fails to make up for the delay in subsequent milestone(s),

amount mentioned against each milestone missed subsequently also shall be withheld. However no interest whatsoever shall be payable on such withheld amount.

d) Bonus for early completion

Deleted

e) Management meetings

i. Either the Engineer or the Contractor may require the other to attend a management meeting. The business of management meetings shall be to review the plans for remaining work and to deal with matters raised in accordance with the early warning procedure.

ii. The Engineer shall record the business of management meetings and is to provide copies of his record to those attending the meeting and to the Employer. The responsibility of the parties for actions to be taken to be decided by the Engineer either at the management meeting or after the management meeting and stated in writing to all who attended the meeting.

Rescission of Contract (Amendment as per letter No.10639 dt.27.05.2005 of Works Department, Odisha):- To rescind the contract (of which rescission notice in writing to the contractor under the hand of the Municipal Commissioner shall be conclusive evidence), 20% of the value of left over work will be realized from the contractor as penalty.

104. Building and other Construction Workers Welfare Cess @ 1% of the estimated cost as per tender notification read with latest corrigendum if any will be proportionately deducted from the contractor's bill at the time of making payment of each bill.

105. The tenderers are required to go through each clause of P.W.D. Form P-1 carefully in addition to the clauses mentioned here in before tendering.

106. A Contractor may be black listed as per amendment made to Appendix XXXIV to OPW D Code Vol.-II on rules for black listing of Contractors vide letter no.3365 dt.01.03.2007 of Works Department, Odisha.

As per said amendment a Contractor may be blacklisted

a) Misbehaviour/threatening of Departmental & supervisory officers during execution of work/tendering process.
b) Involvement in any sort of tender fixing.
c) Constant non-achievement of milestones on insufficient and imaginary grounds and non-adherence to quality specifications despite being pointed out
d) Persistent and intentional violation of important conditions of contract.
e) Security consideration of the State i.e. any action that jeopardizes the security of the state.
f) Submission of false/ fabricated / forged documents for consideration of a tender.

107. The safety certificate of the E.I. work will be furnished by the agencies after getting necessary verification from the electrical inspector / equally competent authority responsible for the work prior to Energisation of the building.

108. Percentage rate contract (vide Works Department letter no.8310 dt.17.05.2006) In case of percentage rate tender:-

i. The Contractor has to mention percentage excess or less over the estimated cost (In figures as well as words) in the prescribed format appended to

the tender document.

ii. Contractors participated in the tender for more than one work may offer conditional rebate. Rebate offer submitted in separate sealed envelope shall be opened, declared and recorded first. The rebate so offered shall be considered after opening of all packages called in the same Tender Notice. The Contractors who wish to tender for two or more works shall submit separate tender for each. Each tender shall have the Bid Identification No., Name & Sl. No. of the work (as per IFB) to which they refer, written on the envelope.

iii. Only percentage quoted shall be considered. Percentage quoted by the Contractor should be accurately filled-in figures and words, so that there is no discrepancy.

1) If any discrepancy is found in the percentage quoted in words and figures, then the percentage quoted by the Contractor in words shall be taken as correct
2) If any discrepancy is found in the percentage quoted in percentage excess/ less and the total amount quoted by the Contractor, then percentage will be taken as correct.
3) The percentage quoted in the tender without mentioning excess or less and not supported with the corresponding amount will be treated as excess.
4) The percentage quoted in the tender without mentioning excess / less supported with corresponding amount does not tally with either to percentage excess or less then it will be treated as percentage excess.
5) The percentage quoted in the tender without mentioning excess / less supported with corresponding amount if tallied with the percentage then it will be treated as to which side the amount tallies.
6) The Contractor will write percentage excess/ less up to two decimal points only.
7) The tender shall be written legibly and free from erasures, over writings or corrections of figures. Corrections, over writings & interpolations where unavoidable should be made by making out, initialing, dating and rewriting.

iv. In the contract P1 time is the essence. The contractor is required to maintain a certain rate of progress specify in the contract.

v. The quantity mentioned can be increased or reduced to the extent of 10% for individual items subject to a maximum of 5% over the estimated cost. If it exceeds the limit stated above prior approval of competent authority is mandatory before making any payment.

vi. The period of completion is fixed and cannot be altered except in case of exceptional circumstances with due approval of next higher authority.

vii. Bills for percentage rate tenders shall be prepared at the estimated rate for individual items only and the percentage excess or less shall be added or subtracted from the gross amount of the bill.

APPROVED

Chief Executive Officer

Tenderer (s) is/are required to submit the information in the following Schedules

SCHEDULE - A

CERTIFICATE OF NO RELATIONSHIP

/We hereby certify that I/We* am/are* related / not related(*) to any officer of Rourkela Smart City Limited of the rank of Assistant Engineer & above and any officer of the rank of Assistant /Under Secretary and above of the Works Department, Govt. of Odisha I/We* am/are* aware that, if the facts subsequently proved to be false, my/our* contract will be rescinded with forfeiture of E.M.D and security deposit and I/We* shall be liable to make good the loss or damage resulting from such cancellation.

(*) - Strike out which is not applicable

Signature of the Tenderer Date:-

SCHEDULE – B

A. Brief Company profile

SL.NO.	PARTICULARS Name of Bidder	DESCRIPTION OR DETAILS
1	Name of Bidder	
2	Legal status of Bidder (Individual ,Firm, Company, Pvt.. Ltd., LLP etc.)	
3	Main business of the Bidder	
4	Registered office address	
5	Incorporation date and number	
6	GST Registration Certificate (State And Central)	
7	PAN details	

8	Primary Contact Person (Name, Designation, address, mobile number, fax, email)	
9	Secondary Contact Person (Name, Designation, address, mobile number, fax, email)	
10	EMD/Bid Security Declaration details	

B. Certificate of Incorporation

(To be submitted by sole Bidders)

C. Financial Turnover
(To be submitted by Sole Bidder)

The financial turnover of the company is provided as follows as per Clause no 102 of DTCN

	2016 – 17	2017-2018	2018-19	2019-20	2020-21
Annual Turnover					

Copy of audited financial statements or declaration from the appointed Chartered Accountant to be provided as proof of the financial turnover with UDIN no. on its certificate.

- In case the annual accounts for the latest financial year i.e. 2020-21 are not audited and therefore the bidder cannot make it available, the Bidder shall give an undertaking to this effect and the statutory auditor/Chartered Accountant shall certify the same. In such case, the Bidder shall provide the annual turnover for 5 (five) years preceding the year for which the Audited Annual Report is not being provided. i.e.

2015-16	2016-17	2017-18	2018-19	2019-20

SCHEUDLE – C

WORK EXPERIENCE

LIST OF SIMILAR NATURE OF PROJECTS EXECUTED AS PER CLAUSE NO 102 OF DTCN

i.

Project Code	Name of Employer	Name of location and name of work	Contract price in Indian Rupees/ Agreement no.	Major Items of works	Date of starting the work as per Agreement	Stipulated date of completion of the work as per Agreement	Actual date of completion of the work	Reasons for delay in starting/ completion if any
	1	2	3	4	5	6	7	8
A								

B								
C								
..								

ii.

S.No	Projects Code	Year 1 Total Receipt from Project	Year-2 Total Receipt from Project	Year-3 Total Receipt from Project	Year-4 Total Receipt from Project	Year-5 Total Receipt from Project
1	A					
2	B					
3	C					
..	..					
..	..					
Total		Total of Year 1	Total of Year 2	Total of Year 3	Total of Year 4	Total of Year 5

Note: 1. The above information is to be certified by the Engineer in Charge / Employer not below the rank of Executive Engineer vide Completion Certificate.

Signature of the Tenderer

Date.

SCHEDULE – D

INFORMATION REGARDING CURRENT LITIGATION, DEBARRING EXPELLING OF TENDERER OR ABANDONMENT OF WORK BY THE TENDERER

1	a)	Is the tenderer currently involved in any litigation relating to the works.	Yes / No
	b) If Yes : given details:		
2		Has the tenderer or any of its constituent partners been debarred/ expelled by any agency in India during the last 5 years.	Yes / No
3	a)	Has the tenderer or any of its constituent partners failed to perform on any contract work in	

		India during the last 5 years.	

b) If yes, give details

Note:

If any information in this schedule is found to be incorrect or concealed, qualification application will summarily be rejected.

Signature of Tenderer

SCHEDULE – E

AFFIDAVIT

1. The undersigned do hereby certify that all the statements made in the required attachments are true and correct.
2. The undersigned also hereby certifies that neither my / our firm / company / individuals _____ nor any of its constituent partners have abandoned any road/ bridge/Irrigation /Buildings or other project work in India nor any contract awarded to us for such works have been rescinded during the last five years prior to the date of this bid.
3. The undersigned hereby authorise(s) and request(s) any bank, person, firm or Corporation to furnish pertinent information as deemed necessary and as requested by the Department to verify this statement or regarding my (our) competency and general reputation.

4. The undersigned understands and agrees that further qualifying information may be requested and agree to furnish any such information at the request of the Department.

(Signature of Tenderer)
Title of Officer
Name of Firm
Date:

Original Affidavit sworn before Notary Public or Executive Magistrate

Schedule-F

EXISTING COMMITMENTS AND ON-GOING WORKS:

i.

Project Code	Name & Description of works	Place & State	Contract No.	Name & Address of Employer	Value of Contract (`In Cr.)	Stipulated Period of Completion	Value of works * remaining to be completed (`In	Anticipated date of completion
A								
B								
C								

ii.

S.no	Projects Code	Year 1 Total Receipt from Project	Year-2 Total Receipt from Project	Year-3 Total Receipt from Project	Year-4 Total Receipt from Project	Year-5 Total Receipt from Project	Year-6 Total Receipt from Project
1	A						
2	B						
3	C						
..	..						
..	..						
Total		Total of Year 1	Total of Year 2	Total of Year 3	Total of Year 4	Total of Year 5	Total of Year 6

Schedule-G

Certificate of Employment of Unemployed Graduate Engineer/Architecture/Diploma Holder
(For Above A Class Contractors only)

I/We herby certify that at present , the following Engineering Personnel are working with me/in our firm/Company and their bio-data are furnished below:

S.No.	Name of Engineering Personnel appointed for supervising Contractor	Qualification	Date of Appointment	Monthly Emoluments	Whether full time engagement and continuous	if they are superannuated/ retired/dismissed or removed personnel from State Govt. /Central Govt./ PSU/Pvt.

	s work with Address					Companies or any one ineligible for Government Service
1	2	3	4	5	6	7
2						
3						
4						
5						
6						
7						

Schedule-H

UNDERTAKING

This is to certify that

1. My firm has neither been associated , directly or indirectly , with the Consultant or with any other entity that has prepared the design ,specifications, and other documents for the Project nor has any person associated with been proposed as Project manager for the Contract.
2. My firm has not engaged any agency and any of its affiliates engaged by the Engineer in Charge to provide Consulting services for the preparation or supervision of this work.
3. My firm has not engaged any Engineer of Gazetted rank employed in Engineering or Administrative duties in an Engineering Department of the Government of Odisha or other Gazetted Officer retired from Government Service during last two years without prior permission of the Government of Odisha in wining before submission of this tender. I am aware that my contract is liable to cancelled if either i or any of my employees is found any time to be such a person who had not obtained

the permission of the Government of Odisha as aforesaid.

4. I/We have visited the site and have fully acquainted with the local condition regarding the materials labour and factors pertaining to work for completion in all respect before submitting the tender.
5. I/We have carefully studied the conditions of the Construction ,specification, contract condition and all other documents relating to this work and agree to execute the same accordingly.

6. I/We solemnly pledge that I/We shall sincere in discharging my/our duties as responsible contractor and complete the work within the prescribed time limit. In case there are deviation from the Construction Programme , I/We shall abide by the decision of Engineer –In-Charge for revision of programme and arrange for the labours, materials, equipments etc accordingly.
7. In the event of award of the work to me/us. I/We undertake the entire responsibility for the structural stability to reconstruct/replace the whole or part of the Component of the structure in the event of failure or improper functioning /Improper Construction within a period of one year from the date of completion without asking extra payment from the account of department.

8. I/We undertake that I/We shall not claim any escalation of cost on account of materials , labours, taxes from any account in connection with work with execution of the work till the actual completion period and shall not be entertained by Rourkela Smart City Limited,

9. In case of vaiolation of contents of department's tender documents in shape of extra conditions or in any form , my offer/tender shall be rejected by the department without any intimations to me/us.

Signature of the Tenderer

Date:

SCHEDULE –I

RELATIONSHIP DECLARATION

To,

Chief Executive officer,

Rourkela Smart City Limited

Subject: (Name of Work"…… Bid reference number)

Sir,

Pursuant to clause 2 of the ITB, it is to inform that I have relative(s) employed as an Officer in the rank of an Assistant Engineer/Under Secretary under the

_____

Department. His (Their) details are as follows.

Relationship

Name:			
Office			
Address			
Pursuant to clause 2 of the ITB, I am to submit herewith the names of persons who are working under my firm having near relatives to any gazetted officer in the rank of an Assistant Engineer/Under Secretary in the _____ Department.			
S.No	Name of the my employee and his designation in the firm	Presently working at	Details of his relatives working in the Department
			Relationship
			Name:
			Designation
			Office
			Address
			Relationship
			Name:
			Designation
			Office
			Address

I am also duty bound to inform the relationship of any subsequent employment with any gazetted officer in the rank of an Assistant Engineer/Under Secretary in the _____ Department. I am aware that any breach of this condition would render my firm liable for penal action for suppression of facts.

Yours Sincerely
Signature of the Tenderer

SCHEDULE –J

MEMORANDUM OF UNDERSTANDING

First Party I Sri/Smt.……, Aged …. years, S/O- ……..……..,

At / P.O. / Dist-…… (Hereinafter called the First Part)

AND

Second Party I Sri/Smt.……, Aged …. years, S/O-

……..…., At / P.O. / Dist-…… (Hereinafter called the Second Part) having M.V. license registration No……. valid up to ……..

AND WHEREAS the First Party of 1st part is the managing partner of ……. AND WHEREAS the First Party willing to appoint the Second Party to execute the E.I. portion for the tender work, "……."

AND WHEREAS the Second Party accepted the offer of First Party.

NOW THIS DEED OF AGREEMENT WITNESSES AS FOLLOWS;

1) That, the Second Party shall do all E.I. works, if the tender is awarded to First Party.

2) That, the Second Party shall fulfill all the E.I. works as per the tender schedule by instruction of Engineer-in-Charge.

3) That, the First Party shall receive payment, signing the bill the document for the concerned work.

4) That, the Second Party shall abide the rules, regulations and specification of E.I. works of above said matter.

In witness where of both the party have signed in presence of

WITNESS

W_1 –

W_2 –

Schedule-K

Information (Machineries owned/possessed on lease/hire) Details of machinery possessed owned / leased/ hired

SL No	Name of the Machineries	No of Machineries	Owned/Hired/Leased
1	10/7 Concrete Mixer	3	
2	Excavator	1	
3	Vibrator	6	
4	Tractor /Tipper	2	
5	Water Tanker	2	

NB. Scan copies of Owned or leased or hired receipts/Agreements of the above machineries must be uploaded into Technical Cover.

Schedule-L

AFFIDAVIT

(Applicable for SC/ST Bidders)

1. I, Sri/Smt/Ms……,Son/Daughter/Wife of ……..., hereby declare that;

   a. I am a registered ……..Class ST/SC Contactor under Govt. of Odisha

   Or

   b. The Partnership Firm/Private Ltd. Company named/titled, as "……" is a registered SC/ST Contractor under Govt. of Odisha within the ambit specified in Works Department Resolution No. 27748 dt. 11.10.77 and I, Sri/Smt/Ms……..……, Son/ Daughter/ Wife of ……..,

is authorized signatory on behalf of the Firm/Company (scanned authorization copy with my signature duly certified and attested/identified has been submitted on-line with our tender).

[Tick (a) or (b) above whichever is applicable and fill up accordingly.]

2. As per Works Department, Govt. of Odisha Resolution No.27748 dt.. 11.10.77, I/My Firm am/is entitled for exemption of 50% ISD and accordingly, I/My Firm have/has submitted tender for the work.
3. I/My Firm hereby submit willingness to avail price preference as ST/SC category Civil Contractor as entitled in the aforesaid resolution.
4. Necessary documentary evidence(s) as prescribed in the Tender Notice at * in support of my/our aforesaid claim for exemption of ISD have/has been duly up-loaded on-line/submitted along with my/our tender for the aforesaid work.
5. In addition to those, other documents and original(s), as required by CEO, RSCL to sustain my/our aforesaid claim shall be submitted by me/us within a week from the date of instruction/intimation of CEO,, RSCL through telephone/letter/e-mail failing which my/our tender shall be liable for rejection .

(*) –Strike out which is not applicable.

(Deponent)

(Signature of the Tenderer/Authorised Signatory in case of
Partnership Firm/Company with Seal of the Firm/Company) . Original Affidavit sworn before Notary Public or Executive Magistrate

Schedule-M

AFFIDAVIT

(Applicable for Contractors with Physical Disabilities)

1. , Sri / Smt / Ms ……,Son / Daughter / Wife of ……. …., hereby declare that I am a registered ……..Class Contactor with Physical Disabilities within the ambit prescribed in Works Department, Odisha- Resolution No.23934 dt.8.11.91

2. As per the said Resolution, I am entitled for exemption of ISD and accordingly , I have submitted tender for the work.

3. Necessary documentary evidence(s) as prescribed in the Tender Notice at in support

of my aforesaid claim for exemption of ISD have/has been duly up-loaded on-line/submitted along with my tender for the work.

4. In addition to those, other documents and original(s), as required by CEO, RSCL to sustain my aforesaid claim shall be submitted by me within a week from the date of instruction/intimation of CEO, RSCL through telephone/letter/e-mail failing which my tender shall be liable for rejection.

(Deponent)

Original Affidavit sworn before Notary Public or Executive Magistrate

Schedule-N

AFFIDAVIT

(Applicable for Engineer Contractors Intending to Avail Exemption of ISD as per OPWD Code)

1. I, Sri/Smt/Ms…….. hereby declare as the Contractor/as the authorized signatory on behalf of the Contractor,"……..”(Strike out whichever is not applicable) do hereby solemnly affirm and state as follows.
2. That, I/we am/are a registered …….. Class Engineer

   Contractor
3. That, I/we herewith claim exemption of ISD during the

Year……. For participation in the tender for this work.

4. That, I/we have not exhausted the facility available to me/us an Engineer Contractor during the year……. for exemption of ISD as per Works Deptt. Guideline & OPWD Code.
5. That, I/we shall ensure production of my/our valid Original Contractor's Registration Certificate (license) after or during opening of bids (as per direction of CEO, RSCL for the above work for verification and also for subsequent entry of exemption of ISD (if selected as the contractor for this work and availed the exemption of ISD in my/our license as per direction of CEO,RSCL, within such time as directed by him failing which action, as decided by RSCL, may be taken against me/us and appropriate steps may be taken by RSCL to facilitate execution of the tendered work

(*)- Strike out which is not applicable

(Deponent)

(Signature of the Tenderer /Authorised Signatory in case of Partnership Firm/Company with Seal of the Firm/Company)

Original Affidavit sworn before Notary Public or Executive Magistrate

Schedule-O

Affidavit

(Applicable for the Bidder not registered under EPF)

I, Sri/Smt/ Ms.……hereby declare as the Contractor /as the authorised signatory on behalf of the Contractor ……(Strike out whichever is not applicable) do hereby solemnly affirm and state as follows.

1. That as on date, I/W e am/are not registered with RPFC(Regional Provident Fund Commission) and solemnly affirm that, I/W e shall follow the " Employees Provident Fund and Misc Provision Act, 1952 & Rules /Schemes" made there under, in case the work is awarded to me/us

2. That I/We shall submit, after execution of work and before payment of any bill, the detail list of labours, such as

    a) Name:
    b) Father's name:
    c) Place of Permanent Residence:
    d) Statement of Wages paid to them till the completion of the Work

3. The RSCL Authority will be at liberty to deduct 26% of the labour component amount of the Contract & shall retain it as an additional security with RSCL.
4. That. In case I/We submit the EPF Registration Certificate, then the said additional security shall be released to me /us by RSCL without any interest subject to fulfilment of other Compliances/conditions.
5. That , this affidavit is required to be produced before the authority of Rourkela Smart City Limited for tender purpose.

That the facts stated above are true to the best of my /our knowledge.

(Deponent

(Signature of the Tenderer/Authorised Signatory in case of Partnership Firm/Company with Seal of the Firm/Company)

Original Affidavit sworn before Notary Public or Executive Magistrate

ANNEXURE-I
FORM OF AGREEMENT

(First page to be filled up and signed in non –judicial stamp paper of worth Rs.100/-)

This contract made on Dt……between Rourkela Smart City Limited (RSCL) , hereinafter called " the employer" and ……..(name and address of the selected bidder), hereinafter called "the Contractor"

Whereas, the employer is desirous that the Contractor shall execute;
"Construction of Transit Home at Kaling Vihar in Rourkela on Percentage Rate Basis."

vide Bid Reference no……/Dt……,,,,,,,(hereinafter called "the work") and the

employer has accepted the bid of the Contractor for execution and completion of such works and rectifications of defects , if any, at an accepted tender/contract price of Rs.……(Rupees) only.

Now, therefore, it is herby agreed upon by RSCL and the Contractor as follows:

1. In this contract, words and expressions shall have the same meanings as are respectively assigned to those in this DTCN and the Contract form as a whole. The DTCN and agreement shall be deemed to form and be read as construed as part of this contract with a view to maintaining the sanctity of this contract for successful execution and completion of the work unless otherwise clarified/redefined at a later stage during the Contract remains in force including the defect liability period.
2. In consideration of the payments to be made by the employer, the Contractor herby covenants with the employer to execute and complete the work and rectify the defects therin, if any , in conformity with the provisions of this contract.
3. The employer hereby covenants to pay the Contractor in consideration of the execution and completion of the work and for rectification of defects , if any , wherein the contract price or such other sum, as may become payable under the provisions of the contract and in the manner prescribed under this Contract.
4. The following documents shall be deemed to form, read and construed in conjunction with other portions/clauses/conditions of this contract and DTCN.

   I. DTCN invited for the work including the Short Notice
   II. Contractor's Bid and negotiation correspondence , if any
   III. Letter of Acceptance/Letter of Intent for the Work(LOA/LOI)
   IV. Notice to proceed with the work (Work Order) to be issued by RSCL and subsequent instructions of RSCL to the selected Bidder subject to confirmation of the same, if required , by RSCL through written notice to the selected bidder.
   V. P1 Agreement which includes Items, Quantities, Rates and Amounts of the work to be duly signed by RSCL and the Contractor.
   VI. Copy of agreements drawn by the contractor with electrical Contractor vide scope of work of DTCN for Electrical Works.
   VII. Instruction/intimation of RSCL for execution of extra work/item/quantity found essential for the work and corresponding rates not covered in the agreement/DTCN /Financial Bid and also curtailment/exclusion of any items of the Financial Bid from execution.
   VIII. Drawing, design, work programme or part thereof submitted by the contractor and duly approved by RSCL with or without modification.
   IX. Letter/ Intimation/ Instruction(including physically and over telephone) of RSCL for repair/replacement/ defect rectification, if any, with respect to modified quality/specification for such repair/ replacement/ defect rectification work and allowed time to accomplish the same either during the execution of the work or during the defect liability period of 365 days from the officially declared /notified/noted date of completion of the whole work including additional/curtailed items/ quantities of the work as per direction of RSCL. RSCL reserve the right to declare/ note the date of completion of the original work and date of expiry of defect liability period which will be binding upon the Contractor.

In witness whereof , the aforesaid two parties have entered into this contract on the date mentioned above.

Binding Signature of Employer signed by……..
(for and on behalf of Rourkela Smart City Limited-Employer)

Binding Signature of Contractor signed by……..
(authorised signatory in case of firm/company with applicable authorisation letter/declaration attached to this Contract)

In presence of witnesses
1. Name:
Address:
Tel No: Signature
2. Name:
Address:
Tel No: Signature

Signature of Contractor
(Authorised Signatory with Seal)
(Authorised Signatory with Seal)

Signature of Employer
(Authorised Signatory with Seal)

APPENDIX - II
Form of Bid Security Declaration

(Refer DTCN Clause 20)
Letter head of the Bid –
Date
Name of the Project: "Construction of Transit Home at Kaling Vihar in Rourkela on Percentage Rate Basis in Rourkela on Percentage Rate Basis".

Bid No.

To

Chief Executive Officer,
Rourkela Smart City Ltd.
Udit Nagar,Rourkela
(Insert complete name and address of the Authority/Employer/Tender Inviting Authority)

We, the undersigned declare that:

1. We understand that, according to your conditions, bids must be supported by a Bid Security Declaration.
2. We accept that the Authority/Employer/Tender Inviting Authority shall cancel our Empanelment (registration of OPWD) and / or suspend/prohibit/debar/blacklist from participating in bidding in any contract of the State for a minimum period of 180 days, if we are in breach of our obligation(s) under the bid conditions, because we:

(a) Have withdrawn out Bid prior to the expiry date of the bid validity specified in the letter of Bid or any extended date provided by us; or

(b) Having been notified of the acceptance of our Bid by the Employer prior to the expiry date the bid validity in the Letter of Bid or any extended date provided by us,

(i) Failure of use to furnish the Performance Security and Additional Performance Security, if required in accordance DTCN/Terms of the Bid Document, or

(ii) Fail to agree to the decisions of the contract negotiation meeting or

(iii) Failure refuse to execute the Contract.

3. We understand this Bid Security Declaration shall expire, if we are not the successful Bidder, upon the earlier of your notification of the name of the successful Bidder through award of contract;

or

(ii) after the expiry date of the Bid validity.

Name of the Bidder_____

Name of the person duly authorized to sign the Bid on behalf of the Bidder_____

Title of the person signing the Bid _____

Signature of the person named above _____

Date signed _____ day of_____

• In the case of the Bid submitted by joint venture specify the name of the Joint Venture as Bidder- NA

• Person signing the Bid shall have the power of attorney given by the Bidder attached to the Bid.(In case of Partnership firm/Company/LLP/ Cooperative society

Annexure-III

All Financial Transaction Related to the Project must be abide with the Following Instruction

As per Govt. of Odisha Finance Department No. 24705 /F Dt.20.07.2019 or any amendment "Selection of Banks for handling business and deposits of State Public Sector Undertakings (SPSUs) and State Level Autonomous Societies (SLASs) for the years 2019-20 followings banks have been selected for handling Business & Deposits (Copy attached) for Ref.:-

Public Sector Banks		Private sector banks	
1	State Bank of India	18	ICICI Bank
2	Canara Bank	19	Indus Ind Bank
3	Bank of Baroda	20	YES Bank
4	Union Bank of India	21	Bandhan Bank
5	Bank of India	22	HDFC Bank

6	Andhra Bank	23	Federal Bank
7	UCO Bank	24	DCB
8	Punjab National Bank	Small Finance Banks	
9	Allahbad Bank	25	Suryodaya SFB
10	United Bank of India	RRBs & Co-operative Banks	
11	Indian Overseas Bank	26	Odisha Gramya Bank
12	Central Bank of India	27	Utkal Grameen Bank
13	Oriental Bank of Commerce	28	Odisha State Co-Op. Bank
14	IDBI Bank		
15	Indian Bank		
16	Syndicate Bank		
17	Corporation Bank		

\

Annexure-IV

FORM OF BANK GUARANTEE
[Performance Security/Additional Performance Security]

To
_____ [name of Authority]

_____ [address of Authority]

WHEREAS_____[name and address of Contractor]

(hereafter called the "Contractor") has undertaken, in pursuance of Letter of Acceptance (LOA) No. _____Dated_____ for construction of _____[name of the Project] (hereinafter called the "Contract").

AND WHEREAS the Contract requires the Contractor to furnish an {Performance Security/ Additional Performance Security} for due and faithful performance of its obligations, under and in accordance with the

Contract, during the {Construction Period/ Defects Liability Period} in a sum of Rs….. cr. (Rupees ……..….. crore) (the "**Guarantee Amount**"[1]).

AND WHEREAS we, …….. through our branch at ……. (the "**Bank**") have agreed to furnish this Bank Guarantee (hereinafter called the **"Guarantee**") by way of Performance Security.

NOW, THEREFORE, the Bank hereby, unconditionally and irrevocably, guarantees and affirms as follows:

1. The Bank hereby unconditionally and irrevocably guarantees the due and faithful performance of the Contractor's obligations during the {Construction Period/ Defects Liability Period} under and in accordance with the Contract, and agrees and undertakes to pay to the Authority, upon its mere first written demand, and without any demur, reservation, recourse, contest or protest, and without any reference to the Contractor, such sum or sums up to an aggregate sum of the Guarantee Amount as the Authority shall claim, without the Authority being required to prove or to show grounds or reasons for its demand and/or for the sum specified therein.

2. A letter from the Authority, under the hand of an officer not below the rank of General Manager of Rourkela Smart City Ltd., that the Contractor has committed default in the due and faithful performance of all or any of its obligations under and in accordance with the Contract shall be conclusive, final and binding on the Bank. The Bank further agrees that the Authority shall be the sole judge as to whether the Contractor is in default in due and faithful performance of its obligations during and under the Contract and its decision that the Contractor is in default shall be final and binding on the Bank, notwithstanding any differences between the Authority and the Contractor, or any dispute between them pending before any court, tribunal, arbitrators or any other authority or body, or by the discharge of the Contractor for any reason whatsoever.

3. In order to give effect to this Guarantee, the Authority shall be entitled to act as if the Bank were the principal debtor and any change in the constitution of the Contractor and/or the Bank, whether by their absorption with any other body or corporation or otherwise, shall not in any way or manner affect the liability or obligation of the Bank under this Guarantee.

4. It shall not be necessary, and the Bank hereby waives any necessity, for the Authority to proceed against the Contractor before presenting to the Bank its demand under this Guarantee.

5. The Authority shall have the liberty, without affecting in any manner the liability of the Bank under this Guarantee, to vary at any time, the terms and conditions of the Contract or to extend the time or period for the compliance with, fulfillment and/ or performance of all or any of the obligations of the Contractor contained in the Contract or to postpone for any time, and from time to time, any of the rights and powers exercisable by the Authority against the Contractor, and either to enforce or forbear from enforcing any of the terms and conditions contained in the Contract and/or the securities available to the Authority, and the Bank shall not be released from its liability and obligation under these presents by any exercise by the Authority of the liberty with reference to the matters aforesaid or by reason of time being given to the Contractor or any other forbearance, indulgence, act or omission on the part of the Authority or of any other matter or thing whatsoever which under any law relating to sureties and guarantors would but for this provision have the effect of releasing the Bank from its liability and obligation under this Guarantee and the Bank hereby waives all of its rights under any such law.

6. This Guarantee is in addition to and not in substitution of any other guarantee or security now or which may hereafter be held by the Authority in respect of or relating to the Contract or for the fulfillment, compliance and/or performance of all or any of the obligations of the Contractor under the Contract.

[1] Guarantee Amount for Performance Security and Additional Performance Security shall be calculated as per Contract.

7. Notwithstanding anything contained hereinbefore, the liability of the Bank under this Guarantee is restricted to the Guarantee Amount and this Guarantee will remain in force for the period specified in paragraph 8 below and unless a demand or claim in writing is made by the Authority on the Bank under this Guarantee all rights of the Authority under this Guarantee shall be forfeited and the Bank shall be relieved from its liabilities hereunder.

8. The Guarantee shall cease to be in force and effect on ****[$]. Unless a demand or claim under this Guarantee is made in writing before expiry of the Guarantee, the Bank shall be discharged from its liabilities hereunder.

9. The Bank undertakes not to revoke this Guarantee during its currency, except with the previous express consent of the Authority in writing, and declares and warrants that it has the power to issue this Guarantee and the undersigned has full powers to do so on behalf of the Bank.

10. Any notice by way of request, demand or otherwise hereunder may be sent by post addressed to the Bank at its above referred branch, which shall be deemed to have been duly authorized to receive such notice and to effect payment thereof forthwith, and if sent by post it shall be deemed to have been given at the time when it ought to have been delivered in due course of post and in proving such notice, when given by post, it shall be sufficient to prove that the envelope containing the notice was posted and a certificate signed by an officer of the Authority that the envelope was so posted shall be conclusive.

11. This Guarantee shall come into force with immediate effect and shall remain in force and effect for up to the date specified in paragraph 8 above or until it is released earlier by the Authority pursuant to the provisions of the Contract.

12. This Guarantee is subject to the Uniform Rules for Demand Guarantees (URDG) 2010 Revision, ICC Publication No. 758, except that the supporting statement under Article 15(a) is hereby excluded.

13. This guarantee shall also be opera table at our…….. Branch at Rourkela , from whom, confirmation regarding the issue of this guarantee or extension / renewal thereof shall be made available on demand. In the contingency of this guarantee being invoked and payment thereunder claimed, the said branch shall accept such invocation letter and make payment of amounts so demanded under the said invocation

14. Bank Detail of Rourkela Smart City Ltd.

S.No.	Particulars	
1	Name of Bank	State Bank of India
2	Name of Branch	Udit Nagar Branch
3	A/c No	36450132867
4	Type of A/c	Saving Bank A/c
5	IFSC	SBIN0007474

[$]Insert date at least 12 (Twelve) Month from the date of issuance of this Guarantee (in accordance with Clause 29 of the DTCN).

Signed and sealed this ……. day of ……., 20…… at ……..

SIGNED, SEALED AND DELIVERED

For and on behalf of the Bank by:

(Signature)

(Name)

(Designation)

(Code Number)

(Address)

Annexure-IV

Format for Power of Attorney for signing of BID
(Refer Clause Annexure-II)

Know all men by these presents, We…….. (name of the firm and address of the registered office) do hereby irrevocably constitute, nominate, appoint and authorize Mr./ Ms (name), …… son/daughter/wife of …… and presently residing at ……., who is presently employed with us/ the Lead Member of our Joint Venture and holding the position of……. , as our true and lawful attorney (hereinafter referred to as the" Attorney") to do in our name and on our behalf, all such acts, deeds and things as are necessary or required in connection with or incidental to submission of our BID for the "Construction of Transit Home at Kaling Vihar in Rourkela on Percentage Rate Basis." Project proposed or being developed by the Rourkela Smart City Ltd. (the "Authority") including but not limited to signing and submission of all applications, BIDs and other documents and writings, participate in Pre-BID and other conferences and providing information/ responses to the Authority, representing us in all matters before the Authority, signing and execution of all contracts including the agreement and undertakings consequent to acceptance of our BID, and generally dealing with the Authority in all matters in connection with or relating to or arising out of our BID for the said Project and/ or upon award thereof to us and/or until the entering into of the EPC Contract with the Authority. AND we hereby agree to ratify and confirm and do hereby ratify and confirm all acts, deeds and things done or caused to

be done by our said Attorney pursuant to and in exercise of the powers conferred by this Power of Attorney and that all acts, deeds and things done by our said Attorney in exercise of the powers hereby conferred shall and shall always be deemed to have been done by us.

IN WITNESS WHEREOF WE, ……., THE ABOVE NAMED PRINCIPAL HAVE EXECUTED THIS POWER OF ATTORNEY ON THIS …… DAY OF ……. 2…..

For ……..
(Signature, name, designation and address) of person authorized by Board Resolution (in case of Company)/ partnership deed (in case of : Partnership firm & LLP)/ Copy of PAN (in case of Individual " "Copy must enclosed"

Witnesses

1.
2.
Accepted

……

(Signature)

(Name, Title and Address of the Attorney)

(Notarised)

(Person identified by me/ personally appeared before me/)

Attested/ Authenticated*

(*Notary to specify as applicable)

(Signature Name and Address of the Notary)

Seal of the Notary

Registration No. of the Notary

Date:……

SCOPE OF WORKS & SPECIFICATIONS

For

Construction of Transit Home at Kaling Vihar in Rourkela on Percentage Rate Basis

1. Scope of Work

The scope of work covered in this tender shall be as per the Bill of Quantities, specifications, drawings, instructions, orders issued to the contractor from time to time during the pendency of work. The drawings for this work, which may be referred for tendering, provide general idea only about the work to be performed under the scope of this contract

Details and drawings given in Tender document is for information purpose only and successful bidder shall undertake confirmatory survey for accuracy and completeness of data. It is in scope of successful Bidder to undertake all Site surveys,

Geotechnical investigations, obtaining all required approvals from the relevant authorities, Further detailing and designing of Structural works, Electrical, Mechanical, Plumbing, External Infrastructure works, …etc as per Employers requirement and submit the same to client for review and approval, Prepare Good for Construction Drawings, Carry out Shop Drawings ,submit maintenance manual to client for approval. The successful bidder shall have to prepare and submit 'As Built Drawings' depicting the exact construction carried out on site, in soft and hard copy format.

Drawings are attached in the Tender Notification on the basis of this Contractor has to prepare GFC and submit for approval etc.

The work is divided into following parts:

- Preliminary Works
- Construction of Dwelling units
- Construction of roads & drains
- Installation of water supply works
- Installation of street light and electrical works

1.1 Preliminary Works

All preliminary works such as site clearance in all types of conditions, survey, investigations, marking of alignment, layout etc. as described elsewhere in these specifications, for such work no extra payment shall be made to the Contractor. The Contractor is advised to inspect site before tendering to ascertain the quantum and cost of such work and include this cost in their offer.

2 Civil Works

The Scope of Work under this contract includes but is not limited to the following in relation to the design, construction, and operation of the Works:

- Site Topographic Survey and Geotechnical Investigations as deemed necessary by the Contractor as per BIS latest codes, NBC etc as applicable through any nationally accredited lab. Employer may verify the results submitted by contractor, if need be.
- Construction enabling works like site office, labour camp, material stacking, laboratory, etc. shall be the responsibility of contractor.
- Setting out of the works.
- Site Clearing, Site Grading, and Excavation, disposal of excavated earth and bailing out & disposal of water.
- Contractor shall do Structural Design based on approved Civil Structural Design Criteria.
- Preparation of complete structural design, drawings for foundation, basements, podiums, superstructure and for other related structures in the housing pocket. i. e. UGRs, pump house, DG set meter room, substation building, gate , compound wall, chambers, trenches etc to be provided as per provision contained in IS codes/NBC but not lower than the minimum criteria mentioned in the tender. , Scales for each detail in drawing and drawing sheets shall be use as per BIS standards.
- Construction of all Civil Structures and Building finishes Work of all structures in housing pocket.
- One Copy of structural design calculations and details in soft and hard copy (latest version of software) based on the approved building plan shall be submitted before commencement of the construction work at site for information and record.
- Submission of Detailed Engineering Designs, Drawings, Process Calculations, Data Sheets for approval.
- Execution of all Civil Works at Site including Construction, Erection, Testing and Handing over.
- Design and Construction of Internal Roads, Curbs, Pavements, Parking Spaces, Compound Wall, water supply and sewage disposal and Storm Water Drains etc.
- Water tanks shall be designed for limited crack width as per BIS code and checked for water tightness after construction.
- Implementing Anti-termite treatment / Water proofing / Insulation works. Contractor shall submit warranty certificate for same in approved format.

- Plantation and Landscaping works.
- Preparation and Submission of As-Built drawings for Civil and Structural Works.
- Issuing Warranty certificate for Anti-termite treatment / Water proofing / Insulation works.
- Maintaining safety requirements and relevant Government Regulations, and ensure their implementation.
- Safety reporting: Brief reports of all accidents and hazardous incidents including descriptions of causes, extent of injuries, action taken, and precautions instituted to prevent repetition of such events.
- Contractor has to erect batch mix plant (minimum 60 cum/hr capacity) fully automatic, computerised for preparation of design mix concrete as per latest BIS codes at his own cost and shall prepare all concrete accordingly. RMC to be used for 6 cum or more than 6 cum of concrete to be done in single pour.

Guarantee for construction defect/manufacturing defects during defect liability period: Contractor shall guarantee the entire work for period of 60 months after completion of work. Any damage or defect that may arise or that may remain undiscovered at the time of issue of completion certificate connected in any way with the equipment or materials supplied by him or in the workmanship be rectified or replaced by contractor at his own expense as desired by engineer-in-charge or in default may cause the same to be made good by other agency and deduct expenses there of (for which the certificate of engineer-in-charge shall be final) from any sums that may then or any time thereafter become due to contractor or of sale thereof or a sufficient portion thereof. The contractors shall be liable to construction defect/ manufacturing defects and not liable to damage caused by occupants if any.

The Contractor shall institute a Quality Assurance and Quality Control (QA/QC) system in accordance with the requirements to demonstrate compliance with the requirements of the Contract. The Contractor shall submit, within 14 days of signing of the Contract Agreement, the required Quality Assurance and Quality Control (QA/QC) Program for approval by the Employer's Representative. The Employer's Representative will either approve the submittal or provide comments thereon to the Contractor within 14 days of submission by the Contractor. The Employer's Representative's, approval, disapproval, comments, or failure to provide any of these to the Contractor, shall in no way relieve the Contractor of any of its obligations or responsibilities under the Contract. The Contractor, prior to commencement of work at the Site, shall set up his own laboratory, with prior notification to the Employer's Representative. The calibration of the laboratory equipment and instruments shall be certified by agencies approved by the Employer's

Representative. Laboratory equipment shall be properly maintained and calibrated throughout the period of the Contract by the Contractor at his own expense. The Contractor shall give the Employer's Representative reasonable advance notice prior to conducting any tests required by the Bid Documents, which the Employer's Representative may choose to witness at his discretion. The Employer's Representative will also inspect the laboratory if deemed necessary and the Contractor shall provide adequate facilities to the Employer's Representative that may be necessary for witnessing testing or for independent verification of the accuracy and adequacy of the facilities and equipment. Compliance with the QA/QC system shall not relieve the Contractor of any of his duties, obligations, or responsibilities under the Contract. Contractor shall maintain Quality Control records. QA/QC records till the completion of Defect liability Period shall be maintained.

Weekly/Fortnightly/Monthly Progress Reports, along with photographs depicting the progress achieved in the month, shall be prepared by the Contractor in a format approved by the Employer's Representative and the Employer and submitted to the Employer's Representative. Contractor shall submit Weekly/Fortnightly/Monthly Progress Reports in review meetings for Project Progress and approval.

3 Survey and Investigations:

All the necessary surveys and investigations such as Geotechnical investigations, topographical survey, etc. need to be carried out by the contractor as per the project requirement under the concurrence of Engineer in charge.

4 Safety:

- Contractor has to take care of all safety measures as per Owner / Engineer-in-charge's HSE requirements. Local barricading shall be provided around the other work areas, where main barricading of 15m was not provided. No extra payment shall be made for the local barricading works provided for protection.
- Proper management of loose earth, mud, water, oily material is to be ensured to avoid making the area messy and slippery.
- Working area needs to be properly cordoned off and proper care is to be taken so that surrounding equipment, instruments etc. are not damaged during the construction.
- An experienced safety engineer shall be deployed to site to ensure that the construction work is carried out in a safest manner and shall work in coordination with Owner / Engineer-in-charge's safety Engineer.

  Following codes shall be followed as applicable as per direction of engineer.

CONSTRUCTION SAFETY	IS 3696 (Part 1):1987 Reaffirmed 2017	Safety code of scaffolds and ladders: Part 1 Scaffolds(first revision)

CONSTRUCTION SAFETY	IS 3696 (Part 2):1991 Reaffirmed 2017	Safety code of scaffolds and ladders: Part 2 Ladders(first revision)
CONSTRUCTION SAFETY	IS 7969:1975 Reaffirmed 2017	Safety code for handling and storage of building materials.
CONSTRUCTION SAFETY	IS 8989:1978 Reaffirmed 2015	Safety code for erection of concrete framed structures.

5 Co Operations with other Contractors:

The contractor shall provide all facilities and give complete co-operation for the execution of various other works, if required to be carried out simultaneously by other agencies. While his own work is in progress, the co-ordination will be affected in consultation with the Engineer-in-Charge of the work. Other contractors are also likely to work in the same area during the construction stage.

6 Traffic Interference & Inconvenience to The Public:

The contractor shall conduct his operations so as to interfere as little as possible with the traffic. When interference to traffic is inevitable, notice of such interference shall be given to the Engineer-in-Charge well in advance (at least 2 days). The contractor shall take all precautionary and other measures, such as providing warning signals, temporary diversions, etc., all as directed by the Engineer-in-Charge. The contractor shall exercise full care to ensure that no damage is caused by him or his workmen, during the operations, to the existing water supply and power lines. The cost of any such damage and risks arising out of this shall be entirely borne by the contractor.

7 Preamble to Bill of Quantities:

(a) The Bill of Quantities shall be read in conjunction with the Instructions to Bidders, Conditions of Contract, Technical Specifications, and Drawings.

(b) The quantities given in the Bill of Quantities are estimated and provisional, which may be varied, and are given to provide a common basis for bidding. The basis of payment will be the actual quantities of work ordered and carried out, as measured by the Contractor and verified by the Engineer and valued at the rates and prices tendered in the priced Bill of Quantities, where applicable, and otherwise at such rates and prices as the Engineer may fix within the terms of the Contract.

(c) General directions and descriptions of work and materials are not necessarily repeated or summarized in the bill of Quantities. The contractor shall refer to the relevant sections of the contract documentation before entering rates or prices against each item in the Bill of Quantities.

(d) The method of measurement of completed work for payment shall be in accordance with the Particular Specifications, guidelines issued by Bureau of Indian Standards as per

order of precedence and also as per the method mentioned in the contract and standard specification.

(e) The amount provisioned for O&M shall be paid quarterly after successful completion of O&M for the preceding quarter.

(f) Unless stated otherwise, all rates and prices entered in the Bills of Quantities shall be deemed to include the following:

- Labour and all costs in the connection with the execution and maintenance of the work.
- The supply of materials, goods, storage and all costs in connection therewith including wastages, shrinkage and delivery to site.
- Sampling and testing materials and goods, checking workmanship, providing, storing, packing and transporting samples to and from the place of testing.
- Fixing, erecting, installing or placing of material and goods and excavated materials, including stacking, storing, loading, transporting and unloading.
- All Temporary works.
- Construction, maintenance of temporary access roads within the sites and any roads required for the access to any part of the site for the purpose of carrying out the Works , taking into account that the access roads under the Contractor's maintenance control will also be used by the Employer and his staff vehicles.
- Construction , maintenance and removal , if required , of temporary Sites drainage on the Site and for ensuring that all drains are kept clear of debris and blockages at all times.
- Survey, Investigation, design and drawings.
- All general obligations, liabilities and risks involved in the execution and maintenance of the works set forth or reasonably implied in the documents on which the Bid is based.
- Establishment charges, overheads and profits.
- Co-operating with other Contactors.
- The price for transportation included in any of the items in the Bills of Quantities are to include for all labour and equipment required for unpacking , loading , conveying , unloading , storing and multiple handling of all and every item to be transported.

A. TECHNICAL SPECIFICATION

The works shall be performed conforming to the Indian Standard codes, specifications as per P.W.D, PHED, as applicable. Wherever such specifications are not available, CPWD specifications, relevant references, manuals etc. shall be followed as directed by Employer.

ARCHITECTURE

1. ITEM OF WORK

1. Concrete shall be with conformity to I.S.456.
2. Foundation shall be with conformity to I.S.1080.
3. C.R. Masonry shall be with conformity to I.S.1597.
5. Fly ash Brick masonry shall be with conformity to I.S.13757.
6. Cement plastering shall be with conformity to I.S.9103 & 6925.
7. Mortar shall be with conformity to I.S.2250
8. White and colour washing shall be with conformity to I.S.6278.
9. CC in foundation shall be with conformity to I.S.2571.
10. Anti-Termite Treatment shall be with conformity to I.S.6313. (Part I & Part II)
11. Painting to all surfaces shall be with conformity to I.S.2395 (Part I & Part II)
12. DPC shall be with conformity to I.S.3067
13. Tar felt treatment shall be with conformity to I.S.1346
14. Steel painting shall be with conformity to I.S.1477 (Part I & Part II) I.S.1661

Works shall be executed in conformity with relevant IS codes, BOQ item description and technical specification provided her under. In case any discrepancies between BOQ item and technical specification, engineer's decision shall be final.

2. BRIEF SPECIFICATION OF ITEMS USED

It is the intent of these specifications to establish acceptable standards of quality and to provide the Contractor with complete and detailed information and subsequent instructions necessary to enable him to submit a well planned Tender, to carry out the design, where and when required, and to execute properly the work prescribed. This specification covers the general requirements for civil and architectural works comprising of masonry, flooring, skirting, dado, plastering for wall and ceilings, painting, doors, windows, ventilators, Builders hardware, ironmongery, Glass and glazing, Partition works, False ceiling works, toilet cubicles, sanitary fixtures and fittings, waterproofing, Metal sheet cladding, grills and railing works. For any items missed standard specification of OPWD will apply and for items that are not available in OSR, Delhi Schedule of Rates may be considered.

Standards and Codes

i. The Contractor shall follow the Indian Codes and specifications for his work.

ii. All standards and codes employed or referred to shall be the latest current issue in effect at the date 28 days prior to the Tender submission date.

iii. In case of discrepancies between these Specifications and national or international standards and codes, these Specifications being only indicative in nature shall not govern, unless otherwise established by the Authority in each particular case.

Termite Treatment:

Providing and injecting chemical emulsion for pre - constructional ant termite treatment as per IS specification and creating a chemical barrier in bottom and sides of foundation trenches, top surface of plinth filling junction of walls and floors along with external perimeter of the building expansion joints surrounding the pipes and cables etc. complete using approved quality of chemical emulsion of requisite quantity prescribed by the manufacturer as directed by the Engineer-in-charge including cost of all materials and labour taxes etc. complete. (Indemnity bond for warranty for 10 years to be furnished)

Cement Concrete Tile:

Supplying, fitting and fixing in position 25mm thick cement concrete tile of Ultra category- 1/Eurocon or equivalent type of approved make, quality, colour and size in all floors at all height on 20mm thick bed of cement mortar of mix (1:4) laid in proper slope and gradient grouted with neat white cement slurry with required quantities of pigments of approved marks watering and curing for 21 days, including cost, conveyance, loading, unloading, royalties and taxes of all materials, cost of all labour, sundries, T&P required for the work complete in all respect as directed by the Engineer-in charge.

Ceramic Floor Tile:

Providing 30cmx30cm/40cmx40cm size special plain/printed series ceramic floor tiles of premium grade of approved make having thickness 9mm to 10mm, conforming to IS 13755 for ceramic tile flooring of approved quality, colour and size in all floors at all height with tile adhesive on bed of cement mortar of mix (1:1) laid in proper slope and gradient, grouted with neat white cement slurry jointing the tile with neat white cement slurry mixed with required quantities of pigments of approved marks to match the shades of the ceramic tile if required, watering and curing for 21 days, including cost, conveyance, loading, unloading, royalties and taxes of all materials, cost of all labour, sundries, T&P required for the work, complete in all respect as directed by the Engineer-in-charge.

Ceramic Wall Tile:

Providing 30cmx30cm size special plain/printed series edge cut ceramic wall tiles of premium grade having thickness 6.5mm to 6.7mm conforming to IS 13753 of approved make & shade in Dadoes with tile adhesive over minimum 12mm thick cement plaster 1:3 (1 Cement: 3 Coarse sand) finished with modular pointing in white cement & pigment to match the shade of the tiles including cost, conveyance, loading, unloading, royalties and taxes of all materials, cost of all labour curing sundries and T & P etc. required for the work etc. complete as per specification and direction of Engineer-in-charge.

Sal Wood Frame:

Providing and fixing in position well dressed, naturally seasoned sal wood rebated frames of size 125mmx63mm to doors including two coats of hot bitumen applied to rear of frame in contact with masonry or concrete surface fixed with MS hold fast of 35x5mm embedded in cement concrete blocks 15x10x10cm of 1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 20mm nominal size) complete with all materials, labours, T & P including cost, conveyance, loading, sundries required for the work etc. complete in all respect as directed by the Engineer-in-charge.

PVC Door & Frame:

Providing and fixing factory made PVC door frame of size 50x42mm with a wall thickness of 2mm rigid PVC foam sheet, mitred at corners and jointed with 2 nos of 150mm long brackets of 15x15mm MS square tube, the vertical door frame profiles to be reinforced with 19x19mm square tube of 19 gauges.

24 mm thick factory made PVC door shutters made of styles and rails of a UPVC hollow section of size 59x24 mm and wall thickness 2 mm ± 0.2 mm with inbuilt edging on both sides.The styles and rails mitred and joined at the corners by means of M.S. galvanised/plastic brackets of size 75x220 mm having wall thickness 1.0mm and stainless steel screws.The styles of the shutter reinforced by inserting galvanised M.S. tube of size 20x20 mm and 1 mm ± 0.1 mm wall thickness.The lock rail made up of 'H' section, a UPVC hollow section of size 100x24 mm and 2 mm ± 0.2 mm wall thickness fixed to the shutter styles by means of plastic /galvanised M.S. 'U' cleats. The shutter frame filled with a UPVC multichambered single panel of size not less than 620 mm, having over all thickness of 20 mm and 1 mm ± 0.1 mm wall thickness. The panels filled vertically and tie bar at two places by inserting horizontally 6 mm galvanised M.S. rod and fastened with nuts and washers, door fittings such as handle, aldrop etc,complete as per manufacturer's specification and direction of Engineer-in- charge.

3. List of Approved Make

Following list of approved vendors are provided for different materials. However contractor may procure from other equivalent vendors after approval from employer.

SR. NO.	PRODUCT	BRAND, AGENCY
1.	AAC / flyash blocks	Charbuja, Aerocon, Siporex, Ecolite, CEEFpro, BLIT, First Build
2.	Waterproofing Treatment	Pidilite, BASF
3.	Concrete, Stone Sealar	Degussa, Wacker, Hytek, Aquamix, Laticrete, Kerakoll
4.	Fire Check Wood, Steel Doors	Signum, Godrej, Guardian, Navair, Shakti Hormann, Promat, Alhada,
5.	Flush Doors	Tata Conswood, Greenwood, Garnet, Merino, Century
6.	Door seals [dust / fire]	Lorient, Enviroseals, Pemko, Assorted
7.	Structural, Weather Sealant	Dow Corning, GE, Dupont
8.	Glazed, Ceramic & Vitrified Tiles	Kajaria, Jhonson,
9.	Pigmented Joint fillers	Laticrete, Pidilite
10.	Cement Putty	Birla White, J K white
11.	Paint	Nerolac, Asian Paints, Dulux,
12.	Glass	Saint Gobain, AIS
13.	Fire rated glass	Schott, Saint Gobain
14.	Doors, Window Fittings And Fixtures	Dorma, Giesse, Dline, Union, Yale, Assa Abloy brands
15.	Toughening Agencies	Sejal, GSC, Gold Plus, Impact
16.	Lamination Films	Garware, Dupont
17.	Gypsum & Mineral Fibre boards, systems, access panels & accessories	Saint Gobain, India Gypsum, Rondo, Armstromg, AMF, Knauf, Rehau, Lafarge, Gypsemma, USG
18.	Handrails	Technorails, Dline, Dorma, Carlf India,
19.	Thermoplastic Road Marking Paint	Asian Paint PPG-Apcomark, Automark Technologies (India) Pvt. Ltd.
20.	Fire Stop Mortar & Foam	Firestop, Hilti, Promat, Newkem
21.	Expansion Joints	CS expansion joints, BASF Eabco, Excel Tech
22.	Cast in Channels	Halfen Deha, Jordhal
23.	Sanitary wares	Hindware, Parryware, Cera, HR Jhonson
24.	Concealed flush tanks / valves	Gebrit, Jaquar, Schell, Commander, Viega,

SR. NO.	PRODUCT	BRAND, AGENCY
		Parryware
25.	Faucets /sanitary fittings	Jaquar, Grohe, Schell,
26.	HDPE drain boards	Doerken, Green global, Pidilite
27.	CPVC plumbing pipes & adhesives	Flowgaurd, Astral ,Ashirwad, Prince
28.	Manhole covers	Neco, Municast,
29.	Light Fittings	Bajaj, Philips,Orient
30.	AAC / flyash blocks	Charbuja, Aerocon, Siporex, Ecolite, CEEFpro, BLIT
31.	Waterproofing Treatment	Pidilite, BASF,FOSROC
32.	Anchor Fastener	Fischer, Hilti

TECHNICAL SPECIFICATION for Civil Works

DESIGN CRIETRIA

(Civil Works)

Codes, standards and specifications

The design shall comply with the latest editions and revisions of the codes, specifications, and standards listed below:

Table 1: Latest edition and revision of codes

1	NBC	National Building Code of India.
2	IS: 1893 (Part 1)	Criteria for Earthquake Resistant Design of Structures (Part 1 – General Provisions and Buildings).
3	IS: 1893 (Part 2)	Criteria for Earthquake Resistant Design of Structures (Part 2 – Liquid retaining tanks – Elevated and ground supported).
4	IS: 1893 (Part 3)	Criteria for Earthquake Resistant Design of Structures (Part 3 – Bridges and retaining walls).
5	IS: 1893 (Part 4)	Criteria for Earthquake Resistant Design of Structures (Part 4 – Industrial Structures including Stack-Like Structures).
6	IBC	International Building Code.
7	IS 3414	Code of practice for design and installation of joints in buildings

Table 2 : Latest edition and revision of RCC

1	IS: 432	Specification for mild steel and medium tensile steel bars and hard drawn steel wire for concrete reinforcement.
2	IS: 456	Plain and Reinforced Concrete – Code of Practice.
3	IS: 1786	High strength deformed steel bars and wires for concrete reinforcement.
4	IS: 2502	Code of Practice for Bending and Fixing of Bars for Concrete Reinforcement.
5	IS: 4326	Code of practice for earthquake resistant design and construction of buildings.
6	IS:13920	Code of practice for ductile design and detailing of reinforced concrete structures subjected to seismic forces.
7	IS: 1904	Code of practice for design and construction of foundations in soils: General requirements.
8	IS: 3370 (Part 1 to 4)	Concrete structures for the storage of liquids - Code of Practice.
9	IS: 5249	Determination of dynamic properties of soil, method of test.
10	IS: 8009 (Part 1 & 2)	Code of practice for calculation of settlements of foundations.
11	IS: 3414	Code Of Practice For Joints In The Buildings.
12	SP: 16	Design Aids for Reinforced Concrete to IS 456: 1978.

13	SP: 24	Explanatory Hand Book on Indian Standard Code of Practice for Plain and Reinforced Concrete (IS 456: 1978).
14	SP: 34	Hand Book of Concrete Reinforcement and Detailing.
15	SP: 20 (S & T)	Explanatory Hand Book on Masonry Design and Construction.

Material, workmanship and design criteria

The proposed structure will consist of concrete and steel reinforcement as main materials used for construction of the structures.

Structural design of RCC elements

The design aims to achieve an acceptable probability that structures being designed will perform satisfactorily during their intended life. With an appropriate degree of safety, they should sustain all the loads and deformations of normal construction and use and have adequate durability and resistance to the effects of earthquake, wind as well as misuse and fire. Structures and structural elements will be designed by Limit State Method. Due consideration will be given to the accepted theories, experience and modern design philosophy and practices

Construction joint

Construction joints and shrinkage strips to be planned by the contractor, at design stage (as per IS code: 3414) itself and only be used in locations pre-approved by consultants. Water stops shall be provided in all construction joints below ground level in addition to any joint which may be detailed on the drawing.

Expansion joint

To relieve the structure from temperature stresses, expansion joints are provided at several locations as per the IS requirements. As per BIS code requirement expansion joints are proposed if the length of the structure exceeds 45m. Depending upon geometry of building and for lateral load resisting system expansion joint may be provided for the RCC structures like retraining wall as recommended by IS codes. Gap for the expansion / separation joint shall be provided as per the provisions mentioned in IS 1893 part IV.

Permissible deflections

Permissible deflections shall be as per IS: 456 clauses 23.2. Total deflection of various structural members shall be calculated as per ANNEX C of IS 456. Provisions of IS 1893 and IS 875 shall be followed for lateral deformations.

- The final vertical deflection due to all loads including the effects of temperature, creep and shrinkage and measured from the as-cast level of the supports of floors, roofs and all other horizontal members should not normally exceed span/250.
- The part deflection including the effects of temperature, creep and shrinkage should not normally exceed span/350 or 20 mm whichever is less.
- Under wind load, the lateral sway at the top of building should not exceed height/500.

CRACK WIDTH

Various structural members shall be designed for crack width mentioned as below as per clause no. 35.3.2 IS 456:2000 & clause no. 4.4.1.2, IS 3370(Part-2):2009.

For structural members exposure to serve exposure condition = 0.1mm

- For water retaining structures = 0.2 mm
- For members exposed to soil or ground water = 0.2 mm
- All other structural members = 0.3 mm

Design loads

The design of various structural members for this building should follow the following loads and also effects due to shrinkage, creep, temperature, etc., where applicable.

Dead load

The dead loads should be calculated on the basis of unit weights of materials given in IS: 875 (Part 1). The dead load considered in the structural design shall consist of the full weight of all known fixed structural and architectural elements. The unit weight of materials will be used as follows.

Table 4: Unit weight of material

	Particulars	Weight
1	Reinforced concrete	25.00 kN/m^3
2	Plain concrete	24.00 kN/m^3
3	Light weight concrete	12.00 kN/m^3
4	Concrete block work	18.00 kN/m^3
5	Brickwork	20.00 kN/m^3
6	Autoclaved Aerated Concrete Blocks	8.00 kN/m^3
7	Stone cladding	25.00 kN/m^3
8	Floor finishes	20.00 kN/m3
9	Glass	23.50 kN/m^3
10	Structural steel	78.50 kN/m^3
11	Water	09.81 kN/m^3
12	Dry Soil	16.00 kN/m^3
13	Saturated Soil (Garden load with roots)	21.00 kN/m^3

TypicalDead loads considered in the design are as follows:

Self-weight of slabs, beams, columns & walls - As per sectional sizes of the members.

Additional dead loads

- Floor finishes at Typical floors -1.5 kN/m2
- Water Proofing at Terrace -3.0 kN/m2

Live load

All the live loads should be followed as per IS: 875 (Part 2).

Seismic load (sl)

All buildings, structures, foundations should be designed to resist the effects of earthquakes in accordance with IS: 1893 - Criteria for Earthquake Resistant Design of Structures for Design Basis Earthquake. The structure is primarily column and beam framing system and Retaining wall , since due considerations will be given to the major suggestions/ clauses from IS: 13920. The Retaining wall are to be designed to carry lateral loads .

Seismic design forces should be determined based upon the following parameters. Buildings of different materials of construction and lateral force resisting systems shall be investigated separately.

- ***Seismic weight calculation***

The seismic weight of building includes all permanent rigidly attached structural and non-structural components of a building, such as walls, floors, roofs, total weight of permanent equipment etc. The contribution of live load to be considered in the seismic weight calculation shall be taken as per Clause 7.3.1 and as specified in Table – 8 of IS 1893 (part 1).

- ***Permissible stresses***

- Whenever seismic forces are considered along with other normal design forces, the permissible stresses in material shall be governed by the respective codes as per which the structure/ equipment is being designed.
- For the other provisions of the code Cl.No.6.3.5 of IS: 1893 (part-1) and Cl.No. 7.4 of IS: 1893 (Part-4) shall be followed.
- Earthquake loads shall not be considered to act simultaneously with wind.

- ***Ductile detailing***

The ductility details of reinforced concrete members should be provided as per the provisions of IS: 13920 to avoid premature failure during earthquake.

Surcharge load

Minimum surcharge of 10KN/m2 and as per IRC whichever is higher shall be considered for design of all underground structures to take in to account the construction load and vehicular traffic in the vicinity of structure.

Earth pressure

Earth pressure for walls of basement/ tanks etc. with propped support condition will be calculated using coefficient of earth pressure at-rest. Earth pressure for cantilever walls like cable trenches and Retaining wall will be calculated based on active earth pressure. Unit weight of soil shall be as per section 8.1. Other soil parameters such as cohesion and angle of internal friction shall be considered as per soil investigation report.

Hydrostatic pressure

If envisaged, the ground water load shall be applied on the substructure as super imposed dead load in addition to the earth pressure. The dry density of soil shall be considered in this combination.

Construction loads

Loads produced by the materials of construction plus the equipment required to construct the facility (crane loads, rigging loads, earth moving equipment, temporary bracing, etc.) as applicable shall be considered.

Load combinations

Each element of a building or structure shall be provided with sufficient strength to resist the most critical effects resulting from the following combination of loads.

Load cases and load combination shall be as follow:

Static load cases

- Dead load (DL)
- Live load (LL)
- Seismic load (Spectra) in X-direction (EQX)
- Seismic load (Spectra) in Y-direction (EQY)

(X and Y directions are mutually orthogonal in plan area, to define the direction of seismic forces with reference to building)

The following Load Combinations have been considered for the analysis.

- 1.5 DL
- 1.5 (DL+ LL)
- 1.2 (DL +LL+EQX)
- 1.2 (DL + LL – EQX)
- 1.2 (DL + LL + EQY)
- 1.2 (DL + LL – EQY)
- 1.5 (DL + EQX)
- 1.5 (DL – EQX)
- 1.5 (DL + EQY)
- 1.5 (DL – EQY)
- 0.9 DL + 1.5 EQX
- 0.9 DL -1.5 EQX
- 0.9 DL + 1.5 EQY
- 0.9 DL - 1.5 EQY

Load Combinations for Serviceability

- DL+ LL
- DL + 0.8 LL + 0.8 EQX
- DL + 0.8 LL – 0.8 EQX
- DL + 0.8 LL + 0.8 EQY
- DL + 0.8 LL - 0.8 EQY
- DL + EQX
- DL – EQX
- DL + EQY
- DL - EQY

The design shall be governed by worst load combinations, keeping in view the probability of Each load case acting together and Their disposition in relation to other loads and severity of stresses or deformations caused by combinations of the various loads is necessary to ensure the required safety and economy in the design of a structure.

The allowable stresses and soil bearing values shall not be increased for any condition of dead, live loads acting alone or in combination with each other.

TECHNICAL SPECIFICATIONS

(Civil Works)

General

The works shall be performed conforming to the Indian Standard codes, P.H.D & P.W.D. specifications of the State Government. Wherever such specifications are not available, CPWD specifications, relevant references, manuals etc. shall be followed as directed by Owner.

1. EARTHWORK

1.1 SCOPE OF WORK

The work covered by this section of the specifications consists of furnishing all plant, labor, equipment, appliances and materials and in performing all operations in connection with earthworks of all underground supplies and services and for all structural units, stock piling, of specifications and applicable drawings, and subject to terms and conditions of the contract. The scope of this section of specifications is also covered with detailed specifications as laid down herein.

1.2 GENERAL

The Contractor shall acquaint himself with the nature of the ground, existing structures, foundations and subsoil which might be encountered during excavation of earthworks. The Employer does not guarantee or warrant in any way that the material to be found in the excavation will be similar in nature to that of any samples which may have been exhibited or indicated in the report, drawings or in any other contract documents or to material obtained from boring or trail holes. The contractor shall be deemed to have made local and independent inquiries and shall take the whole risk of the nature of the ground subsoil or material to be excavated or penetrated and the Contractor shall not be entitled to receive any extra or additional payment nor to be relieved from any of his obligations by reasons of the nature of such ground subsoil or material.

All excavations, cutting, and fills shall be constructed to the lines, levels and gradients specified with any necessary allowance for consolidation, settlement and drainage so that at the end of the period of maintenance the ground shall be at the required lines, levels and gradients.

During the course of the Contract and during the period of maintenance any damage or defects in cuttings and fills, structures and other works, caused by slips, falls or basins or any other ground movement due to the Contractor's negligence shall be made good by the Contractor at this own cost.

1.3 SITE PREPARATION

The Contractor shall construct and maintain accurate bench marks so that the lines and levels can be easily checked by the Project Engineer. The Contractor shall Construct and maintain such ditches, in addition to those shown on the plans, as will adequately drain areas under construction.

The Contractor shall perform a joint survey with the Project Engineer's representative of the area where earthwork is required, plot the ground levels on the drawings and obtain approval from him before starting the earthwork.

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

1.4 EXCAVATIONS

Excavation shall include the removal of all material of every name and nature. Excavations shall be carried out in accordance with excavation plans and sections shown on the Drawings and as directed by the Project Engineer.

The major portion of excavations shall be carried out by mechanical excavators and excavated materials disposed off to stock on spoil as per drawings or as directed by the Project Engineer. The excavation which cannot be done by mechanical means including leveling, trimming and finishing to the required levels and dimensions shall be done manually. The material suitable for fill and back fill shall be stock piled within the free haulage limit of the 200m of the works.

The Contractor shall give reasonable notice that he intends to commence any excavation and he shall submit to the Project Engineer full details of his proposals. The Project Engineer may require modifications to be made if he considers the Contractor's proposals to be unsatisfactory and the Contractor shall give effect to such modifications but shall not be relieved of his responsibility with respect to such work.

For major excavations, the Contractor shall submit for the prior approval of the Project Engineer full details and drawings showing the proposed method of supporting and strutting etc. The design, provisions construction, maintenance, and removal of such works shall be the responsibility of the Contractor and all cost in these respects shall be included in the unit rates for the permanent work.

The Contractor's attention is drawn particularly to his obligations under the general conditions in respect of those works which are in close proximity to existing buildings.

The Contractor shall preserve the complete excavation from damage from slips and earth movements, ingress of water from any source what so ever and deterioration by exposure to the sun and the effects of the weather.

All excavation of every description, in whatever material encountered shall be performed to the elevations and dimensions shown on the drawings in such a manner as to avoid interruption to work in other parts of the site. The Contractor shall be responsible for injury to the permanent works caused by excavation on other parts of the works.

Excavation shall extend to sufficient distance from walls and footing to allow for placing and removal of forms, installations of services and for inspection, except where the concrete for walls and footings is authorized to be deposited directly against excavated surfaces.

All excavations in foundations shall be taken to 150mm and shall be trimmed carefully to a smooth and level surface, immediately after trimming to the final elevation a layer of building concrete shall be placed to the thickness shown on the drawings. All excavations for foundations which have been trimmed and disturbed shall be compacted and covered by concrete by the end of the day. It is specifically brought to the notice of the Contractor that any excavation taken down to the trimmed elevation which is left overnight or for any length of time thereafter, uncovered by the blinding concrete, shall be required to be trimmed to such lower elevation as directed by the Project Engineer and any extra work or any consequent increase in the quantities caused thereby shall not be paid to the Contractor.

No excavation shall be refilled nor any permanent work commenced until the foundation has been inspected by the Project Engineer and his permission to proceed given. If excavation for sub-structures is carried below the required level, as shown in the drawings or as directed by the Project Engineer, the surplus depth shall be filled in with concrete of same grade as of blinding concrete at the sole cost of the Contractor.

All excavation shall be performed in the dry. The placing of blinding concrete, placing of reinforcement and casting of the permanent works in the excavation shall be carried out in the dry and the Contractor shall have sufficient equipment for this purpose. Adequate precautions shall be taken to prevent any corrosion due to undercutting from underneath the previously constructed adjoining foundations.

Existing utility lines to be retained, as well as utility lines constructed during excavation and backfilling, and if damaged, shall be required to be repaired by the Contractor at his expense. Any existing utility lines which are not known to the Contractor in sufficient time to avoid damage, if inadvertently damaged during excavation, shall be repaired by the Contractor and adjustment in payment will be made as approved by the Project Engineer. When utility lines which are to be removed, are encountered within the area of operations the Contractor shall notify the Project Engineer in ample time for necessary measures to be taken to prevent interruption of the service.

Excavated material suitable for use as filling material shall be stock piled within the free haulage limit 200m of works as directed by the Project Engineer. This stock piled material shall be transported back to places requiring fill or backfill. Surplus or material unsuitable for use as filling shall be disposed of by the Contractor at locations approved by the Project Engineer within specified free haulage limit.

The Contractor shall make independent enquiries and perform and make independent observations to ascertain the water table in the areas of excavations during the period when the construction works are in progress. The Contractor shall take whole risk of any nature for fluctuation of the water table from his own findings. The Employer is not bound in any way and shall not be responsible for any information given by him or any information, observations or values obtained from his reports, drawings and documents.

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

Before starting the excavations, the Contractor shall ensure the correct alignment of the recharge trenches and location of recharge pits on the ground, the depth and width of excavation of the trench and pits, all in accordance with the drawings and instructions of the Project Engineer.

The Contractor at his cost shall provide to the satisfaction of the Project Engineer all timbering, approved supports and shores and bracings to the sides of the excavated trench and foundations in such a manner to secure the sides of the trench and excavations from falling or adverse movement. All responsibility connected with such shoring shall rest with the Contractor. Adequate clearance / working space on both sides of the structure/pipe line shall be provided for which no payment shall be made.

Without the written permission of the Project Engineer no more than 50.0m the trench shall be opened in advance of the completed pipe line. The bottom of all excavations shall be carefully leveled. Any pockets of soft or loose material in the bottom of the pits and trenches shall be removed and the cavities so formed filled with lean concrete at the Contractor's expense.

The Project Engineer may require the Contractor to excavate below the elevations shown on the drawings or he may order him to step above the elevations shown depending upon the suitable foundation material encountered.

If for any reasons, the levels grades or profiles of the excavations are changed adversely, the Contractor shall at his own cost be liable to bring the excavations to the required levels and profiles as shown on the drawings or as directed by the Project Engineer.

1.5 EXCAVATION TOLERANCES

Excavation shall be performed within the tolerances for excavation limits indicated on the drawings. Where no tolerance limits are indicated excavation shall be performed to tolerances established by the Project Engineer as accepted for the design and type of work involved.

2. BACK FILLING

After completion of foundation footing, foundation, walls, and other construction below the elevation of the final grades and prior to backfilling, forms shall be removed and the excavation shall be cleaned of trash and debris.

The backfilling shall include filling around the foundations, trenches.

Filling shall be approved selected material from excavation or other predominantly granular material and free from slurry, mud, organic or other unsuitable matter and capable for compaction by ordinary means.

The excavated material if found suitable shall be stock piled within the free haulage limit of the site of the works. This material shall be used for backfilling if approved by the project engineer and shall be transported by the contractor any where required for the purpose of backfilling work in this contract.

The contractor shall provide the approved quality fill and backfilling material as required to complete the fill/backfilling work. Filling in trenches and foundation shall be placed in 200 mm layers and compacted at optimum moisture content by mechanical means or other means as approved by the project engineer.

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

Material for back filling shall be as approved by the project engineer and shall be placed in layers of 150 mm measured as compacted material and saturated with sufficient water and compacted to produce in-situ density not less than 95% of the maximum density at optimum moisture content, achieved in test no.15 of IS 1377:1975 or similar clause of relevant is code.

All filled areas shall be left neat, smooth and well compacted with the top surface consisting of the normal site surface soil unless otherwise directed.

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

Fill shall not be placed against foundation walls prior to approval by the project engineer. Fill shall be brought up evenly on each side of the walls as far as practicable. Heavy equipment for spreading and compacting the fill shall not be operated closer to the wall than a distance equal to the height of the fill above the top of footing.

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

Fill shall not be placed against foundation walls prior to approval by the project engineer. Fill shall be brought up evenly on each side of the walls as far as practicable. Heavy equipment for spreading and compacting the fill shall not be operated closer to the wall than a distance equal to the height of the fill above the top of footing.

In case the contractor is instructed to arrange for the fill material the quality of the fill material will be subject to the approval of the project engineer. The project engineer shall require the contractor to carry out various tests of the fill material. All such tests shall be made at an approved laboratory at the cost of the contractor. Once a material from a specific source has been approved, the material for the same quality and from that source only shall be used. Any fill material from borrow pits which has not been approved or the

quality of which differs from the approved material shall be rejected out rightly. The project engineer reserves the right to order removal of any such materials brought to the site of works at his discretion at contractor's expense. In order to ensure satisfactory compaction, it will be necessary to carry out, depending upon the type of material, particle size distribution tests, determination of organic content tests, maximum and minimum density tests and determination of optimum moisture content for the filling material.

The method of compaction, namely type of compactor, type of roller, weight of roller and number of passes proposed by the contractor for any particular fill material shall be subject to the approval of the project engineer after completion of satisfactory field tests, subsequent to the laboratory analyses, using the materials and equipment proposed to be used for the earth work in conditions similar to those likely to be encountered during construction.

The final selection of the soil moisture content, the thickness of layers, the type of compaction equipment and the number of passes shall be decided after these tests, which shall be conducted at contractor's expense.

Having established the method of compaction to be used, no departure from this approved method shall be permitted without the prior approval of the project engineer. Adequate control of the fill and compacting operations shall be ensured by in-situ density tests and in order to obtain significant results, not less than two measurements shall be carried out per one hundred square meters of area compacted. The frequency of tests shall be determined on site and may be varied at the discretion of the project engineer. Compaction shall not be less than 95% in-situ density with respect to the maximum density, at optimum moisture content.

The exact thickness of layers and the method of placing and compacting the fill shall be determined by the field tests, as stated above, but not withstanding the results of these trails, fill shall not be placed in layers exceeding 200mm in thickness. In order to maintain control of the thickness of layers, timber profiles shall be used wherever feasible. The travelers of such profiles for each layer of fill shall be checked by the supervisory staff of the project engineer. The contractor shall provide adequate supply of water and sufficient capacity of mechanical water carriers to ensure uniform and uninterrupted operation of compaction. The project engineer may forbid the contractor to proceed with placing and/or compaction of fill and/or order removal and re-compaction of such fill when he finds that the contractor has insufficient or defective equipment or that the fill has been improperly laid and/or compacted.

If it is found necessary to alter the moisture content of the fill material in any way, then very strict control shall be exercised over the wetting and/or the drying process and frequent moisture content tests.

The fill material should be well graded non-cohesive and nearly silt-free (silt content between 5 to 10 percent) salt free and free of organic materials (less than 2%). It should also be free of stones larger than 100 mm. Maximum dimension. It should be of such nature and characteristics that it can be compacted to the specified densities in reasonable length of time. It shall be free of plastic clays, of all materials subject to decay, decomposition or dissolution and or cinder or other material which corrode piping and other metals.

TOLERANCES

The stabilization of compacted backfill/fill surfaces shall be smooth and even and shall not vary more than 100mm in 3 meters from true profile and shall not be more than 12.5mm from true elevation.

DISPOSAL OF SURPLUS MATERIAL

The rejected unsuitable material and surplus excavated material shall be disposed of within 200 m free haulage limit measured from boundary of the works to places or as directed by the Project Engineer.

The disposal of surplus excavated material shall include loading, unloading, transporting, stacking,

spreading as directed by the Project Engineer.

3. PLAIN AND REINFORCED CEMENT CONCRETE

The work covered by this section of the Specifications consists of furnishing all plant, labor, equipment, appliances and materials, and in performing all operations in connection with the supply and installation of plain and reinforced concrete work, complete in strict accordance with this section of the Specifications and relevant documents, subject to the Conditions of the Contract.

GENERAL

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

Embedded items shall have been inspected, and tests for concrete and other material or for mechanical operations shall have been completed and approved, before concrete is placed.

Formwork shop drawings shall be designed and prepared by the Contractor at his own cost. Approval of shop drawings as well as those of mock-ups /actual samples of finished concrete shall be obtained before Work is commenced.

Contractor shall prepare bar bending schedules, and get the same approved by the Project Engineer, prior to commencement of work.

RELATED SPECIFICATIONS

The codes and standards generally applicable to the work of this section are listed herein after.

IS 269	:	Ordinary and low heat Portland Cement
IS 8041	:	Rapid Hardening Portland Cement
IS 455	:	Portland slag cement
IS 1489	:	Portland Pozzolana Cement
IS 8112	:	High Strength Ordinary Portland Cement
IS 383	:	Coarse and fine aggregates from natural sources for concrete
IS 456	:	Code of practice for plain and reinforced concrete
IS 516	:	Method of sampling and analysis of concrete
IS 1199	:	Method of sampling and analysis of concrete
IS 1139	:	Hot rolled deformed bars
IS 23896	:	Methods of testing of aggregates for concrete (Part I to III)
IS 2751	:	Recommended Practice for welding for reinforcement bars
IS 9103	:	Admixtures for concrete
IS 10262	:	Recommended guide lines for concrete mixed design

MATERIALS

CEMENT

a. Cement shall conform to standards listed in section 2 of IS:456, latest edition as per the work requirement and direction of engineer.

b. Only one brand of each type of cement shall be used for concrete in any individual member of the

structure. Cement shall be used in the sequence of receipt of shipment, unless otherwise directed.

c. There shall be sufficient cement at site to ensure that each section of Work is completed without interruption.

d. Cement reclaimed from cleaning of bags or from leaky containers shall not be used.

e. Contractor shall provide and erect, at his own cost, in a suitable place, dry, well ventilated, and water proof shed of sufficient capacity to store the cement.

f. The cement shall be used as soon as possible after delivery, and cement which the Project Engineer considers has become stale or unsuitable through absorption of moisture from the atmosphere or otherwise shall be rejected and removed immediately from the site at Contractor's expense.

g. The mixing together of different types of cement shall not be permitted.

AGGREGATES

a. The sources of supply of all fine and coarse aggregates shall be subject to the approval of Project Engineer.

b. All fine and coarse aggregates shall be clean and free from clay, loam, silt, and other deleterious matter. If required, Project Engineer reserves the right to have them washed by the Contractor at no additional expenses. Coarse and fine aggregates shall be delivered and stored separately at Site. Aggregates shall not be stored on muddy ground or where they are likely to become dirty or contaminated.

c. Fine aggregate shall be hard coarse sand, crushed stone or gravel screenings and shall conform to requirements of IS: 383 latest edition.

d. Coarse aggregate shall be gravel or broken stone or hard, durable material free from laminated structure and conforming to IS: 383 latest edition. The aggregates shall be graded as follows for use in mass concrete as in foundations:

TOTAL PASSING	PERCENT BY WEIGHT
2" B.S. Sieve (50.00 mm)	100
1-1/2" Sieve (38.10 mm)	95-100
3/4" Sieve (19.00 mm)	35- 70
3/8" Sieve (9.50 mm)	10- 30
No. 4 Sieve (4.75 mm)	0- 5

Coarse aggregate for all cast-in-place concrete other than mass concrete as for foundations shall be graded with the following limits:-

TOTAL PASSING	PERCENT BY WEIGHT
1" Sieve (25.00 mm)	100
3/4" Sieve (19.00 mm)	90-100
3/8" Sieve (9.50 mm)	20- 55

No. 4 Sieve (4.75 mm) 0- 10

Water:

Only clean potable water from the city supply, tube well installed at the Site or from other sources approved by Project Engineer shall be used. Contractor shall supply sufficient water for all purposes, including mixing the concrete, curing and cleaning plant and tools. Where doubts exist as to the suitability of the water, it shall be tested in accordance with IS: 3025. Where water can be shown to contain any sugar or an excess of acid, alkali or salt, Project Engineer may refuse to permit use. As a guide, the following concentrations represent the maximum permissible values:

a. To neutralize 200 ml sample it should not require more than 2 ml of 0.1 normal NaOH.

b. To neutralize 200 ml sample it should not require more than 10 ml of 0.1 normal HCL.

c. Percentage of solids should not exceed the following:

	PERCENT
Organic	0.02
Inorganic	0.30
Sulphates	0.05
Alkali Chlorides	0.10

In case of doubt, Project Engineer may require that concrete mixed with water proposed to be used should not have a compressive strength lower than 90 percent of the strength of concrete mixed with distilled water.

Reinforcement

a. Reinforcement for concrete shall conform to the respective IS or other standards as specified in the drawings and Contract Documents or as may be specified by Project Engineer.

b. Unless otherwise specified, all plain reinforcing bars shall comply with the requirements of IS: 432, and shall have a minimum yield stress of 248 N/sq mm.

c. Unless otherwise specified, all deformed reinforcing bars shall comply with the requirements of IS: 1786 for deformed cold worked steel bars and shall have minimum characteristic stress of 415 N/sq mm.

d. Reinforcement shall be obtained only from manufacturer's approved by Project Engineer. If and when required Contractor shall provide all necessary facilities to Project Engineer for the selection of test pieces and shall cause these to be prepared and submitted where directed for tests at Contractor's cost.

e. If the reinforcement is to be supplied by Employer, Contractor shall inform Project Engineer of his requirements much before its use in construction.

f. Reinforcement of all types is to be stored at Site in an approved manner so as to avoid damage.

g. Contractor shall report immediately on receipt of any consignment, having any deviation in the standard weights of the reinforcing bars beyond those allowed in respective standards mentioned in clause (3.3.3.4.b) and (3.3.4.4.c) herein before.

4. CONCRETE MIX PROPORTIONS

General:

The proportions of ingredients shall be such as to produce a mixture which will work readily into the

corners and angles of the forms and around reinforcement by the methods of placing and consolidation employed on the Work, but without permitting the materials to segregate or excessive free water to collect on the surface. Specific approval of the Project Engineer is required to waive limitations on mixture proportions.

The proportions of ingredients shall be selected in accordance with Section 5.7 to produce the proper placebility, durability, strength and other required properties.

Strength

The Specified compressive strength of the concrete cube, shall be 15 N/sq mm. or 20 N/sq mm.. Samples from fresh concrete shall be taken as per IS: 1199 and cubes shall be made, cured and tested at 28 days in accordance with IS: 516.

Durability

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

Slump

Unless otherwise permitted or specified, the concrete shall be proportioned and produced to have a slump of 100 mm or less. A tolerance of up to 25 mm above the indicated maximum shall be allowed for individual batches provided the average for all batches or the most recent 10 batches tested, whichever is fewer, does not exceed the maximum limit.

Concrete of lower than usual slump may be used provided it is properly placed and consolidated.

Note: If S.R. Cement is used, permissible water-cement ratio may be increased by 0.05.

Slump shall be determined by the "Test for slump for Portland Cement Concrete" as per relevant IS code.

Maximum Size of Coarse Aggregate:

The nominal maximum size of the aggregate shall be 20.mm for all portions of the structure except footings which may be 38 mm. These limitations may be waived if, in the judgment of the Project Engineer, workability and methods of consolidation are such that the concrete can be placed without honeycomb or voids.

Admixtures:

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

Methods of Obtaining Mix Design:

For concrete of normal weight, mix proportions to provide the desired characteristics shall be developed using the methods/procedure covered by the Recommended Practice for Selecting Proportions for Normal Weight Concrete ACI-211.1-77/ IS:456- 1978.

Trial mixtures having proportions and consistencies suitable for the Work shall be made based on above codes, using at least three different water-cement ratios which will produce a range of strengths encompassing those required for the Work. Trial mixes shall be designed to produce the specified slump. The temperature of concrete used in trial batches shall be reported.

For each water-cement ratio, compression test of cube shall be made, cured, and tested in accordance with IS:1199 and IS:516. From the results of these tests a curve shall be plotted showing the relationship between

the water-cement ratio and compressive strength. From this curve, the water-cement ratio to be used in the concrete shall be selected to produce the required design strength. The cement content and mixture proportions to be used shall be such that this water- cement ratio is not exceeded when slump is the maximum permitted. Control in the field shall be based upon maintenance of proper cement content and slump.

5. STEEL REINFORCEMENT

SCOPE OF WORK

The work to be done under this section consists of furnishing, cutting, fabricating, bending, placing and tying steel reinforcement in concrete structures or elsewhere as shown on the drawings or directed by the Project Engineer. The scope of this section of this section of specifications as laid down herein.

MATERIAL AND SIZE OF BARS

Reinforcement for concrete shall conform to the respective Indian or other standards as specified in the drawings and in the contract documents or as may be specified by the Project Engineer.

Unless otherwise specified, all plain mild steel reinforcing bars shall comply with the requirements of IS: 432 (Part- I) and shall have a minimum yield stress of 250 N/mm.sq.

Unless otherwise specified, all deformed reinforcing bars shall comply with the reinforcements of IS: 1786 for deformed cold twisted steel bars and shall have a minimum characteristic strength of 415 N/mm.

Reinforcement shall be obtained only from manufacturers approved by the Consultant/Project Engineer. Each consignment of reinforcement steel shall be accompanied by a manufacturer's certificate or shall refer to a previous certificate, if the consignment is from the same batch, showing that the reinforcement steel complies with the following requirement

If such certificate is not made available or if the Consultant / Project Engineer considers that the manufacturer's tests are inadequate, samples shall be taken for acceptance test from different consignments as the Project Engineer may direct and shall be tested at the Contractor's cost should the result of such that any sample does not meet with the specifications, the whole consignment shall be rejected and removed from the site at the Contractor's cost.

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

Reinforcement shall be free from all loose or flaky rust and mill scale or coating, including ice, and other substance that would reduce or destroy the bond. Reduced section steel reinforcement shall not be used.

If such certificate is not made available or if the Consultant / Project Engineer considers that the manufacturer's tests are inadequate, samples shall be taken for acceptance test from different consignments as the Project Engineer may direct and shall be tested at the Contractor's cost should the result of such that any sample does not meet with the specifications, the whole consignment shall be rejected and removed from the site at the Contractor's cost.

If such certificate is not made available or if the Consultant / Project Engineer considers that the manufacturer's tests are inadequate, samples shall be taken for acceptance test from different consignments

as the Project Engineer may direct and shall be tested at the Contractor's cost should the result of such that any sample does not meet with the specifications, the whole consignment shall be rejected and removed from the site at the Contractor's cost.

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

Reinforcement shall be free from all loose or flaky rust and mill scale or coating, including ice, and other substance that would reduce or destroy the bond. Reduced section steel reinforcement shall not be used.

Steel wire mesh reinforcement shall conform to requirement of relevant Indian codes or those of ASTM: A 185-64 or BS. 4483, 1969: Standard Specifications for welded steel wire fabric for concrete reinforcement. It shall be used where shown on the drawings.

Applicable standards

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

DELIVERY & STORAGE

Delivery

Steel reinforcement bars shall be delivered in bundles firmly secured and tagged. Each bars or bundle of bars shall be identified by marks stamped on hot or cold or painted on or by any other means. The identifying marks shall contain the following information:

a. Name of the producer or his trade.

b. Standard to which the bars have been manufactured.

c. The clause, type and strength respectively.

d. The diameter.

e. The number of the test certificate (if available).

Storage

The method of storage shall be approved by the Project Engineer. Reinforcing bars shall be stored in racks or platforms above the surface of ground and shall be protected free from scaling, rusting, oiling, coatings, damage, contamination and structural defects prior to placement in works. Bars of different diameters and grades of steel reinforcement shall be kept separate.

BAR BENDING SCHEDULES

The Contractor shall prepare bar bending schedule of all the reinforcing steel bars and these bar bending schedules will be supplied to the Consultants/Project Engineer in duplicate on the basis of which the work shall be carried out. However, the Contractor shall be responsible to satisfy himself as to the correctness and accuracy of the bar bending schedule. Any discrepancy shall immediately be notified to the Consultant / Project Engineer before commencing work.

MEASUREMENT & PAYMENT

Except otherwise specified herein or elsewhere in the Contract documents, no measurement and payment will be made for the under mentioned specified works related to the relevant items of the Bill of Quantities. The cost thereof shall be deemed to have been included in the quoted unit rate of the respective items of the Bill of Quantities. Providing and installing chairs, supports, hooks, spacers, binding wires, and laps not shown on drawings including wastage and rolling margin.

6. BRICK MASONRY

GENERAL

Brick Masonry shall consist of all work required in connection with constructing brick masonry at locations shown on drawings including, but not limited to, furnishing brick, portland cement and sand for mortar and all other materials, and mixing, placing brick masonry as per bill of quantities.

MATERIALS

All portland cement for mortar shall be furnished by the Contractor and shall conform to the applicable requirements specified in the section "Plain and Reinforced Concrete". All sand for mortar shall be furnished by the Contractor and shall conform to the applicable requirements for sand specified in the section "Plain and Reinforced Concrete".

All water used in the manufacture of bricks and in the preparation of mortar shall be free

from objectionable quantities of silt, organic matter, alkali, salts and other impurities,

and will be tested and approved by the Project Engineer as per the guidelines of IS: 456.

MORTAR

a. MIX: Mortar for all brick masonry, expect where otherwise directed by the Project Engineer, shall consist of one part cement to six parts of damp loose mortar sand by volume for brickwork 230mm and above. For brick piers, half brick walls, honeycombed brickwork and hollow (cavity) walls, the mortar mix shall consist of one part cement and four parts of sand. Quantity of water shall be just sufficient enough to produce proper consistency for the intended use. Where directed and approved by the Project Engineer, hydrated lime putty, shall be added to the mortar for increased workability. The putty shall, however, not exceed 25% by volume of the dry cement.

b. Methods and equipment used for mixing mortar be such as will accurately determine and control the amount of each separate ingredient entering into the mortar and shall be subject to the approval of the Project Engineer. Mortar shall be mixed only in sufficient quantities for immediate use and all mortar not used within 30 minutes after addition of the water to the mix shall be wasted. Re-tempering of mortar will not be allowed. The mixers shall be thoroughly cleaned and washed at the end of each day's work.

BRICK

a. All bricks shall be of first class quality made from flyash confirming to IS 13757, free from saline deposits and shall be sand moulded. They shall be thoroughly burnt without being vitrified, shall be regular, uniform in shape and size with sharp and square edges parallel faces and of deep red or copper colour. First class bricks shall be homogeneous in texture and emit a clear ringing sound when struck, and shall be free from flaws, cracks, chips, stones and nodules of lime. First class brick in an oven dried condition shall not absorb more than 1/5 of its weight of water when immersed for one hour in water at 21 to 27 degrees centigrade and shall show no signs of efflorescence on subsequent drying. The minimum compressive strength required is 75 kg/cm2. The bricks in general shall conform to the requirements of IS: 13757.

PLACING

a. The methods and equipment used for transporting the bricks and mortar shall be such as will not damage the brick nor delay the use of mixed mortar. Brick shall not be placed during rains sufficiently heavy or prolonged to wash the mortar from the brick. Mortar which becomes diluted by rain shall be

removed and replaced before continuing with the work. All bricks to be used in brick masonry shall be moistened with water for three to four hours before they are used. The chosen method of wetting shall ensure that all bricks are thoroughly and uniformly wetted. All bricks shall be free from water adhering to their surface when they are placed in the brick masonry.

b. Bricks shall be laid "Frog" upward with mortar joints and in English bond as directed by the Project Engineer. Both bed and vertical joints shall be 6mm in thickness completely filled with cement mortar as specified herein, and each brick shall be bedded by firmly tapping with the handle of the trowel. All horizontal joints shall be parallel and all vertical joints in alternate courses shall be directly over one another. Excess mortar at the outer edges shall be removed and joints drawn straight with the edge of a trowel and a straight edge. All anchors and similar work required to be embedded in the brick masonry shall be installed as the work progresses. At the completion of the work all holes or defective mortar joints shall be cut out and repointed.

c. The exterior faces of the walls shall be finished by striking the joints as the work proceeds. The joints shall be struck by raking the green mortar after the brick work has been laid and finishing the joint with a pointing tool. Horizontal joints shall be struck to form weathered joints and vertical joints shall be struck with a V notch. Care shall be taken that the striking tools do not develop a cutting edge as the object of striking the joint is to compress the mortar into the joints.

CURING AND REPAIR

a. All brick masonry shall be water cured and shall be kept wet for least seven days by an approved method which will keep all surfaces continuously wet. Water used for curing shall meet the requirements of these specifications for water used in the manufacture of bricks.

b. If, after the completion of any brick masonry work, the brick are not in alignment or level or does not conform to the lines and grades shown on the drawings, or shows a defective surface, it shall be removed and replaced by the Contractor at his expense unless the Project Engineer grants permission, in writing to patch or replace the defective area.

TOLERANCES

The brickwork shall be erected plumb and true to line at level with the maximum variation in any storey height of any length of wall being one meter. The maximum tolerance in the length, height or width of any single masonry unit shall be +/- 3mm.

MEASUREMENT AND PAYMENT

GENERAL

Except otherwise specified herein or elsewhere in the contract documents, the measurement and payment will be made for the under mentioned specified works related to the relevant items of the bill of quantities.

MEASUREMENT

Measurement of acceptable completed works of brick masonry will be made on the basis of cubic meters provided and installed in position as shown on the drawing or as directed by the Project Engineer.

PAYMENT

Payment will be made for acceptable measured quantity of brick masonry on the basis of unit rate per cum quoted in the bill of quantities and shall constitute full compensation for all the works related to the items.

7. FINISHING

General

All plaster work shall be of the best workmanship and in strict accordance with the dimensions of the drawings. All plastering shall be finished to true levels including plumbs, without imperfections, and square with adjoining work. It shall form proper foundations for finishing materials such as paint etc. Masonry and concrete surface to which plaster is to be applied shall be clean, free from efflorescence, sufficiently rough and keyed to ensure proper bond.

All chasing, installation of conduits, boxes, etc. shall be completed before any plastering is commenced on a surface. Chasing or cutting of plaster will not be permitted. Broken corners shall be cut back less than 150 mm on both sides and patched with plaster of Paris as directed. All corners shall be rounded to a radius. Contractor shall get samples of each type of plaster work approved by the Architect/Project Manager.

All chasing, installation of conduits, boxes, etc. shall be completed before any plastering is commenced on a surface. Chasing or cutting of plaster will not be permitted. Broken corners shall be cut back less than 150 mm on both sides and patched with plaster of Paris as directed. All corners shall be rounded to a radius. Contractor shall get samples of each type of plaster work approved by the Architect/Project Manager.

The materials used for plastering shall be proportioned by volume by means of gauge boxes. Alternatively it may be required to proportion the materials by weight.

PLASTER WORK

The joints in the brick work, concrete blocks, shall be raked to a depth of 15 mm while the masonry is green. Concrete surfaces to receive plaster shall be suitably roughened. All walls shall be washed with water and kept damp for 10 hours before plastering.

The plaster unless specified otherwise shall be average of 12 mm thick on walls. The finished texture shall be as approved by the Architect/Project Manager. The mix for plaster unless otherwise specified, shall be one part cement and four parts sand, to walls and one part cement, 3 parts sand to ceiling.

The interior plaster shall be applied in one coat only. The surface shall be trowelled smooth to an approved surface. All plaster work shall be kept continuously wet for seven days

The external plaster shall be of two coats on an overall thickness of minimum 20 mm. Preparations of walls to receive plaster work shall be the same as in internal plaster. Backing coat shall be 12 to 15 mm thick with cement mortar 1:5 and finishing coat shall be with cement mortar 1:3.

Backing coats shall be combed on wet surface to form keys for finishing coat. All external plaster shall be waterproofed with approved water proofing powder added to cement in proportion of 1.5 Kg. to 50 Kg. of cement as per the manufacturers' instruction, for both the coats. Cost of waterproofing powder per Kg. shall be paid for separately.

For sand faced cement plaster, the finishing coat shall be in cement mortar 1:3, sand used shall be of selected color, properly graded and washed so as to give a grained texture. Finishing plaster coat shall be 8 mm thick, uniformly applied and surface finished with special rubbing by sponge pads and other tools and recommended by the Architect/Project Manager.

8. *Paver Blocks / Interlocking Concrete Block Pavement**:***

Shall confirm to IRC 63

Providing and fixing pre-cast Rubber Dye inter locking concrete block 60mm thick with grade of concrete M-30 compressed by mechanically pressed and as per approved design including 50 mm Sand layer for levelling and filling the joint with sand in proper line and level etc complete.

The scope of work includes supplying and lying of precast paver blocks at site, as mentioned in the Item. All relevant provisions of IS 15658:2006 shall apply. Laying of paver blocks at site as per requirement in technical specification, within shortest possible time. The work shall be executed in perfect line and level as per instructions of Engineer in charge. Colored concrete paver blocks shall be manufactured as per specifications using approved color pigment. The color shade shall be as selected by employer before commencement of the work. The contractor shall guarantee that all material and components designed, fabricated, supplied and laid by him shall be free from any type of defect due to faulty material and/Workmanship/erection For a period of One year from the date of completion of work.

9. *Grass Pavers*

The grass pavers should have perpendiculars after release from the mould and the same should be retained until the laying. The surface should be of anti-skid and anti-glare type. The grass pavers should have minimum 50% opening for grass ,uniform chamfers to facilitate easy drainage of surface run off. The pavers should have uniform interlocking space of 2mm to 3mm to ensure compacted sand filling after vibration on the paver surface.

The concrete mix design should be followed for each batch of materials separately and automatic batching plant is to be used to achieve uniformity in strength and quality.

The pavers shall be manufactured in single layer only.

Skilled labour should be employed for laying blocks to ensure line and level for laying, desired shape of the surface and adequate compaction of the sand in the joints.

The pavers are to be skirted all round with kerbing using solid concrete blocks of size 100mm x 200mm x 400mm or as directed by the Engineer. The kerbing should be embedded for 100mm depth. The concrete used for kerbing shall be cured properly for 7 days minimum.

10. *Kota stone flooring*

Materials

The stone shall be hard, sound, durable, homogeneous in texture and resistant to wear. These shall be without any soft veins, cracks or flaws and shall have uniform colour. They shall have natural surface free from broken flakes on top. Hand cut/ machine cut for exposed edges and machine polished. Kota stone shall be of the best quality and of the specified thickness, size and the shade, which shall be got approved by the Engineer-in-charge. The slabs / tiles shall be rectangular or square in shape or as per pattern shown in drawing and as directed by the Engineer-in-charge. The sizes given in schedule of quantities are tentative and can vary only slightly as per the availability in the market. The thickness of the slab after it is dressed shall be 20, 25, 30 or 40 mm as specified in the item. Tolerance of (+/-) 2 mm shall be allowed for the thickness. In respect of length &width, tolerance in length & width shall be permissible upto (+/-) 5 mm for hand cut slabs & (+/-) 2 mm for machine cut slabs. At its thinnest, no stone shall be thinner than the specified thickness.

Uniformity of size and colour / shade shall generally be maintained for the stones used in any one room. The exposed surface shall be machine polished to a smooth, even and true plane and the edges hand cut and dressed true and squares. The evenness of the surface of slabs and edges of the slab shall not be marred by

careless dressing or handling, and no patching up shall be allowed for the slab. The edges shall be quite straight. The under face may be left as required or rough dressed. Before taking up the work, samples of stone slabs to be used and their dressing and polishing shall be got approved by the Engineer-in-charge and kept in his office as approved sample and the stone slabs to be used shall conform to the same.

Bedding/ Backing Coat

Kota Stone floorings when laid on ground , a base course of lean concrete mixCement Mortar 1:4:8 (Cement, Course Sand, Stone Aggregate 40mm nominal size) is to be provided between flooring and well compacted sub-base. The minimum thickness of Base-Course will be 100 mm for floors of buildings/ Platform/Concourse/Pathway etc.

Construction Details

Cement mortar as specified for bedding shall be uniformly mixed. The amount of water added shall be the minimum necessary to give just sufficient plasticity for laying and satisfactory bedding. Care shall be taken in preparing the mortar to ensure that there are no hard lumps that would interfere with the even bedding of the stones. Before spreading the mortar, the sub-floor or base shall be cleaned of all dirt, set mortar scum or laitance and of loose materials by hacking and brought to original levels and then well wetted without forming pool of water on surfaces.

Fixing the stone slab/ tile:

Before laying, the stone shall be thoroughly wetted with clean water, neat cement grout (2.75 kg/ sqm.) of honey like consistency shall be spread on the mortar bed over as much areas as could be covered with the slabs within half an hour. The specified type of stone shall be laid on the neat cement float and shall be evenly and firmly bedded to the required level and slope in the mortar bed. Each stone shall be gently tapped with wooden mallet till it is firmly and properly bedded.

Curing

The work shall be kept well wetted with damp sand or water for seven days.

Polishing and cleaning

When the bedding and joints have completely set and attained required strength, the surface shall be machine polished to give smooth, even and true plane to the flooring. All flooring shall be thoroughly cleaned and handed over free from any mortar stains etc. Polishing shall be done as per relevant IS and IS-14223 (Specification for polished building stones).

11. *Bedding Sand Course*

The bedding sand shall consist of a clean well graded sand passing through 4.75mm sieve and suitable for concrete. The bedding . should be from either a single source or blended to achieve the following grading.

Bedding Sand Requirement

In Sieve Size	% Passed

9.52mm	100
4.75mm	95-100
2.36mm	80-100
1.18mm	60-100
600 Microns	25-60
300 Microns	10-30
150 Microns	5-15
75 Microns	0-10

- Contractor shall be responsible to ensure that single-sized, gap-graded sands or sands containing an excessive amount of fines or plastic fines are not used. The sand particles should preferably be sharp not rounded as sharp sand possess higher strength and resist the migration of sand from under the block to less frequently areas even though sharp sands are relatively more difficult to compact than rounded sands, the use of sharp sands is preferred for the more heavily trafficked driveways. The sand use for bedding shall be free of any deleterious soluble salts or other contaminants likely to cause efflorescence.
- The sand shall be of uniform moisture content and within 4% - 8% when spread and shall be protected against rain when stock piled prior to spreading. Saturated sand shall not be used. The bedding sand shall be spread loose in a uniform layer as per drawing. The compacted uniform thickness shall be of 45mm and within +/- 5mm thickness variation shall not be used to correct irregularities in the base course surface.
- The spread sand shall be carefully maintained in a loose dry condition and protected against pre-compaction both prior to and following screening. Any pre-compacted sand or screened sand left overnight shall be loosened before further laying of paving blocks take place.

  Sand shall be slightly screened in a loose condition to the predetermined depth only slightly ahead of the laying of paving unit.

12. *Painting*

SCOPE

These specifications cover the use of paints for the plastered and concrete surfaces. It also includes the painting of wood and metal surfaces.

GENERAL

The provisions of the latest revisions of the following IS : Codes shall form a part of this specification.

IS: 63	Whiting for Painting Ready mixed paint, brushing, grey filler, for Enamels, for use over primers.
IS: 426	Specification for paste filler for colour coats.
IS : 428	Specification for Distemper, Oil Emulsion, colour as required.
IS : 710	Marine Plywood

IS : 1200 (Part XIII)	Method of Measurement of Building & Civil Engg. Works - White Washing colour washing, distempering & other finishes.
IS : 1477 (Part I)	Code of practice for painting for ferrous metals in buildings Pretreatment.
IS : 1477 (Part II)	Code of practice for finishing of ferrous metals in building. Painting
IS : 2338 (Part I)	Code of practice for finishing of wood and wood based materials Operations and workmanship for finishing.
IS : 2338 (Part II)	Code of practice for finishing of wood and wood based materials, Schedule.
IS : 2395 (Part I)	Code of practice for painting concrete masonry and plaster surfaces. Operation & workmanship
IS : 2395 (Part II)	Code of practice for painting concrete, masonry and plaster surfaces. Schedule.
IS : 159	Specification for ready mixed paint, brushing, acid resistant.
IS : 2524 (Part I)	Code of practice for painting of non-ferrous metal in building Pre-treatment.
IS : 2524 (Part III)	Code of practice for painting of non-ferrous metal in building Painting.
IS : 3140	Code of practice for painting asbestos cement buildings.
IS : 5410	Specification for cement paints, colour as required.IS:15489-04 Specification for External Paint

Other IS Codes not specifically mentioned here, but pertaining to painting form part of these specifications.

MATERIALS

Materials shall strictly conform to the relevant IS: Specifications.

PLASTERED OR CONCRETE SURFACES

General

Wherever scaffolding is necessary, it shall be erected in such a way that as far as possible no part of scaffolding shall rest against the surface to be painted..

For painting on external surfaces secured double scaffolding to be used.

Where ladders are used, pieces of old gunny bags shall be tied at top and cotton to prevent scratches to the walls and floors. For painting of ceilings, proper stage scaffolding shall be erected, where necessary.

Preparation of surfaces

The surface shall be thoroughly cleaned off all dirt, dust, mortar dropping and other foreign matter, before paint is to be applied. New plaster surfaces shall be allowed to dry for at least 2 months, before applying paint. All unnecessary nails shall be removed. Pitting in plaster shall be made good with putty. The surface shall then be rubbed down again with a fine grade sand paper and made smooth.

The surface shall be allowed to dry thoroughly before the regular cost of paint is allowed.
The surface affected by mounds moss, fungi, algae lichens, efflorescence shall be treated in accordance with IS 2395 (Part I) before applying paint. The Adjoining surfaces/finishes shall be protected with either masking tape / plastic to avoid damages to other finishes.
The masking tape / plastic shall be removed without damaging the finishes.

WATER PROOF CEMENT PAINT

PREPARATION OF SURFACES

The surfaces shall be thoroughly wetted with clean water before the waterproof cement paint is applied.

PREPARATION OF PAINT

Portland cement paints are made readily by adding paint power to water and stirring to obtain a thick paste, which shall then be diluted to a brushable consistency. Generally equal volumes of paint powder and water make a satisfactory paint. In all cases the manufacturer's instructions shall be followed. The paint shall be mixed in such quantities as can be used up within an hour of mixing as otherwise the mixture will set and thicken, affecting flow and finish.
The lids of cement paint drums shall be kept tightly closed when not in use, as by exposure to atmosphere the cement paint rapidly air set due to its hydroscopic qualities.

APPLICATION OF PAINT

No painting shall be done when the paint is likely to be exposed to a temperature of below 7 degree within 48 hours after application.
When weather conditions are such as to cause the paint to dry rapidly, work shall be carried out in the shed as far as possible. This helps the proper hardening of the paint film by keeping the surface moist for a longer period.
To maintain a uniform mixture and to prevent segregation the paint shall be stirred frequently in the bucket.
For undercoated surfaces, the surface shall be treated with minimum two coats of water-proof cement paint. Not less than 24 hours shall be allowed between two coats and the second or subsequent coat shall not be started until the preceding coat has become sufficiently hard to resist marking by the brush being used. In hot dry weather the preceding coat shall be slightly moistened before applying the subsequent coat.
The finished surface shall be even and uniform in shade without patches, brush marks, paint drops, etc.
Cement paints shall be applied with a brush with relatively short stiff hog or fibre bristles. The paint shall be brushed in uniform thickness and shall be free of excessively heavy brush marks. The laps shall be well brushed out.

CURING

Painted surfaces shall be sprinkled with water two or three times a day. This shall do between coats and for at least two days following the final coat. The curing shall be started as soon as the paint has hardened so as not to be damaged by the sprinkling of water, say about 12 hours after its application.

PAINTING WOOD AND METAL SURFACES

GENERAL REQUIREMENT

The material required for the execution of painting work shall be obtained directly from approved manufacturers and brought to the site in maker's drums, with seals unbroken. All paints of low VOC shall conform to relevant Indian Standards as mentioned under sub-head "Material".
All materials not in actual use shall be kept properly protected. Lids of containers shall be kept closed and surface of paint in open or partially open containers covered with a thin layer of turpentine to prevent formation of skin. Materials, which have become stale or fat due to improper and long storage shall not be

used. The paint shall be stirred thoroughly in its container before pouring into small containers. While applying also, the paint shall be continuously stirred in the smaller container. No left over paint shall be put back into stock tins. When not in use, the containers shall be kept properly closed.

If for any reason thinning is necessary, in case of ready mixed paint, the brand of thinner recommended by manufacturer shall be used.

Painting except the priming coat shall generally be taken in hand after all other builder's work is practically finished. The rooms shall be thoroughly swept out and the entire building cleaned up at least one day in advance of the paintwork being started. The surface to be painted shall be thoroughly cleaned and dusted. All rust, dirt scales, smoke and grease shall be thoroughly removed before painting is started.

No painting on exterior or other exposed parts of the work shall be carried out in wet, humid or otherwise unfavorable weather and all the surfaces must be thoroughly dry before painting work is started.

BRUSHING OF PAINT

The brushing operations are to be adjusted to the spreading capacity advised by the manufacturers of the particular paint. The painting shall be applied evenly and smoothly by means of crossing and laying off, the later in the direction of the grain of wood. The crossing and laying off consists of covering the area over with paint, brushing the surface hard for the first time over and then brushing alternatively in the opposite directions two to three times and then finally brushing lightly in a direction at right angles to the same. In this process, no brush marks shall be left after the laying off is finished. The full process of crossing and laying off will constitute out coat.

During painting, every time after the paint has been worked out of the brush bristles or after the brush has been unloaded, the bristles of the brush. (Which are drawn together due to the high surface tension) shall be opened up by striking the brush against a portion of the unpainted surface with the end of the bristles held at right angles to the surface, so that bristles thereafter will collect the correct amount of paint when dipped again into the paint container.

SPRAYING

Where so stipulated, the painting shall be done with spray. Spray machine used may be (a) high pressure (small air aperture) type or (b) a low-pressure (large air gap) type, depending on the nature and location of work to be carried out. Skilled and experienced workmen shall be employed for this class of work. Paints used shall be brought to the requisite consistency by adding a suitable thinner.

Spraying should be done only when dry conditions prevail. During spraying the spray gun shall be held perpendicular to the surface to be coated and shall be passed over the surface in a uniform sweeping motion. Different air pressures and fan adjustment shall be tried so as to obtain the best application with the minimum wastage of paint. The air pressure shall not be kept too high as otherwise the paint will clog up and will be wasted.

Spots that are inaccessible to the spray pattern shall be touched up by brush after spraying.

At the end of the job, the spray gun shall be cleaned thoroughly so as to be free from dirt. Incorrect adjustments shall be set right, as otherwise they will result in variable spray patterns, runs, sags and uneven coats.

Each coat shall be allowed to dry completely and lightly rubbed with very fine grade of sand paper and loose particles brushed off before next coat is applied. Each coat shall vary slightly in shade and shall be got approved 'from the Engineer-in-charge before next coat is started.

Each coat except the last coat shall be lightly rubbed down with sand paper or fine pumice stone and cleaned off dust before the next coat is applied.

No hair marks from the brush or clogging of paint puddles in the corner panels, angles of mouldings, etc. shall be left on the works. In painting doors and windows, the putty round the glass panes shall also be

painted but case shall be taken to see that no paint stains etc. are left on the glass. Tops of shutters and surfaces in similar hidden locations shall not be left out in painting.

In painting steel work, special care shall be taken while painting over bolts, nuts, rivets, overlaps etc.

The additional specifications for primer and other coats of paints shall be according to the detailed specifications under the respective headings.

BRUSHES AND CONTAINERS

After work, the brushes shall be completely cleaned off paint and linseed oil by rinsing with turpentine. After cleaning, brushes are wrapped in heavy paper or waterproof paper for storage. It is to be used the next day; it shall be hung in a thinner or linseed oil in a container. On no account shall brushes to be made to stand on bristles. A brush in which paint has dried up in ruined and shall on no account be used for painting work.

The containers, when not in use, shall be kept closed and free from air so that paint does not thicken and also shall be kept guarded from dust. When the paint has been used, the containers shall be washed with turpentine and wiped dry with soft clean cloth, before they can be used again.

WHITE WASHING

GENERAL

The item refers to whitewashing over old and new concrete, stone masonry brick plastered surfaces and asbestos cement sheets.

White wash shall be prepared from fresh burnt white stone lime or shell lime. This lime shall be of class type as per IS: 712. Surkhi lime or lime of equivalent quality may be used. The lime shall be dissolved in a tub with sufficient quality of water (about 4.5 liters/Kg. Of line) and the whole shall be thoroughly mixed and stirred until it attains the consistency of thin cream. The white wash shall be taken out in small quantities and strained through a clear course cloth. Alternatively with IS : 63 may also be used. Clean gum dissolved in hot water shall then be added in suitable proportion of 2 gm of gum Arabic to a little of lime or whiting to prevent the white-wash coming off easily when rubbed. Rice may be used instead of gum.

SCAFFOLDING

This may be double or single according to requirements. If ladders are used, pieces of old gunny bags or cloth rags shall be tied on their tops to avoid damage or scratches to the wall. Proper stage scaffolding shall be created when whitewashing ceiling. The contract shall be responsible for accidents if any taken place.

PREPARATION OF SURFACE

The surface shall be prepared by removing all mortar dropping and foreign matter and thoroughly cleaned with wire or fiber brush or other means as may be ordered by the Engineer to produce an approved clean and even surface. All loose pieces and the scales shall be scraped off and holes stopped with mortar. In case where the surface has been previously colour washed, the old colour wash must be entirely removed before the white-wash is applied. In the case of surface, which has once been white-washed, the old loose white-wash shall be broomed down. In case, the loose whitewash cannot be removed by brooming, the Engineer may order scraping of the surface.

After cleaning the surface as specified above, the unwanted nails shall be removed and all nail holes, cracks and crevices stopped with mortar similar in composition to the surface to be stopped. The mortar should be cured.

APPLICATION OF WHITE-WASH

On the surface so prepared, the whitewash shall be laid. Each coat shall be laid on with a brush. The first stroke of the brush shall be form the top downward, another from bottom upwards over the first stroke, and

similarly, one stroke from the right and another from the left over the first brush before it dries. This will from one coat. Each coat must be allowed to dry and shall be subject to inspection before the next coat is applied. When dry, the surface shall show no signs of cracking. It shall present a smooth and uniform finish free from brush marks and it should not come off easily when rubbed with a finger.

No portion in the surface shall be left out initially, to be patched up later on.For new work, the white washed surface shall present a smooth and uniform finish.

For old work, patches and repairs shall be white washed first. Thereafter, the whole surface shall be white washed with the required number of coats.

Doors, windows, floors and other articles of furniture, etc. shall be protected from being splashed upon. Splashing and droppings, if any, shall be removed and the surfaces cleaned.

PREPARING THE SURFACE FOR WHITE WASH INCLUDING THE SCAFFOLDING

Appling the white wash in required number of coats as specified above and prior white washing of repaired patched.

PAINTING TO EXTERNAL SURFACES

GENERAL

Weather shield paint of low VOC from the approved brand shall be applied over plastered surfaces as directed by the EIC.

Other specifications including preparation of surfaces, application of paint etc. shall conform to section 7.0 above and as directed by EIC. The primping coat, anti-fugal treatment, preparation of paint etc. shall be carried out as per manufacturer's specification /as directed by EIC. General

Acrylic weather shield paint shall be applied on surfaces which are liable to external condensation and are to be used generally on masonry or plastered surfaces. Suitable primer as per manufacturer shall be provided.

PAINT

Weather shield paint of approved brand and manufacture as per the required shade shall be used.

PREPARATION OF SURFACE

The surface shall be thoroughly cleaned of dust, old white or colour wash by washing and scrubbing. The surface shall then be allowed to dry for at least 48 hours. It shall then be sand papered to give a smooth and even surface. Any unevenness shall be made good by applying external putty mixed with water on the entire surface including filling up the undulation and then sand papering the same after it is dry.

APPLICATION

The number of coats shall be as stipulated in the item.

The paint will be applied in the usual manner with brush or roller.

The paint dries by evaporation of the water content and as soon as soon as the water has evaporated the film gets hard and the next coat can be applied. The time of drying varies from one hour on absorbent surfaces to 2 to 3 hours on non-absorbent surfaces.

The thinning of paint is to be done with water and not with turpentine.

Thinning with water will be particularly required for the undercoat, which is applied on the absorbent surface. The quantity of thinner to be added shall be as per manufacturer's instructions.

The surface on finishing shall present a flat velvety smooth finish. If necessary more coats will be applied till the surface presents a uniform appearance.

PRECAUTIONS

Old brushes if they are to be used with paints should be completely dried of turpentine or oil paints by washing in warm soap water.

Brushes should be quickly washed in water immediately after use and kept immersed in water during break periods to prevent the paint from hardening on the brush.

In the preparation of walls for painting, no oil base putties shall be used in filling cracks, holes etc it should be only the external putties.

Splashes on floors etc. shall be cleaned out without delay, as they will be difficult to remove after hardening.

Washing of surfaces treated with emulsion paints shall not be done within 3 to 4 weeks of application.

13. *Erection of Structural Steel*

This specification covers the general requirements for erection of structural steel. In addition to provision of erection and transport equipment, the scope of work includes supply of tools and tackles, consumables, materials, labor and supervision and shall cover the following:

- Storing and staking of all fabricated structural components/units/assemblies at site storage yards till the time of erection.
- Transportation of structures from storage yard to site of erection, including multiple handling, if required.
- All minor rectifications/ modifications such as:-
  i. Removal of bends, kinks, twists etc for parts damaged during transportation and handling
  ii. Reaming of holes which do not fit properly, or which are damaged, for use of next higher size bolt.
  iii. Plug-welding and re-drilling of holes which do not register, and which cannot be reamed for use of next higher size bolt.
  iv. Drilling of holes which are either not drilled at all or are drilled in incorrect position during fabrication.
- Fabrication of minor missing items as directed by the Employer
- Verification of the position of embedded anchor bolts and inserts w.r.t lines and levels, installed by others based on Geodetic Scheme /Bench Mark/Reference co-ordinates to be furnished by Employer.
- Verification of actual dimensions of structures (erected by others) which would have bearing on the cutting lengths, end connections etc of those members which are to be erected under this scope of work.
- Assembly at site of steel structural components wherever required, including temporary supports and staging
- Making arrangements for providing all facilities for
  i. Conducting Ultrasonic Testing (UT) by reputed testing laboratories approved by Employer.
  ii. Making available test films / graphs, with reports / interpretation.
- Rectifying at site damaged portions of shop primer by cleaning and application touch-up paint.
- Erection of structures including making connections by bolts/ High strength Friction Grip bolts / welding as per drawing.
- Alignment of all structures true to line, plumb and dimensions within specified limits of tolerance.
- Application at site after erection, required number of coats of primer and finishing paint as per specification.
- Rectification of structures as per preliminary acceptance report and Final acceptance report.

All necessary items of work required for satisfactory completion of job on schedule.

13.1 APPLICABLE CODES STANDARDS & SPECIFICATIONS

The pertinent clauses of the following Indian Codes, Standards and Specification (latest editions including all applicable official amendments, reaffirmations and revisions) shall apply

to the material and workmanship covered by this specification. In the event of the conflict of certain requirements between this specification and the codes referred herein, this specification shall govern. It is not the intent to

specify herein all the codes and standards required for the satisfactory completion of work. The list of codes and standards indicates certain primary codes & standards and not all the codes required for the work under the contract. It is understood that all the pertinent codes and standards shall form the part of this specification whether explicitly indicated or not.

Reference codes and standards:

IS 800 General Constructions in Steel –Code of Practice.
IS 806 Code of Practice For Use Of Steel Tubes In GeneralBuilding Construction.
IS 822 Code of Procedure for Inspection of Welds.
IS:1363 Hexagonal Head Bolts, screw and nut of Product grade C
IS:1367 Technical Supply Conditions for threaded fastener (all parts)
IS 4000 Code of Practice High strength bolts in Steel Structures.
IS 7205 Safety code for erection of structural steel
IS 7969 Safety code for handling and storage of building Materials
IS:9595 Metal Arc Welding of Carbon and Carbon manganese steel.
IS 12843 Tolerances for erection of steel structures.
SP:6(1) Structural Steel Sections.
AWS D1.1 Structural Welding Code: Steel

13.2 REGULATORY REQUIREMENTS

The work covered in this specification, shall comply with all relevant government and local laws, regulations and standards. For subjects not covered by regulations, codes, standards or specifications, the materials and construction shall be based on good engineering practice, subject to approval by EMPLOYER.

13.3 ERECTION SCHEME

CONTRACTOR after the award of work shall submit a detailed erection scheme covering the period of completion of all the works covered under the specification for ENGINEER's approval. The erection scheme shall include but not limited to the following.

i. Methods proposed to be employed for transporting his equipment's, tools, tackles, gas cylinders, electrodes and all that is necessary to site.
ii. Type, capacity and quantity of equipment that the CONTRACTOR proposes to bring to site for unloading, transporting within the site, handling, assembling, hoisting and erecting of the structural steel components for all these operations.
iii. Strength and trade wise composition of the work force and supervisory personnel that will be deployed by the CONTRACTOR for the various operations.
iv. Any special specific scheme being adopted for erection of special / complicated structural elements such as roof trusses etc.

A brief write-up covering the above activities shall be submitted along with the bid document by the Bidder during submission of his bid. ENGINEER reserves the right to direct the CONTRACTOR either at the start or during the contract period, to mobilize additional resources in terms of labour, material, equipment, tools and plant etc at no cost to the EMPLOYER if in his opinion that the resources employed by the CONTRACTOR does not meet the schedule of completion.

13.4 ERECTION PROGRAMME

Within two (2) weeks of acceptance of bid the CONTRACTOR shall submit a detailed erection programme with dates and estimated completion time for various parts of the work for ENGINEER's approval. This programme shall broadly comprise the following:

i. Layout plan identifying the areas proposed for unloading, main storage, Subsidiary storage and assembly
ii. Transportation of fabricated material between the storage and work areas.
iii. Layout to indicate the points at which proposed erection begins, direction in which it is proposed to progress, the deployment of equipment, access route for cranes to reach work
areas, etc.
iv. The locations and extent of site offices and stores, labor quarters if any. v. Layout of electrical cables and water pipes from the tap-off points.
vi. Details of the method of handling, transport, hoisting and erection including false work/staging, temporary bracing, guying, etc. along with complete details of the quantity and capacity of the various items of erection equipment that will be used.
vii. Site organization chart showing the number of supervisory personnel, and the number and composition of the various gangs.
viii. Safety measures to be adopted at site of erection and organization chart showing safety personnel.
Any modifications to the erection programme directed by ENGINEER for the reasons of inadequacy of
i. The quantity and/or capacity of the erection equipment.
ii. Erection personnel and supervisors, temporary bracing, guying etc.,
iii. Safety of the erection methods, or stability of the erected portions of structures, or unsuitability of the erection sequence due to interference with the work of other agencies.
iv. Any other unforeseen events which may delay the schedule.
v. Safety measures proposed.
Shall be incorporated by CONTRACTOR and the work shall be carried out in accordance with the revised programme. Approval by ENGINEER shall not relieve the CONTRACTOR from the responsibility for the safe, sound, accurate and timely erection of structural steel work as required by ENGINEER/EMPLOYER. CONTRACTOR shall also make no extra claims for bringing additional equipment to site for erection, if so directed by ENGINEER. CONTRACTOR shall be deemed to have visualized all erection problems while bidding for the work and no additional compensation shall be claimed on this account.

13.5 ACCEPTANCE, HANDLING AND STORAGE

The fabricated material received at erection site shall be verified with respect of marking on the key plan / marking plan or shipping list. Any material found damaged or defective shall be stacked separately and the damaged or defective material shall be painted in distinct colour for identification and the same shall be brought to the notice of ENGINEER. No dragging of steel shall be permitted. All fabricated items shall be stored 300mm above ground on suitable packing to avoid damage. It shall be stored in the order required for erection, with erection marks visible. All storage areas shall be prepared and maintained by CONTRACTOR. Steel shall not be stored in the vicinity of areas where excavation or grading will be done and, if so stored temporarily, this shall be removed by CONTRACTOR well before such excavation and/or grading commences to a safe distance to avoid burial under debris. Scratched or abraded steel shall be given a coat of primer in accordance with TCE specification M4-405-04 (painting of structural steel) after unloading and handling prior to erection. All milled and machined surfaces shall be properly protected from rust/corrosion by suitable coating and also from getting damaged.

13.6 ANCHOR BOLTS, EMBEDDED PARTS AND FOUNDATIONS

CONTRACTOR shall carefully check the location, level and layout of anchor bolts embedded in foundations constructed by others, to ensure that the structures can be properly erected as
shown on the drawings. Any discrepancy in the anchor bolts/foundation shall be reported to
ENGINEER. CONTRACTOR shall carefully check the actual dimensions of structures and also the location, level and sizes of embedded parts a) in the RC beam /column and/ or b) cleats / plates provided in steel beam /column constructed by others to receive structures covered under this scope of work. CONTRACTOR shall take note of

discrepancies if any, shall be reported to ENGINEER and fabricate the structures covered under this contract suitably before the commencement of erection.

Levelling of column bases to the required elevation may be done either by providing shims or three nuts on the upper threaded portion of the anchor bolt. All shim stock required for keeping the specified thickness of grout and in connection with erection of structures on foundations, crane brackets or at any other locations shall be of good M.S. plates and shall be supplied by CONTRACTOR at his cost.

A certain amount of chipping/cleaning of foundations and preparing the area is considered normal and shall be carried out by CONTRACTOR at no extra cost. Where beams bear in pockets or on walls, bearing plates shall be set and levelled as part of the work. All grouting under column base plates or beam bearing plates will be carried out by CONTRACTOR, unless the grouting is specifically excluded from the CONTRACTOR's scope.

13.7 ASSEMBLY AND CONNECTIONS

Field connections may be affected either by bolting, welding or by use of high strength friction grip bolts as shown in the design and erection drawings. All bolts, nuts, washers, rivets, electrodes required for field connections shall be supplied by CONTRACTOR free of cost. The materials shall have prior approval from the EMPLOYER /ENGINEER and necessary test certificates shall be furnished to ENGINEER's approval.

Materials shall be procured from the reputed manufacturers with prior approval from EMPLOYER/ENGINEER All assembling shall be carried out on a level platform. Drifts shall be used only for drawing the work to proper position and must not be used to such an extent as to damage the holes. Size of drifts larger than the nominal diameter of hole shall not be used. Any damaged holes or burrs must be rectified to the satisfaction of ENGINEER.

Corrections of minor misfits and reasonable amount of reaming shall be considered as a part of erection. Any error in the shop, which prevents proper fit on a moderate amount of reaming and slight chipping or cutting, shall be immediately reported to ENGINEER.

13.8 ERECTION

Erection work shall be taken up after receipt of clearance from the ENGINEER. All structural steel shall be erected as per approved Design / fabrication drawings.

For safety requirements during erection, provisions of IS: 7205,IS:7969, IS800 and other relevant codes shall be strictly followed.

Erection shall be carried out with the help of maximum mechanization possible. Prior to commencement of erection, all the erection equipment, tools, tackles, ropes etc shall be tested for their load carrying capacity. Such tests may be repeated at intermediate stages also if considered necessary. Frequent visual inspection shall be done of all vulnerable areas and components to detect damages or distress in the erection equipments, if any. Temporary bracing, whenever required, shall be provided to sustain forces due to erection loads and equipment etc. Erected parts of the structure shall remain stable during all stages of erection when subjected to action of wind, dead weight and erection forces etc. Such bracings shall be left in place as long as may be required for safety and stability. Specified sequence of erection of vertical and horizontal structural members shall be followed Erected members shall be held securely in place by bolts to take care of dead load, wind /seismic load and erection load. All structural members shall be erected with erection marks in the same relative position as shown in the appropriate erection and shop drawings.

All connections shall achieve free expansion and contraction of structures wherever provided.

No final bolting or welding of joints shall be done until the structure has been properly aligned and approved by ENGINEER. For positioning beams, columns and other steel members, the use of steel sledges is not permitted.

Instrumental checking of correctness of initial setting out of structures and adjustment of alignment shall be carried out in sequence and at different stages as required using precision
survey instruments. The final levelling and alignment shall be carried out immediately after completion of each section of a building.
The CONTRACTOR shall design, manufacture, erect and provide false work, staging temporary support etc, Required for safe and accurate erection of structural steelwork and fully responsible for the adequacy of the same.
The CONTRACTOR shall also provide facilities such as adequate temporary access ladders,
gangways, tools & tackles, instruments etc. to EMPLOYER for his inspection at any stage during erection.
Proper size steel cable slings, etc., shall be used for hoisting. Guys shall not be anchored to existing structures, foundations, etc. unless so permitted by ENGINEER in writing. Care shall
be taken to see that ropes in use are always in good condition. Steel columns in the basement, if any, are to be lowered and erected carefully with the help of a crane and/or derrick without damaging the basement walls steel or floor.
Structural steel frames shall be erected plumb and true. Frames shall be lifted at such points
that they are not liable to buckle and deform. Trusses shall be lifted only at node points. Trusses which are very slender in the lateral direction shall be provided with temporary lateral
supports till the horizontal bracings are erected. All steel columns and beams shall be checked for plumb and level individually before and after connections are made.
Chequered plates shall be fixed to supporting members by welding or by countersunk bolts as
shown/specified in relevant drawings and/or as directed by ENGINEER. The edges shall be made smooth and no burrs or jagged ends shall be left. While splicing, care should be taken
so that there is continuity in pattern between the two portions. Care should also be taken to
avoid distortion of the plate while welding. The erection of chequered plates shall include:

a. Welding of stiffening angles/vertical stiffening ribs as per drawings
b. Cutting to size and making holes to required shape wherever necessary to allow service lines such as piping, cables etc to pass through
c. Splicing as shown in relevant drawings
d. Smoothening of edges
e. Fixing of chequered plates by welding and/or countersunk bolts
f. Providing lifting hooks for ease of lifting.

Cutting, heating or enlarging holes may be carried out only with prior written Approval from
the ENGINEER.

13.9 FIELD CONNECTIONS:

Assembly by Permanent Bolts:

- The number of washers on permanent bolts shall not be more than two (2) and not less than one (1) for the nuts and one (1) for the bolt head.
- Only wooden rams or mallet shall be used in forcing members into position in order to protect the metal from injury or shock.
- Where bolting is specified on the drawing, the bolts shall be tightened to the maximum limit.
- The threaded portion of each bolt shall project through the nut by at least one thread. Tapered washers shall be provided for all heads and nuts to achieve uniform bearing on sloping surface.
- To prevent loosening of nuts, spring washers or lock-nuts shall be provided as specified in the design / shop drawings.
- All machine fitted bolts shall be perfectly tight and the ends shall be checked to prevent nuts from becoming loose. No unfilled holes shall be left in any part of the structure.

ASSEMBLY BY WELDING:

- All field assembly by welding shall be executed in accordance with the requirements for shop fabrication. Where the steel has been delivered painted, the paint shall be removed before field welding for a distance of at least 50 mm on either side of the joints to be welded.
- All other requirements of welding and its acceptance standards shall be in accordance with clauses specified in TCE.M4-405-01(Supply and Fabrication of structural steel).

Assembly by High Strength Friction Grip Bolts (HSFG Bolts)

- Assembly of structures with HSFG bolts shall conform to IS:4000
- The mating surface shall be prepared in accordance with the requirements of design in order to achieve required properties to develop adequate friction between the surfaces.
- The mating surfaces shall be absolutely free from grease. Lubricant, dust, rust etc and shall be thoroughly cleaned before assembly. The nuts shall be tightened up to the specific torque with the help of torque wrench or by half-turn method with the help of pneumatic wrench lever.
- The direction of tightening of the nuts shall be from the middle towards the periphery of assembly.
- After desired tightening the bolt heads, nuts and edges of the mating surfaces shall be sealed with a coat of paint to obviate entry of moisture.
-

13.10 INSPECTION

ENGINEER/EMPLOYER or their authorised representatives shall have free access to all parts of the job during erection and all erection shall be subjected to their approval. In case of faulty
erection, all dismantling and re-erection required will be at CONTRACTOR's cost. No paint shall be applied to rivet heads or field welds or bolts until these have been approved by ENGINEER.

13.13 TOLERANCES

Tolerances mentioned below shall be achieved after the entire structure or part thereof is in
line, level and plumb. The tolerances specified below do not apply to steel structures where
the deviations from true position are intimately linked with and directly influence technological process. In such cases, the tolerances on erected steel structures shall be as per recommendations of process technologists/suppliers which will be indicated in the drawings.

COLUMNS

 Deviation of column axes at foundation top level with respect to true axes

(a) In longitudinal direction: ± 5 mm

(b) In lateral direction: ± 5 mm

 Deviation in the level of bearing surface of ± 5 mm

Columns at foundation top with respect to True level Out of plumbness (verticality) of column Axis from true vertical axis, as measured at Column top:

(a) For columns up to and including 15 ± 1/1000 of column height in mm or±15mm Meters in height whichever is less.

(b) For columns exceeding 15 meters ± 1/1000 of column height in mm or±20mm in height Whichever is less.

 Deviation in straightness in ± 1/1000 of column height in mm or±10mm Longitudinal and transverse planes of whichever is less. Column at any point along the height

 Difference in erected position of adjacent Pairs of columns along length or across ± 10 mm

Width of building prior to connecting width of building prior to connecting Trusses/beams with respect to true distance

 Deviation in any bearing or seating level ± 5 mm with respect to true level
 Deviation in differences in bearing levels of a member on adjacent pair of columns both ± 10 mm Across and along the building

TRUSSES AND BEAMS

 Shift at the centre of span of top chord ± 1/250 of height of truss in mm or ± 15 Member with respect to the vertical plane mm Whichever is less. Passing through the centre of bottom chord
 Lateral shift of top chord of truss at the Centre of span from the vertical plane whichever ± 1/1500 of span of truss in mm or ± 15 passing through the centre of support of the truss mm whichever is less
 Lateral shift in location of truss from its true Vertical position ± 10 mm
 Lateral shift in location of purlin true Position ± 5 mm
 Deviation in difference of bearing levels of Trusses or beams from the true difference

i) ±20 mm for trusses
ii) For beams:
Depth < 1800mm: ±6mm
Depth > 1800mm: ±10 mm

 Deviation in sag in chords and diagonals of Truss between node points 1/1500 of length in mm or 10mm whichever is smaller
 Deviation in sweep of trusses, beams etc in 1/1000 of span in mm subject The horizontal plane to a maximum of 10 mm

CRANE GIRDERS & RAILS

 Shift in the centre line of crane rail with respect to centre line of web of crane girder ± 5 mm
 Shift in plan of alignment of crane rail with respect to true axis of crane rail at any point ± 5 mm
 Difference in alignment of crane rail in plan measured between any two points 2 ± 1 mm
meters apart along rail
 Deviation in crane track with respect to time gauge

(a) For track gauges up to and including ± 5 mm 15 meters
(b) For track gauges more than 15 Meters ± [5 + 0.25 (S-15)] where S in meters is true gauge

 Deviation in the crane rail level at any Distance point from true level 1/1200 of the gauge or ±10mm whichever is less
 Difference in the crane rail actual levels Between any two points 2 meters apart Along the rail length ± 2 mm
 Difference in levels between crane track Rails at

(a) Supports of crane girders ± 15 mm
(b) Mid span of crane girders ± 20 mm 2 mm subject to grinding of surfaces

 Relative shift of crane rail surfaces at a smooth transition. joint in plan and elevation
 Relative shift in the location of crane stops end buffers) along the crane tracks with 1/1000 of track gauge S in mm subject to track gauge S in mm maximum of 20mm

13.40 PAINTING

After steel has been erected, all bare and abraded spots, field welds, bolt heads and nuts shall be spot painted. Before paint is applied, the surface shall be dry and free from dust, dirt, scale and grease.

13.15 CLEAN UP OF WORK SITE

During erection, the CONTRACTOR shall without any additional payment, at all times keep the working and storage areas used by him, free from accumulation of waste materials or rubbish. Before completion of erection, he shall remove or dispose of in a satisfactory manner all temporary structures, waste and debris and leave the premises in a condition satisfactory to EMPLOYER/ENGINEER.

13.16 PAINTING OF STRUCTURAL STEEL

 This specification covers the general requirements for shop and field painting for Structural Steel works using hot /cold rolled steel sections joined by using bolting and/or welding.

 Briefly the scope of works covered under this specification are;

i. Supply of all primers, paints and all other materials required for painting other than Employer's supply.
ii. Furnishing of all labor, materials, tools & equipment and the performance of all operations and incidentals necessary for surface preparation, painting, handling, storing, transporting, scaffolding etc.
iii. Testing of paints as per the relevant codes in the Standard Laboratory identified by the Employer and furnishing of required test certificates for Employer's approval.
iv. Repair work of damaged / pre-erection / fabrication shop primer and weld joints at field.
v. Inspection of painting system after its application to conform to the specification requirement.
vi. Any other requirement as required for satisfactory completion of specified work.

 Reference shall be made to Data Sheet-A for Paint system and Data Sheet-B for the structures covered in the scope of works.

13.17 EXCLUSIONS

This specification excludes paintings of the following structures /equipment. Mechanical & electrical equipment and parts.

i. Buried & Overhead piping works
ii. Storage tanks
iii. Insulated parts

13.18 APPLICABLE CODES, STANDARDS

The pertinent clauses of the following Indian / International Codes, Standards And Specification (latest editions including all applicable official amendments, Reaffirmations and revisions) shall apply to the material and workmanship covered by this specification. In the event of the conflict of certain requirements between this specification and the codes referred herein, this specification shall govern.

It is not the intent to specify herein all the codes and standards required for the satisfactory completion of work. The list of codes and standards indicates certain primary codes & standards and not all the codes required for the work under the contract. It is understood that all the pertinent codes and standards shall form the part of this specification whether explicitly indicated or not.

Indian Standard Codes

1. IS:5 Colours for ready mixed paints and Enamels
2. IS:101 Methods of sampling and test for paints, varnishes and related products (all parts & all sections).
3. IS:104 Ready mixed paint, brushing, zinc chrome, priming
4. IS:158 Ready Mixed paint, Brushing, Bituminous, Black, Lead free, Acid, Alkali and heat resisting.
5. IS:1303 Glossary of Terms relating to paints
6. IS:1477 Code of practice for painting of ferrous metals in Buildings.
7. IS:2932 Enamel, synthetic, exterior:(a) undercoating (b) finishing- Specification
8. IS: 9954 Pictorial Surface Preparation Standards for Painting of Steel Surfaces.
9. IS:13183 Aluminium paint, Heat resistant-specification.
10. IS:2074 Ready Mixed Paint, Air Drying, Red Oxide Zinc Chrome, Priming -Specification.

International Standard Codes

i. SSPC Society for Protective Coatings (USA) Volt I & II
ii. NACE National Association of Corrosion Engineers, USA(NACE)
iii. ISO 8501 Preparation of Steel Substrates before application of Paints and related products. Visual assessment of Surface cleanliness. (Part 1&2)

iv. ISO 8502 Preparation of Steel Substrates before application of Paints and related products-Tests for assessment of Surface cleanliness. (Part 1-4)
v. ISO 8503 Preparation of Steel Substrates before application of Paints and related products-Surface roughness Characteristics of blast-cleaned steel substrates. Part 1& 2

Following list of approved vendors are provided for different materials. However contractor may procure from other equivalent vendors after approval from employer.

SR. NO.	PRODUCT	**BRAND, AGENCY**
33.	Cement	Konark, ACC, Ultra Tech
34.	Steel	Bhusan, Jindal, SAIL

TECHNICAL SPECIFICATION OF ELECTRICAL WORKS

All works shall be executed as per BOQ and WESCO standard. Incase any particular specification not available decision of engineer shall be final

Technical Specifications for Water Supply, Sanitary & Drainage Works

1.0 SCOPE

1. This specification covers the general requirements of providing and laying water mains and water supply piping, providing and fixing sanitary fixtures and piping and providing and laying drainage lines.

2. For specifications, mode of measurements and scope of work covered under the respective items for the work included under this contract, following documents shall be referred to in the order of precedence as given below:

   a) Description of the items and notes if any given in the Schedule of Quantities.
   b) Drawings
   c) Specifications.
   d) Additional / Special Conditions of Contract.
   e) General Conditions of Contract.
   f) Applicable Codes and Standards as specified herein with amendments/ revisions issued till date.

   In the event of any discrepancy among the documents referred above, the document in the higher order of precedence shall prevail.

3. In the event of any element of the specification not being available in any of the documents mentioned above, the instructions of the Engineer-in-Charge in writing shall be followed by the Contractor.

4. The Work shall be carried out in accordance with the drawings and designs as would be issued to the Contractor by the Engineer-in-Charge duly signed and stamped by him. The Contractor shall not take cognizance of any drawings, designs, specifications, etc. not bearing Engineer-in-Charge's signature and stamp. Similarly, the Contractor shall not take cognizance of instructions given by any other Authority except the instructions given by the Engineer-in-Charge in writing.

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

6. The Contractor shall acquaint himself fully with the partial provisions for supports that may be available in the structure and utilize them to the extent possible. In any case, the Contractor shall provide all the supports regardless of provisions that have been already made. Nothing extra shall be payable for situations where bed plates (for supports) are not available or are not useful

7. The Contractor shall incorporate seismic considerations of anchoring and isolation in the design of the systems as called for the different equipment.

8. Shop coats of paint that may be damaged during shipment or erection shall be cleaned off with mineral spirits, wire brushed and spot primed over the affected areas, then coated with paint to match the finish over the adjoining shop painted surface.

9. In addition to the sectional testing carried out during the construction, the Contractor shall test the entire installation after connections to the overhead tanks or pumping system or mains. He shall rectify all leakage and shall replace all defective materials in the system. Any consequential damage is done, on account of Contractors carelessness, open or burst pipes or failure of fittings, during testing and commissioning to the building, furniture and fixtures shall be made good by the Contractor.

2.0 GENERAL PROVISION

2.1 Scaffolding

2.1.1 Only steel tube scaffolding of approved design shall be used for all works. The scaffold structure shall comply with the requirements of IS: 4014 and IS : 3696. An independent tied scaffold (double scaffold), which has two lines of standards, shall be provided with the inner line kept at least one board clear of the finished face with extended transoms, or hop up baskets to carry an inside board. Diagonal braces shall not prevent the material being moved along the scaffold run. The scaffolding shall be suitably packed at the ends to prevent damage to the finished work.

2.2 Protection

2.2.1 Protection against damage: Care shall be taken to avoid damage from any cause at all stages. Packing pieces used for protection shall not disfigure or otherwise permanently mark the Works.

2.2.2 Surface protection shall be afforded by careful handling and the avoidance of the use of hooks, crowbars, or other implements that are likely to damage the works.

2.2.3 During installation of piping, the open end of pipe shall be protected with temporary cover to prevent dust or other materials entering in it.

2.2.4 Protection during construction: Decorative surfaces shall be carefully protected during construction by a temporary cover.

2.2.5 Protection of finished work: At all stages of the Contract it is essential that all works are properly protected.

2.2.6 Suitable packing shall be used to ensure that scaffolding does not damage erected stone, marble, granite or other finished works.

2.2.7 Any disfigurement, discoloration or imperfection whatsoever due to any reason shall not be accepted and the Contractor shall either remedy the same or redo the work at no extra cost. The decision of the Engineer-in-Charge, as to whether any work either in whole or in part is acceptable or not shall be final and binding on the Contractor.

2.3 Guarantee

The Contractor shall guarantee and undertake to maintain and rectify the various components of the Plumbing work installed by him for successful performance for a period as indicated in the Datasheet-A. The Contractor shall indemnify the Engineer-in-Charge for a similar period against any damage to property and injury to persons on account of any defective work or maintenance carried out by the Contractor. The format and text of the Guarantee and the Indemnity Bond shall be given by the Engineer-in-Charge.

3.0 APPLICABLE CODES, STANDARDS, AND PUBLICATIONS

All equipment, supply, erection, testing, and commissioning shall comply with the requirements of Indian Standards and code of practices given below as amended till date. All equipment and material being supplied by the contractor shall meet the requirements of IS, and other Codes/ Publications as given below.

SP:6(1)	Structural steel sections

IS:325	Three phase induction motors
IS:554	Dimensions for pipe threads where pressure-tight joints are required on the threads
IS:694	PVC insulated cables for working voltages up to and including 1100 V.
IS:779	Specification for water meters (domestic type)
IS:800	Code of Practice for general construction in steel
IS:1068	Electroplated coatings of nickel plus chromium and copper plus nickel plus chromium
IS:1172	Code of Basic requirements for water supply drainage and sanitation
IS:1367	(Part 1) Technical supply conditions for threaded steel fasteners: Part I Introduction and general information
IS:1367	(Part 2) Technical supply conditions for threaded steel fasteners: Part 2 Product grade sand tolerances.
IS:1554	PVC insulated (heavy duty) electric(Part 1) cables: Part 1 For working voltages up to and including 1100 V.
IS:1554 (Part 2)	PVC insulated (heavy duty) electric cables: Part 2 For working voltages from3.3 kV up to and including 11 kV.
IS:1726	Specification for cast iron manhole covers and frames
IS:1742	Code of practice for building drainage
IS:2064	Selection, installation, and maintenance of sanitary appliances - Code of practice
IS:2065	Code of practice for water supply in buildings
IS:2104	Specification for water meter boxes(domestic type)
IS:2373	Specification for water meters (bulk type)
IS:2379	Colour code for identification of pipelines.
IS:2527	Code of practice for fixing rainwater gutters and downpipes for roof drainage
IS:2629	Recommended practice for hot-dip galvanizing on iron and steel
IS:3114	Code of practice for laying of cast iron pipes
IS:4111 (Part 1)	Code of practice for ancillary structures in sewerage system: Part 1Manholes

IS:4127	Code of practice for laying glazed stoneware pipes
IS:4853	Recommended practice for radiographic inspection of fusion welded butt joints in steel pipes
IS:4985	Unplasticised PVC pipes for potable water supplies – specification.
IS:5329	Code of practice for sanitary pipework above ground for buildings
IS:5455	Cast iron steps for manholes
IS:6159	Recommended practice for design and fabrication of material prior to galvanizing
IS:7558	Code of practice for domestic hot water installations
IS:8321	Glossary of terms applicable to plumbing work
IS:9668	Maintenance of water supplies and firefighting.
IS:9842	Preformed fibrous pipe insulation
IS:9912	Coal tar based coating materials and suitable primers for protecting iron and steel pipelines
IS:10221	Code of practice for coating and wrapping of underground mild steel pipelines
IS:10234	Recommendations for general pipeline welding
IS:10446	Glossary of terms relating to water supply and sanitation
IS:11149	Rubber Gaskets
IS:11790	Code of practice for preparation of butt welding ends for pipes, valves, flanges, and fittings
IS:12183 (Part 1)	Code of practice for plumbing in multi-storeyed buildings: Part 1 Water Supply
IS:12251	Code of practice for drainage of building basements
BS:5572	Code of practice for sanitary pipework
BS:6700	Specification for design, installation, testing, and maintenance of services supplying water for domestic use within buildings and their cartilages
BS:8301	Code of practice for building drainage
BSEN274	Sanitary tapware, waste fittings for basins, bidets, and baths. General technical specifications

IS:458	Specification for precast concrete pipes(with and without reinforcement)
IS:651	Salt-glazed stoneware pipes and fittings
IS: 1239 (Part 1)	Mild steel tubes, tubular and other wrought steel fittings: Part 1 Mild steel tubes
IS:1239	Mild steel tubes, tubular and other wrought steel fittings:
IS:1536	Centrifugally cast (spun) iron pressure pipes for water, gas, and sewage
IS:1538	Cast iron fittings for pressure pipes for water, gas, and sewage
IS:1729	Sand cast iron spigot and socket soil, waste and ventilating pipes, fittings, and accessories
IS:1879	Malleable cast iron pipe fittings
IS:1978	Line pipe
IS:1979	High test line pipe
IS:2501	Copper tubes for general engineering purposes
IS:2643 (Part 1)	Dimensions for pipe threads for fastening purposes: Part 1 Basic profile and dimensions
IS: 2643 (Part 2)	Dimensions for pipe threads for fastening purposes: Part 2 Tolerances
IS:2643 (Part 3)	Dimensions for pipe threads for fastening purposes: Part 3 Limits of sizes
IS:3468	Pipe nuts
IS:3589	Seamless or electrically welded steel pipes for water, gas, and sewage(168.3mm to 2032mm outside diameter)
IS:3989	Centrifugally cast (spun) iron spigot and socket soil, waste and ventilating pipes, fittings and accessories
IS:4346	Specifications for washers for use with fittings for water services
IS:4711	Methods for sampling steel pipes, tubes, and fittings
IS:6392	Steel pipe flanges
IS:6418	Cast iron and malleable cast iron flanges for general engineering purposes.
IS:7181	Specification for horizontally cast iron double flanged pipes for water, gas, and sewage.

IS:778	Specification for copper alloy gate, globe and check valves for water works purposes
IS:780	Specification for sluice valves for water works purposes (50mm to 300mmsize)
IS:1703	Specification copper alloy float valves (horizontal plunger type) for water supply fittings.
IS:2906	Specification for sluice valves for water works purposes (350mm to 1200 mm size)
IS:3950	Specification for surface boxes for sluice valves
IS:5312 (Part 1)	Specification for swing check type reflux (nonreturn) valves: Part 1Single door pattern
IS:5312	Specification for swing check type reflux (non return) valves: Part 2 Multi door pattern
IS:12992	Safety relief valves, spring loaded: (Part 1) Part1Design
IS:13095	Butterfly valves for general purposes
IS:771(Part 1 to 3)	Specification for glazed fire-clay sanitary appliances
IS:774	Specification for flushing cistern for water closets and urinals (other than plastic cistern)
IS:775	Specification for cast iron brackets and supports for wash basins and sinks
IS:781	Specification for cast copper alloy screw down bib taps and stop valves for water services
IS:1700	Specification for drinking fountains
IS:2326	Specification for automatic flushing cisterns for
IS:2548 (Part 1)	Specification for plastic seats and covers for water closets: Part 1: Thermoset seats and covers
IS: 2548(Part 2)	Specification for plastic seats and covers for water closets: Part 2: Thermoplastic seats and covers
IS:2556(Part 1)	Specification for vitreous sanitary appliances (vitreous china): Part 1:General requirements
IS:2556(Part 2)	Specification for vitreous sanitary appliances (vitreous china) Part 2: Specific requirements of wash down water closets
IS:2556(Part 3)	Specification for vitreous sanitary appliances (vitreous china) Part 3:

	Specific requirements of squatting pans
IS:2556(Part 4)	Specification for vitreous sanitary appliances (vitreous china) Part 4: Specific requirements of wash basins
IS:2556 (Part 6 Sec 2)	Specification for vitreous sanitary appliances (vitreous china) Part 6: Specific requirements of urinals, Section 2 Half stall urinals
IS:2556 (Part 6 Sec 4)	Specification for vitreous sanitary appliances (vitreous china) Part 6 :Specific requirements of urinals, Section 4 Partition slabs
IS:2556 (Part 6 Sec 5)	Specification for vitreous sanitary appliances (vitreous china) Part 6 :Specific requirements of urinals, Section 5 waste fittings
IS:2556 (Part 6 Sec 6)	Specification for vitreous sanitary appliances (vitreous china) Part 6: Specific requirements of urinals, Section 6 Water spreaders for half stall urinals
IS:2556(Part 7)	Specification for vitreous sanitary appliances (vitreous china) Part 7: Specific requirements of half round channels
IS:2556(Part 8)	Specification for vitreous sanitary appliances (vitreous china) Part 8: Specific requirements of symphonic wash down water closets.
IS:2556(Part 11)	Specification for vitreous sanitary appliances (vitreous china) Part 11: Specific requirements for shower rose
IS: 2556(Part 12)	Specification for vitreous sanitary appliances (vitreous china) Part 12: Specific requirements of floor traps
IS:2556 (Part 15)	Specification for vitreous sanitary appliances (vitreous china) Part 15: Specific requirements of universal water closets
IS:2692	Specification for ferrule for water services
IS:2717	Glossary of terms relating to vitreous enamelware and ceramic metal systems
IS:2963	Specifications for copper alloy waste fittings for wash basins and sinks
IS:3311	Specification for waste plug and its accessories for sinks and wash basins.
IS:5961	Specification for cast iron gratings for drainage purposes.
IS:6249	Specification for flush valves and fittings for marine use
IS:6411	Specification for gel coated glass fibre reinforced polyester resin bathtubs

IS:8931	Specification for copper alloy fancy single taps, combination tap assembly and stop valves for water services
IS:9758	Specification for flush valves and fitting for water closets and urinals.
Manual for Water Supply & Treatment	CPHEEO Manual for Water Supply & Treatment -1999- MoUD, GoI
SP 7 (Part-9 Section-1) 1983	National Building Code of India
SP 35:1987	Hand book on water supply & drainage
IS 1172 :1993	Code of Basic requirements for water supply, drainage and Sanitation
IS: 8329-2000	Centrifugally Cast (spun) ductile iron pressure pipes for water, gas and sewage
IS: 5382-1985	Specification for Rubber sealing rings for gas mains, water mains and sewers.
IS: 1500	Code for Hardness test for DI pipes
IS 11906:1986	Recommendations for cement mortar lining for cast iron, Mild steel and Ductile Iron pipes and fittings for transportation of water
IS 12288:1987	Code of practice for laying of ductile iron
IS 2373:1981	Water meter (bulk type)

4.0 QUALITY ASSURANCE AND QUALITY CONTROL

1. The Work shall conform to high standards of design and workmanship, shall be structurally sound and aesthetically pleasing. Quality standards prescribed shall form the backbone for the quality assurance and quality control system.

2. At the site level, the Contractor shall arrange the materials, their stacking/ storage in an appropriate manner to ensure the quality. Contractor shall provide equipment and manpower to test continuously the quality of materials, assemblies etc. as directed by the Engineer-in-Charge. The test shall be conducted continuously and the result of tests maintained. In addition, the Contractor shall keep appropriate tools and equipment for checking alignments, levels, slopes and evenness of surface.

3. The Engineer-in-Charge shall be free to carry out tests as may be considered necessary by him at his sole discretion, from time to time, in addition to those specified in this document. The Contractor shall provide the samples and labor for collecting the samples. Nothing extra shall be payable to the Contractor for samples or for the collection of the samples.

4. The test shall be conducted at the site laboratory that may be established by Engineer-in-Charge or at any other Standard Laboratory selected by Engineer-in-Charge.

5. The Contractor shall transport the samples to the laboratory for which nothing extra shall be payable. In the event of Contractor failing to arrange transportation of the samples in proper time Engineer-in-Charge shall have them transported and recover two times the actual cost of the Contractor's bills.

6. Testing charges shall be borne by the Contractor.

7. Testing may be witnessed by the Contractor or his authorized representative. Whether witnessed by the Contractor or not, the test results shall be binding on the Contractor.

5.0 SANITARY WARE AND OTHER APPLIANCES

5.1 SCOPE OF WORK

5.1.1 Without restricting to the generality of the foregoing, sanitary and other appliances shall inter-alia include the following:-

- Sanitary appliances and fixtures for toilets
- Chromium plated brass fittings
- Stainless steel sinks
- Accessories e.g. towel rods, toilet paper holders, soap dish, liquid soap dispensers, towel rails, coat hooks etc.
- Mirrors, hand dryers, drinking water fountains, etc.

5.1.2 Whether specifically mentioned or not the Contractor shall provide for all appliances and fixtures all fixing devices, nuts, washers, Teflon tape, sealant, cement, brackets, supports, paints, connectors, cp riser pipes, adapters, bolts, screws, hangers etc as required.

5.1.3 All exposed pipes within toilets and near appliances/ fixtures shall be of chromium plated brass or copper unless otherwise specified.

5.2 GENERAL REQUIREMENTS

5.2.1 All materials shall be new and of quality conforming to specifications and subject to the approval of the Engineer-in-Charge. Wherever particular makes are mentioned, the choice of selection shall remain with the Engineer-in-Charge.

5.2.2 All appliances, 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, and drawings. Accessories shall include proper fixing arrangement, brackets, nuts, bolts, washers, screws and required connection pieces.

5.2.3 Fixing screws shall be half round head chromium plated (CP) brass screws, with CP brass washers unless otherwise specified.

5.2.4 Porcelain sanitary ware shall be glazed vitreous china of first quality free from warps, cracks and glazing defects conforming to IS: 2556. The choice of the color of the Sanitaryware shall be that of the Engineer-in-Charge and nothing extra shall be payable to the Contractor for fixing of Sanitary ware of any color.

5.2.5 Sinks for kitchen shall be of stainless steel or as specified in the Schedule of Quantities.

5.2.6 Chromium plated fittings shall be cast brass chromium plated of the best quality approved by the Engineer-in-Charge.

5.2.7 If the supply of sanitary appliances, fixtures & fittings are in client's scope, no damages shall occur to the same during shifting, transportation, installation till successful handing over. If any damage occurs, the same shall be replaced by the contractor at his own cost.

5.2.8 All appliances, fittings and fixtures shall be fixed in a neat workmanlike manner true to level and to heights shown in the drawings and in accordance with the manufacturer recommendations. Care shall be taken to fix all inlet and outlet pipes at correct positions. Faulty locations shall be made good and any damage to the finished floor, tiling, plaster, paint, insulation or terrace shall be made good by the Contractor at his own cost.

5.2.9 All materials shall be rustproofed; materials in direct or indirect contact shall be compatible to prevent electrolytic or chemical (bimetallic) corrosion.

5.2.10 Sanitary appliances, subject to the type of appliance and specific requirements, shall be fixed in accordance with the relevant standards and the following:

a) Contractor shall, during the entire period of installation and afterward protect the appliances by providing suitable cover or any other protection in order to absolutely prevent any damage to the appliances until satisfactory handing over. (The original protective wrapping shall be left in position for as long as possible).

b) The appliance shall be placed in correct position or marked out in order that pipework can be fixed or partially fixed first.

c) The appliance shall be fixed in a manner such that it will facilitate subsequent removal if necessary.

d) All appliances shall be securely fixed. Manufacturers' brackets and fixing methods shall be used wherever possible. Compatible rust proofed fixings shall be used. Fixing shall be done in a manner that minimizes noise transmission.

e) Appliances shall not be bedded (e.g. WC pans, pedestal units) in the thick strong mortar that could crack the unit (e.g. a ceramic unit).

f) Pipe connections shall be made with de-mountable unions. Pipework shall not be fixed in a manner that it supports or partially supports an appliance.

g) Appliances shall be fixed so that waterfalls to the outlet (e.g. baths).

h) All appliances shall be secured as per the recommendations of the manufacturer.

i) Appliances shall be fixed true to level firmly fixed to anchor or supports provided by the manufacturer and additional anchors or supports where necessary.

5.2.11 Sizes of Sanitary fixtures given in the Specifications or in the Schedule of Quantities are for identification with reference to the catalogs of makes considered. Dimensions of similar models of other makes may vary within +/-10% and the same shall be provided and no claim for extra payment shall be entertained nor shall any payment be deducted on this account.

5.3 WATER CLOSET

5.3.1 WC shall be washed down or symphonic wash down type floor or wall mounted set, as shown in the drawings, designed for low volume flushing from 3-6 litres of water, flushed by means of a flushing cistern or an exposed or concealed type (as detailed in the drawings or as directed by the Engineer-in-Charge) 32mm size CP brass flush valve with regulator valve. Flush pipe/ bend shall be connected to the WC by means of a suitable rubber adaptor. Wall hung WC shall be supported by CI floor mounted chair which shall be fixed in a manner as approved by the Engineer-in-Charge.

5.3.2 Each WC set shall be provided with a solid plastic seat, rubber buffers, and chromium-plated brass hinges. The plastic seat shall be so fixed that it remains absolutely stationary in a vertical position without falling down on the WC.

5.3.3 Each WC set shall be provided with a fixed type CP brass ablution jet if called for in schedule of quantities, complete with CP/ plastic piping, concealed type CP brass angle cock etc. all of approved make and brand. The nozzle of the ablution jet and its holding down plate shall have smooth and rounded edges and shall not be capable of causing any injury to a user or cleaner.

5.4 PAN CONNECTOR

5.4.1 The WC pan connector shall be Flexible, soft and shall be made of single body construction with integral fins, made from EVA (Ethyl Vinyl Acetate). The pan connector must conform to the BS: 5627: 1984. The pan connector must be supplied with factory fitted spring loaded seal guard.

5.4.2 The connector shall not be allowed to come in contact with mineral oil, grease, putty or any compound containing mineral oil or grease.

5.4.3 The pan connectors must be stored away from the direct sunlight and flames.

5.4.4 While fixing of the pan connector with the Soil pipe, the pipe must be reasonably clean and smooth on the inner surface; in case the soil piping is in C.I. then supplier supplied bush/adaptor shall be used. The connector socket is pushed fully home onto the pan spigot; thereafter the WC is placed in position gently pushing the fitment to ensure that the connector end fits into the Spigot of the pipe. The pan connector must be pushed in such an easy as to ensure that the seals and fins turn inward to ensure proper sealing.

5.5 URINALS

5.5.1 Urinals shall be lipped type half stall white glazed vitreous china of size as called for in the Schedule of Quantities.

5.5.2 Half stall urinals shall be provided with 15mm diameter CP spreader, 32mm diameter CP domical waste and CP cast brass bottle/"P" trap with pipe and wall flange and shall be fixed to the wall by CI brackets, CI wall clips and CP brass screws as recommended by manufacturer complete as directed by the Engineer-in-Charge.

5.5.3 Flushing for urinals shall be by means of no hand operation, PVC or ceramic flushing cistern / electronic auto flush valve with all internal fittings, mounted on a C.I. bracket, and painted with two coats of approved paint of approved shade and confirming to IS: 2326.

5.5.4 Flush pipes shall be PVC pipes concealed in wall chase but with chromium plated bends at inlet and outlet or as given in Schedule of Quantities. These shall be measured and paid for separately.

5.5.5 PVC waste pipes shall be provided for urinals. Waste pipes may be exposed on the wall or concealed in the chase as directed by the Engineer-in-Charge. These shall be measured and paid for separately.

5.6 URINAL PARTITIONS

5.6.1 Urinal partitions shall be white glazed vitreous china of size specified in the Schedule of Quantities.

5.6.2 Porcelain partitions shall be fixed at proper heights with CP brass bolts, anchor fasteners and MS clips as recommended by the manufacturer and directed by the Engineer-in-Charge.

5.7 WASH BASIN

5.7.1 Wash basins shall be white glazed vitreous china of size, shape, and type specified in the Schedule of Quantities.

5.7.2 Each basin shall be provided with painted MS angle or C.I. brackets and clips and the basin securely fixed to the wall. Placing of basins over the brackets without secure fixing shall not be accepted. The MS angle shall be provided with two coats of red oxide primer and two coats of synthetic enamel paint of make, brand, and color as approved by the Engineer-in-Charge.

5.7.3 Each basin shall be provided with 32mm diameter CP waste with overflow, pop-up waste or rubber plug, CP angle valve, CP riser pipe with connectors/adaptors and CP brass chain as specified in the Schedule of Quantities, 32mm diameter CP brass bottle trap with CP pipe to wall flange.

5.7.4 Wash basin shall be provided with hot and cold water mixing fitting or as specified in the Schedule of Quantities.

5.7.5 Basins shall be fixed at proper heights as shown on drawings. If height is not specified, the rim level shall be 790mm from finished floor level or as directed by the Engineer-in-Charge.

5.8 SINKS

5.8.1 Sinks shall be stainless steel or any other material as specified in the Schedule of Quantities.

5.8.2 Each sink shall be provided with painted MS or CI brackets and clips and securely fixed. Countertop sinks shall be fixed with suitable painted angle iron brackets or clips as recommended by the manufacturer. Each sink shall be provided with 40mm diameter CP waste, CP angle valve, CP riser pipe with connectors/adaptors and rubber plug with CP brass chain as given in the Schedule of Quantities. The MS angle shall be provided with two coats of red oxide primer and two coats of synthetic enamel paint of make, brand, and color as approved by the Engineer-in-Charge. Flow Rate = 4.5 to 6 Litres per minute @ 80 PSI

5.8.3 Supply fittings for sinks shall be deck mounted CP swivel faucets with or without hot and cold water mixing fittings as specified in the Schedule of Quantities. These shall be measured and paid for separately.

5.9 TOILETS FOR DISABLED

Where specified, in washroom facilities designed to accommodate physically disabled, accessories shall be provided as directed by the Owner's Site Representative.

Stainless steel garb brass of required size suitable for concealed or exposed mounting and opened non-slip gripping surface shall be provided in all washroom. The flushing cistern/valve shall be provided with chromium plated long handles.

5.1 MEASUREMENT AND RATES

Not used

5.2 FINAL INSTALLATION

The contractor shall install all sanitary fixtures and fittings in their final position in accordance with approved trial assemblies and as shown on drawings. The installation shall be complete with all supply and waste connections. The connection between building and piping system and the sanitary fixtures shall be through proper unions and flanges to facilitate removal/replacement of sanitary fixtures without disturbing the built-in piping system. All unions and flanges shall match in appearance with other exposed fittings.

6 SOIL, WASTE, VENT AND RAINWATER PIPES

6.1 SCOPE OF WORK

Soil, waste, vent, and rainwater disposal scope shall include Supply, Installation, testing, commissioning and successful handing over to the client as per the drawings, specifications, and schedule of quantities.

All soil, waste and storm water disposal for the portion above ground level to the public sewers shall be by gravity, whereas from the basements it shall be by pumping. Without restricting to the generality of the foregoing, the soil, waste, vent and rainwater pipes system shall inter-alia include the following:

a) Vertical and horizontal soil, waste, vent and rainwater pipes and fittings, joints, supports, paints, and connections to fixtures.

b) The connection of all pipes to sewer lines as shown in the drawings at ground level.

c) Floor and urinal traps, clean out plugs, inlet fittings, and rainwater (roof) outlets.

d) Testing of all pipes and fittings in the workshop.

e) Testing, commissioning and handing over of all pipes lines after installation.

6.2 GENERAL REQUIREMENTS

6.2.1 Pipes and fittings shall be fixed truly vertical, horizontal or in slopes as required in a neat workmanlike manner.

6.2.2 Pipes shall be fixed in a manner so as to provide easy accessibility for repair and maintenance and shall not cause obstruction in shafts, passages etc.

6.2.3 Pipes shall be securely fixed to walls, and ceilings with suitable clamps at intervals specified. Only approved type of anchor fasteners shall be used for fixing pipes on RCC ceilings and RCC/ masonry walls.

6.2.4 Access doors for fittings and cleanouts shall be so located that they are easily accessible for repair and maintenance.

6.2.5 Long bends shall be used on all main pipelines as far as possible. Use of elbows shall be restricted for short connections.

6.2.6 Wherever piping is going across the separation/expansion joints of buildings, the piping shall be provided with flexible connectors on both sides of such joints or on the single side depending on whether any wall is to be crossed or not.

6.3 WASTE PIPE FROM APPLIANCES

6.3.1 Waste pipe from appliances e.g. washbasins, baths, sinks, and urinals etc. shall be of UPVC confirming IS 4985 as given in the Schedule of Quantities.

6.3.2 The internal diameter sizes of outlet branch waste pipes for different fittings shall be as follows:

Wash basin - 32 dia

Urinals - 50 dia

Sink - 50 dia

Nahani Trap - 75 diameter, 50 mm seal

Multi Floor Trap - 75 or 100 dia. as required, with 50 mm or 75 mm seal / bolted aluminium grating in 25×25 MS angle

P Trap - 75 mm water seal as required with bolted aluminum grating in 25×25 MS angle

6.3.3 All pipes shall be fixed in gradient towards the outfalls of drains. Pipes inside a toilet room shall be in chase unless otherwise shown on drawings. Where required pipes may be run at ceiling level in suitable gradient and supported on structural clamps as directed by the Engineer-in-Charge. Spacing for the clamps shall be 3000mm for vertical runs and 2400mm for horizontal runs.

6.3.4 Pipes shall be UPVC tubes conforming to IS: 4985 and quality certificates shall be furnished. Pipes shall be provided with all required fittings conforming to IS: 4985 e.g. tees couplings, bends, elbows, unions, reducers, nipples, plugs etc. All UPVC waste pipes shall be terminated at the point of connection with the appliance with an outlet of suitable diameter. Pipes shall be painted as specified under Clause **Error! Reference source not ound.**.

6.3.5 The pipes shall be of class III, 6 Kg/cm2. The pipes shall conform to IS 4985 - 2000. Fittings shall be of injection molded PVC conforming to IS 7834 (Part1) - 1975.

6.3.6 Pipe sleeves and inserts, etc. through RCC wall of buildings either external or internal or for water tanks shall be of PVC provided with water bar flanged.

6.3.7 W.C. pan connectors shall suit the requirements as per drawing, with 40 dia. vent horn for connection to the anti-siphonage pipe. Pan connector shall be of C.I. or lead.

6.3.8 Connection to the sewer or stormwater collection sumps to be perfectly watertight and as specified in the drawing.

6.3.9 Rainwater flashing shall be of 150× 100 or 230× 150 fitted on to the bell mouth of rainwater pipes inlet and then covered with cast iron grating and extension piece.

6.3.10 All rainwater pipes and fittings shall be soil type variety conforming to I.S. 1729-1964 or equivalent. This shall apply to pipe outside buildings within the building or in separate shafts.

6.3.11 Bathroom C.P. grating shall be having bolted down design out of heavy cast brass with chromium plating of the best-approved standards.

6.3.12 Cast iron grating shall be flat with a perfect edge and of the best quality procurable of the specified width and thickness and in the available length.

6.4 PIPE LAYING AND FIXING

The pipe laying and jointing shall be done in accordance with IS 7634 (Part 3) – 1975. Pipes shall be cut to size and chamfered well. Burr's if any shall be removed. Pipes and fittings shall be joined using solvent cement or rubber ring joints. The pipes and fittings shall be jointed accurately without any stress to achieve leak proof joints.

6.5 TESTING

The method which is commonly in use is filling the pipe with water, taking care to evacuate any entrapped air and slowly raising the system to the test pressure at 3Kg/cm2. The pressure testing may be followed as follows. The field test pressure to be imposed should be not less than the greatest of the following:

- One and half times of maximum sustained operating pressure.
- One and half times the maximum pipeline static pressure.
- Sum of the maximum sustained operating pressure and the maximum surge pressure.
- Sum of the maximum pipeline static pressure and the maximum surge pressure, subject to a maximum equal to the works test pressure for any pipe fittings incorporated.
- The field test pressure should wherever possible be not less than 2/3rd working pressure and should be applied and maintained for at least four hours. If the visual inspection satisfies that there is no leakage the test can be passed.
- A test register shall be maintained and all entries signed and dated by Contractor and Engineer-in-Charge. A Performa of the proposed test register shall be submitted to the Engineer-in-Charge for approval.

- All pipes in wall chase or meant to be encased or buried shall be hydro tested before the chase is plastered or the pipe encased or buried.

6.6 CUTING AND MAKING GOOD HOLES / CHASES

Pipes shall be fixed and tested as the building work proceeds. Contractor shall provide all necessary holes, cut outs and chases in structural members as the building work proceeds. Wherever holes are cut or left originally, they shall be made good with cement concrete 1:1:2 (1 cement: 1coarse sand :2 stone aggregate 20mm nominal size) or cement mortar 1:2 (1 cement :2 coarse sand) as directed by the Engineer-in-Charge and the surface restored as in original condition to the entire satisfaction of the Engineer-in-Charge at no extra cost.

6.7 DRAINAGE ACCESSORIES

a) Floor Trap / Urinal Trap Grating

Floor/ urinal traps grating shall be of stainless steel square / round of size 125 x 125 mm square/round as approved by client & shown in the drawing. Floor trap assembly shall be provided with round stainless steel strainer basket as a cockroach trap. Entire assembly shall be complete with ring, frame, outer cup, inner cup, grating, screws etc. of an approved make.

b) Floor Cleanout

Floor cleanout cover shall be of stainless steel square / round of size 125 x 125 mm square/round as approved by client & shown in the drawing. Floor cleanout assembly shall be complete with ring, outer frame, cover, screws etc. of an approved make.

c) Ceiling Cleanout

Ceiling cleanout cover shall be in nickel bronze / PVC plug type / GI flanged type of round shape matching pipe size as approved by client & shown in the drawing. Ceiling cleanout assembly shall be threaded with key hole for opening / flanged type suitable for pipe. Threaded cover shall be used up to 100 mm size & above shall be GI flanged type with GI nuts & bolts. PVC cover shall be used for PVC drainage piping only, whereas nickel bronze & GI flanged type cover shall be used for HDPE / CI / CI LA pipe work.

d) Cockroach Traps

Floor/ urinal traps shall sealed cover provided with 100-150mm square or round stainless steel cockroach trap assembly complete with ring, outer cup, inner cup, jali etc. of an approved make.

e) Wire Balloons / Grating For Rain Water Pipes

The wire balloons and the domical gratings shall conform to IS: 1729. The wire balloons shall be of galvanised steel. The CI domical gratings for the roof outlet shall be minimum 13mm thick.

Leaf and Gravel grates along with a perforated ring shall be made out of M.S. flat/bars of a design and dimension as shown in the drawing or as directed by the Engineer-in-Charge. These shall be painted with epoxy paint with a DFT of 200 microns.

Wire balloons/gratings for rainwater pipes shall be measured by numbers for different sizes. Leaf and gravel grates along with the perforated ring shall be measured in kgs.

6.8 RAINWATER PIPES

All rainwater pipes shall be of UPVC as shown in drawing & specified in specification. UPVC piping shall conform to IS: 13592 g or as specified in the schedule of quantities.

6.9 RAIN WATER OUTLET

a) Rain water out shall be preferably scupper type drain with cast iron body & cast aluminium grating with stainless steel screws. Suitable adopter / connector shall be used to match the pipe. Wherever shafts are not available near rain water outlet, dome type rain water outlet shall be installed.

b) Rain water outlet shall be tested for water leaking, prior to waterproofing treatment. Extreme care shall be taken, while sealing gap between rain water outlet & wall / slab.

6.10 CLAMPS

Wherever MS/GI clamps are required to be anchored directly to brick walls, concrete slabs, beams or columns, nothing extra shall be payable for clamping arrangement, RCC block and making good with cement concrete 1:2:4 mix (1 cement:2 sand:4stone aggregate 20mm nominal size) as directed by the Engineer-in-Charge.

6.11 ANGELS / CHANNELS

Slotted angles/ channels shall be measured per linear metre of finished length and shall include support bolts and nuts, length embedded in the cement concrete blocks of 1:2:4 (1cement: 2 coarse sand: 4 stone aggregate 20mm nominal size) formed in the masonry walls; nothing extra shall be paid for the cement concrete block and making good the masonry wall, anchor fasteners etc. complete.

6.12 INSTALLATION OF SOIL, WASTE & VENT PIPES

All Horizontal pipes running below the slab and along the ceiling shall be fixed on structural adjustable clamps, sturdy hangers of the design as called for in the drawings. The pipes shall be laid in uniform slope and proper levels. All vertical pipes shall be truly vertical fixed by means of stout clamps in two sections, bolted together, built into the walls, wedged and neatly jointed. The branch pipes shall be connected to the stack at the same angle as that of fittings. All connections between soil, waste and ventilating pipes and branch pipes shall be made by using pipe fittings with inspection doors for cleaning. Pipes shall be fixed in a manner as to provide easy accessibility for repair and maintenance and shall not cause obstruction in shafts. Where the horizontal run off the pipe is long or where the pipes cross over building expansion joints etc. suitable allowance shall be provided for any movements in the pipes by means of expansion joint etc. such that any such movement does not damage the installation in any way.

Before joining, the interior of the socket and exterior of the spigots shall be thoroughly cleaned and dried. The spigot end shall be inserted into the socket right up to the back of the socket and carefully centered by two or three laps of threaded spun yarn, twisted into ropes of uniform thickness, well caulked into the back of the socket. No piece of yarn shall be shorter than the circumference of the pipe. The jointed pipe line shall be at required levels and alignment. The reminder of the socket is left for the lead caulking. Where the gasket has been tightly held, a jointing ring shall be placed round the barrel against the face of the socket. Molten Lead shall be poured to the remainder of the socket.

The joint shall not be covered till the pipeline has been tested under pressure. Rest of pipeline shall be covered so as to prevent the expansion and contraction due to variation in temperature.

Rainwater Pipes

All open terraces shall be drained by rainwater down takes.

Rainwater down takes are separate and independent of the soil and waste system and will discharge to rainwater harvesting tank and excess rainwater will be diverted to the external stormwater drain.

7 WATER SUPPLY SYSTEM

7.1 SCOPE OF WORK

The scope shall include supply, installation, testing, commissioning and satisfactory handing over of the complete water supply system to client as per drawings, specifications and schedule of quantities. The water supply system shall inter-alia include the following:

a) Distribution system from main supply or overhead tank to all fixtures and appliances for cold water.

b) Pipe protection and painting.

c) Control valves, masonry chambers and other appurtenances.

d) Connections to all plumbing fixtures, tanks, appliances and municipal mains

e) Inserts, nozzles for R.C.C. tanks

The term water supply is used as indicative of all water supply work required and necessary for the building including such external work as may be necessary to make the system functional.

The scope of this section comprises the supply, installation, testing and commissioning of piping network for water supply for internal & external services as follows:

a. Tapping from available main sourcel /Tanker water supply/

b. Domestic water supply.

c. Flushing water supply

The contractor shall make all necessary application and arrangements for his work to be inspected by the Local Authorities.

The contractor shall be solely responsible for obtaining the Authorities approval of his works prior to the handing over of the complete water supply / distribution installation to the owner.

7.2 GENERAL REQUIREMENTS

7.2.1 If necessary and if approved by the Engineer-in-Charge, where unavoidable, bends may be formed by means of a hydraulic pipe bending machine for pipes up to 20mm dia. No bending shall be done for pipes of 25mm diameter and above. After bending zinc rich paint shall be applied wherever the zinc coating is damaged.

7.2.2 Valves and other appurtenances shall be so located as to provide easy accessibility for operations, maintenance and repairs. Valves shall be located at a height not exceeding

1.6m above their operating floor/ platform level. Where such a provision is not possible and the valve is to be frequently operated a MS chain shall be provided for its operation.

7.3 GI PIPES, FITTINGS AND VALVES

7.3.1 All pipes inside the buildings and where specified, outside the building shall be M.S. galvanized steel tubes conforming to IS: 1239 of Class specified. When Class is not specified they shall be Heavy Class. All embedded / concealed pipes shall be of heavy duty.

7.3.2 Fittings shall be of malleable cast iron galvanized, of approved make. Each fitting shall have manufacturer's trade mark stamped on it. Fittings for GI pipes shall include couplings, bends, tees, reducers, nipples, unions, bushes etc. Fittings etc. shall conform to IS: 1879.

7.3.3 Pipes and fittings shall be jointed with screwed joints using Teflon tape suitable for water pipes. Care shall be taken to remove burr from the end of the pipe after cutting by a round file. All pipes shall be fixed in accordance with layout and alignment shown on the drawings. Care shall be taken to avoid air pockets. Necessary vents and drains shall be provided at all high and low points respectively. GI pipes inside toilets shall be fixed in wall chases well above the floor. No pipes shall be run inside a sunken floor as far as possible. Pipes may be run under the ceiling or floors and other areas as shown on drawings. All pipe joints after testing of the line shall be seal welded and the weld plus the adjoining portion shall be given two coats of zinc rich primer.

7.3.4 Bib cocks and stop cocks

All bib cocks and stop cocks shall be of C.P. brass conforming to IS: 781 of tested quality and approved make and design, of diameter as specified in schedule of quantities.

7.3.5 Clamps

GI pipes in shafts and other locations shall be supported by GI clamps of design approved by the Engineer-in-Charge. Pipes in wall chases shall be anchored by iron hooks. Pipes at ceiling level shall be supported on structural clamps fabricated from MS structural's as described in Clause **Error! Reference source not ound.**. Pipes in shafts shall be supported on slotted angles/ channels as specified/ as directed.

7.3.6 Unions

Contractor shall provide adequate number of unions on all pipes to enable easy dismantling later when required. Unions shall be provided near each gunmetal valve, stop cock or check valve and on straight runs as necessary at appropriate locations as required for easy dismantling and/ or as directed by the Engineer-in-Charge.

7.3.7 Flanges

Flanged connections shall be provided on pipes as required for maintenance/ ease in dismantling or where shown on the drawings, all equipment connections as necessary and required or as directed by the Engineer-in-Charge. Connections shall be made by the correct number and size of the GI nuts/ bolts as per relevant IS Standards and made with 3mm thick insertion rubber washer/gasket. Where hot water or steam connections are made insertion gasket shall be of suitable high temperature grade and quality approved by

the Engineer-in-Charge. Bolt hole dia for flanges shall conform to match the specification for CI sluice valve as per IS: 780. Gaskets shall conform to IS: 11149.

7.3.8 Trenches

All GI/PVC/HDPE pipes running below ground shall have minimum cover of 600mm.

7.3.9 Excavation to be taken to proper depth

Excavation shall be done in all conditions of soil and to such a depth that the sewers / or other pipes shall rest as described in the several clauses relating thereto and so that the inverts may be at the levels given on the section. Should the contractor excavate the trench to a greater depth than is required the extra depth shall have to be filled up with concrete at the contractor's own cost to the requirements and satisfaction of the client / consultants.

7.3.10 Back filling (IS: 12288 – 19S87)

After the sewer or other piping work has been laid and proved to be water-tight, the trench or other excavation shall be refilled. Utmost care shall be taken in doing this so that no damage is caused to the sewer and other permanent works.

7.3.11 Painting

a) All pipes above ground shall be painted with one coat of red lead and two coats of synthetic enamel paint of approved shade and quality to give an even shade, or as specified by the Engineer-in-Charge.

b) Hot water pipes in the chase:

All hot water pipes fixed in wall chase shall be properly insulated by elastomeric tape as per manufacturer's recommendation.

7.3.12 Pipe protection

Where specified, pipes below the floor or below ground shall be protected against corrosion by the application of two or more coats of solvent-based rubberized asphaltic primer to give a uniform coat covered with 'Pipe coat Hiper', a puncture resistant non woven polyester mat. The application of pipe coat primer and "Hiper" membrane shall be as specified by the manufacturer.

7.4 VALVES & FITTINGS

7.4.1 Sluice Valves

Unless otherwise specified all valves 200 mm Dia. and above shall be CI double flanged sluice valves with non rising spindle. Sluice valves shall be provided with the wheel when they are in exposed positions and with a cap top when they are located underground. Contractor shall provide suitable operating keys for sluice valves with cap tops.

Sluice valves shall be of approved makes conforming to IS: 780 of Class as specified.

7.4.2 Butterfly Valves

Where specified, Valves 80 mm Dia. and above shall be Cast steel or cast iron butterfly valve to be used for isolation and/ or flow regulation as directed by the Engineer. The valves shall be tight shutoff/ regulatory type with a resilient seat suitable for flow in either direction and seal in both directions.

Butterfly valve shall conform to IS: 13095.

7.4.3 Non-Return Valve

Where specified nonreturn valve (swing check type) shall be provided through which flow can occur in one direction only. It shall be single door swing check type of best quality conforming to IS: 5312.

7.4.4 Forged Brass Ball Valve

(a) Valves of size 50 mm Dia. and below shall be full bore quarter turn lever operated female threaded forged brass hard chrome plated ball valves conforming to IS: 554. Valve shall have PTFE body seat rings and gland packing, forged brass ball, stem and bonnet, carbon steel nut washer and lever and finished in chrome. Valves shall have the minimum working pressure of 16 bars. Valves shall be tested at manufacturer's works and the same stamped on it.

7.4.5 Air Release Valve (ARV)

(a) Pressurized water supply lines shall be provided with air release valve at the highest point to release accumulated air for piping system. Air release valve shall be automatic float operated; the diameter shall be as specified in the Schedule of Quantities. Air release valve shall be provided with ball valve for ease in Operation and Maintenance. Valve body shall be in cast iron stainless steel, brass and EPDM internal components. Valves shall have the minimum working pressure of 10 Kegs.

7.4.6 Ball float valve

Ball valves with Heavy duty float to be fixed in storage tanks as shown in the drawing and shall consist of cast brass lever arm having copper balls (26 SWG) screwed to the arm integrally. The copper ball shall have bronze welded seams. The closing/opening mechanism incorporating the piston and cylinder shall be non-corrosive metal and include washers. The size and construction of ball valves and float shall be suitable for desired working pressure operating the supply system.

7.4.7 TESTING

(a) All pipes, fittings, and valves shall be tested in accordance with IS: 2065 except as may be modified hereinunder. All pipes, fittings, and valves, after fixing at the site, shall be tested to a hydrostatic pressure of 10 kg/cm2 or 1.5 times the shut-off head of the pump whichever is greater.

(b) The test pressure shall be maintained for a period of at least thirty minutes without any drop in pressure.

(c) A test register shall be maintained and all entries shall be signed and dated by Contractor(s) and the Engineer.

(d) After commissioning of the Water Supply System, the Contractor shall test each valve by closing and opening it a number of times to observe if it is working efficiently and effectively. Valves which do not operate efficiently and effectively shall be replaced by new ones at no extra cost and the same shall be tested as above.

(e) All pipes in wall chase or meant to be encased or buried shall be hydro tested before the chase is plastered or the pipe encased or buried.

7.5 PRESSURE REDUCING VALVE SET

Each pressure reducing valve set shall be complete with pressure reducing or pressure regulating valve, isolating valves, pressure gauges on inlet and outlet, pressure relief valve on outlet and filter on the inlet.

Each pressure reducing valve shall contain loading neoprene diaphragm and a full floating, self-aligning, ignition resistant seat and shall be of the single stage, pressure reduction type with provision for manually adjusting the delivery pressure. The valve shall fail safe to the low pressure.

Valves shall be capable of operating at the maintaining automatically the respective delivery pressure and flow rates as indicated and shall not be liable to creep. Valves shall also be capable of maintaining the pre-set downstream pressure under static condition.

The filter on each inlet to a pressure reducing valve shall be of a replaceable porous sintered metal type.

(a) Pressure reducing valves are used to lower pipeline pressure to a predetermined set point. Pressure reducing valves protect installations against excessive pressure from the supply.

(b) Pressure reducing valves automatically controls downstream pressure, from no flow to full open flow, without regard to changes in inlet pressure. Outlet pressure control is smooth and precise since the friction and hysteresis of the valve and pilot are negligible.

(c) Because the valve will not chatter or slam under low flow conditions, it is not necessary to parallel pressure reducing valves with a second smaller size control valve to obtain accurate pressure control at low flow rates. In any size, pressure reducing valves will control pressure right down to shut off.

(d) Spring loaded pressure reducing valves operate by means of a force equalizing system. The force of a diaphragm operates against the force of an adjustment spring. If the outlet pressure and therefore diaphragm force fall because water is drawn, the then greater force of the spring causes the valve to open. The outlet pressure then increases until the forces between the diaphragm and the spring are equal again. The inlet pressure has no influence in either opening or closing of the valve. Because of this, inlet pressure fluctuation does not influence the outlet pressure, thus providing inlet pressure balancing.

7.6 PRESSURE RELIEF VALVES

Each pressure relief valve shall be of the fully enclosed type and fitted with hand easing gear.

Each pressure relief valve in a pressure reducing station shall have a flow capacity equal to that of the pressure reducing valve. PRV shall be of Brass.

Pressure relief valves in locations other than reducing stations shall have flow capacities equal to that of the associated equipment.

7.7 LEVEL CONTROLLED SOLENOID VALVES

A solenoid valve is an electromechanically operated valve. The valve is controlled by an electric current through a solenoid: in the case of a two-port valve the flow is switched on or off; in the case of a three-port valve, the outflow is switched between the two outlet ports.

Level sensor based solenoid valve will be installed at terrace level for automatic operation of the water transfer pump set.

7.8 UNDERGROUND / OVERHEAD STORAGE TANKS

7.8.1 Storage tanks for water supply shall be in RCC.

7.8.2 Each tank shall be provided with lockable type manhole cover fabricated from MS sheet or standard cast iron tank covers. Manhole covers shall be of an appropriate size as directed by the Engineer-in-Charge.

7.8.3 Each storage tank shall be provided with high and low-level annunciation by means of magnetic level switches.

7.8.4 One solid state electronic annunciation panel fully wired with a visual display and audible alarm unit shall be provided to indicate the following:

- High and low-level alarms for each water storage tank.
- On/ off status of all Pump sets namely domestic

7.8.5 All the necessary arrangements for fixing the panel shall be provided by the Contractor.

7.8.6 All the cabling from the respective level switches to the Annunciation Panel, MCC Switchgear to Annunciation Panel, including power supply from MCC shall be provided by the Contractor.

7.8.7 The number of outgoing terminals shall be equal to the number of incoming terminals from field/ MCC with 20% margin, so that necessary interconnection to BMS could be done at a later date.

7.9 TESTING

7.9.1 All pipes, fittings and valves shall be tested in accordance with IS: 2065 except as may be modified herein under. All pipes, fittings and valves, after fixing at site, shall be tested to a hydrostatic pressure of 10 kg/cm^2 or 1.5 times the shut off head of the pump whichever is greater.

7.9.2 The test pressure shall be maintained for a period of at least thirty minutes without any drop in pressure.

7.9.3 A test register shall be maintained and all entries shall be signed and dated by Contractor(s) and the Engineer-in-Charge.

7.9.4 After commissioning of the water supply system, the Contractor shall test each valve by closing and opening it a number of times to observe if it is working efficiently and effectively. Valves which do not operate efficiently and effectively shall be replaced by new ones at no extra cost and the same shall be tested as above.

7.9.5 All pipes in wall chase or meant to be encased or buried shall be hydro tested before the chase is plastered or the pipe encased or buried.

7.10 INSULATION

7.10.1 All open hot water flow and return pipes shall be insulated with preformed fibrous pipe sections conforming to IS: 9842.

7.10.2 Insulation to pipes shall be with pre-molded pipe sections, the thickness for sections shall be:

a) Pipe 50mm diameter and below - 25mm thick

b) Pipe 65mm diameter and above - 40mm thick

7.10.3 Application:

a) All surfaces shall be thoroughly cleaned with a wire brush.

b) One layer of approved primer shall be applied and pre-molded pipe insulation sections shall be fixed.

c) One layer of aluminum foil of thickness 0.711mm (20 SWG), shall be applied as a finish layer.

7.10.4 Insulation for hot water pipes in the chase:

All hot water pipes in chase shall be insulated with 3 mm elastomeric tape as per manufacturer's recommendations.

7.11 CONNECTION TO RCC WATER TANKS (PUDDLE FLANGE)

The contractor shall provide all inlets, outlets, washouts, vents, ballcocks, overflows control valves and all such other piping connections including a level indicator to water storage tanks as called for. All pipes crossing through RCC work shall have puddle flanges fabricated from GI pipes of required size and length and welded to 6/8 mm thick MS plate. All puddle flanges must be fixed in true alignment and level to ensure further connection in proper order.

Full way gate valves of an approved make shall be provided as near the tank as practicable on every outlet pipe from the storage tank except the overflow pipe. Overflow and vent pipes shall terminate with mosquito proof grating with the bronze screen on vent.

The overflow pipe shall be so placed to allow the discharge of water is readily seen. The overflow pipe shall be of a size as indicated. A stop valve shall also be provided in the inlet water connection to the tank. The outlet pipes shall be fixed approximately 75mm above the bottom of the tank towards which the floor of the tank is sloping to enable the tank to be emptied for cleaning.

The floor and the walls of the tank shall be tiled with glazed tiles up to the overflow level. Alternatively, food grade epoxy to be applied.

7.12 WATER METERS

Water meters of approved make and design shall be supplied for installation at locations as shown. The water meters shall meet with the approval of local supply authorities. Suitable valves and chambers or wall meter box to house the meters shall also be provided along with the meters.

The meters shall conform to Indian Standard IS: 779 and IS: 2373. Calibration certificate shall be obtained and submitted for each water meter.

Provision shall also be made to lock the water meter. The provision shall be such that the lock is conveniently operated from the top. Where the provision is designed for use in conjunction with padlocks, the hole provided for padlocks shall be a diameter not less than 4mm.

(Note: The water meters to be installed at every use of water such as Landscape irrigation, Domestic, Flushing, Firefighting etc.)

7.13 LEVEL SENSORS

Level sensor shall consist of the control unit, preamplifier and one full insulated probe-mounted vertically or two-part insulated probe mounted from tanks side wall adjustable switching system for pump control application, the same to be housed in stove enamel painted cast aluminum weatherproof suitable for black panel/wall mounting etc.,

The enclosure of probes shall be manufactured with the SS316 material. The least count of the central unit with amplifier should be +/- 0.10mm for response value of 30 seconds.

7.14 LEVEL INDICATORS

A level control system with electronic level probes is mounted on the face of the reservoir. The top two level sensors provide the ON-OFF signal for the treated water transfer pumps. A third level sensor enunciates a low-level alarm condition to the paging system and a fourth sensor enunciates an alarm to the paging system and stops the domestic water pumps from operating.

7.15 INSULATION

The insulation for hot water pipes shall be done as specified in Bill of Quantities and accordingly following guidelines shall be followed:

7.16 PAINTING / PIPE PROTECTION / INSULATION

Unless otherwise specified painting/ pipe protection/ insulation for pipes shall be measured and paid for separately. These shall be measured per linear meter along the center line of the pipe, over the finished surface and shall include all valves and fittings for which no deduction shall be made.

7.17 AIR RELEASE VALVES

Air release valve shall be installed as per specifications provided in BOQ.

Table Commonly Adopted Size of Air Valves

Size of Main mm	Type of Valve	Size of Air Valve mm

80	Single air valve	20
100	Double air valve	40
125-200	Double air valve	50
250-350	Double air valve	80
400-500	Double air valve	100
600-900	Double air valve	150
1000-1200	Double air valve	200

a) Air release valves shall be single acting type air valves with cast iron body and bronze/gunmetal internal parts and plastic float.

b) Each air release valve shall be provided with a cast iron isolating sluice valve specification given above.

7.18 MEASUREMENT AND RATES

Not Used

7.19 PUMPS FOR WATER SUPPLY & STROM DRAINAGE SYSTEM

A. SUBMERSIBLE VERTICAL PUMPS

PUMP

- The pump shall conform to IS 8034: 2000 amended up to date.
- The pump shall be submersible bore well type directly coupled to submersible electric motor with built in anti-thrust bearing. The pump set shall be complete with suction strainer, anti-thrust streamlined non return valve and submersible type copper conductor cable of suitable size.
- Inlet passage of the suction casing shall be designed reduce entry losses and strainer shall be provided in suction casing to restrain large solids entering the pump. For submersible type cables, clamping arrangement and cable guard shall be provided on pump casing.
- Each metallic impeller shall be dynamically balanced to Grade G 6.3 of IS 11723.
- The pump characteristic shall be non overloading type to ensure trouble free operation in the entire operating rang

ELECTRIC MOTOR

a) The submersible motor shall conform to IS 9283. The electric motor shall be three phase squirrel cage, water filled submersible type.
b) The motor shall be suitable for operation on 415V (3 phase), 50 Hz electric supply with required RPM capable of delivering the rated output with
   i) The terminal voltage differing from its rated value by not more than +6% and -15%
   ii) The frequency differing from its rated value by not more than 3% or
   iii) Any combination of b) and ii).
c) Motor shall be capable of running continuously at a B. H. P. (brake horse power) not less than 10% in excess of that absorbed by pump set under any operating conditions.
d) Starting current for the motor shall be limited to 6 times the full load current.

e) Motor shall have minimum starting torque of 140% FLT and maximum starting torque 200% FLT. It shall have 100% FLT during running condition.
f) Contractor shall submit the motor details including manufacturer's guarantee for efficiency and P.F. at full load, no load, 3/4 load, 1/2 load.

MATERIAL OF CONSTRUCTION

The material of construction shall be suitable for application and site conditions. The material of construction shall be as follows:

Sr.	Component	Material of Construction
1.	Pump bowl	High graded CI
2.	Impeller	Bronze Gr LTB2 / 20% Glass filled Noryl
3.	Diffuser	20% Glass filled Noryl
4.	Stage casing	High graded CI
5.	Motor casing	SS 304
6.	Pump shaft	SS 410
7.	Motor shaft	SS 410
8.	Bearing bush	Bronze IS 318 Gr LTB 2,3,4,5
9.	Base	Cast iron / Brass
10.	Fasteners	SS 304
	Strainers	SS 304

TESTING

Each pump-motor set shall be factory tested at manufacturer's works as per I.S. 8034 to determine following characteristics covering the full operating range.
-Head- Discharge curve
-Efficiency curve
-Dynamic balancing of rotor, impeller

CERTIFICATES

Contractor shall furnish:
Performance characteristic curves.
Catalogue of pump set and details of pump and its motor.
Manufacturing test certificate, Guarantee card and list of parts for the pump sets.
Operation and maintenance manuals for the pump set.
Drawings showing cross sections of pumps, mounting arrangements, list of materials and necessary curves along with their offer.
In the event of any pump failing to meet the specified requirement of pump set it shall be modified and retested until the requirements are fulfilled. The inspections and testing of the pump set are at contractors cost.

B. HORIZONTAL SUBMERSIBLE PUMPS

DESIGN REQUIREMENTS:

Pump shall be submersible open well monobloc type.

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

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

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

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

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

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

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

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

CONSTRUCTION FEATURES

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

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

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

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

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

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

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

INDUCTION MOTOR FOR SUBMERSIBLE PUMPS

The submersible motor shall confirm to IS: 9283:2013

PERFORMANCE AND CHARACTERISTICS

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

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

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

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

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

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

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

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

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

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

7.20 SUBMERSIBLE CABLE

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

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

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

7.21 EARTHING

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

7.22 INSULATION

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

7.23 TEMPERATURE RISE

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

7.24 CONSTRUCTION FEATURES OF MOTOR

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

7.25 TESTS AND INSPECTION

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

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

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

7.26 PERFORMANCE GUARANTEE

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

7.27 PENALTY:

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

7.28 DRAWINGS

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

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

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

3. Typical cross sectional drawing showing constructional details.

7.29 Materials of Construction

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

Sr.No	Component	Material of construction
1.	Casing	Cast Iron IS:210 Gr. FG 220
2.	Impeller	SS ASTM A351 CF8M
3.	Shaft	SS ASTM A276 TYPE 410
4.	Shaft sleeve	Bronze
5.	Motor body	Cast Iron
6.	Sealing	Mechanical seal

PVC PIPES AND FITTINGS

A. Pipes

The pipes shall be round and shall be supplied in straight lengths with socketed ends. The internal and external surfaces of pipes shall be smooth, clean, and free from grooving & other defects. The ends shall be cleanly cut and square with the axis of the pipe. The pipes shall be designed by external diameter and shall conform to IS: 4985. The pipes shall be of Class-III ; 6 kg/cm2 pressure rating.

B. Fittings

Fittings shall be injection Moulded and shall be 10 kg/cm^2 pressure rating and conform to Indian Standard.

PIPE WORK

1. The acceptable class of pipes shall be is 4985:2000 PVC pipe

2. The laying, jointing, thrust blocking and testing shall be performed to the pipe as per manufacturer's recommendations. If there be any conflict with this specification; the contractors will notify the employer's representative for resolving it at site.

3. Mainline - Pipes will be solvent weld jointed supplied in standard 6 meter lengths. All fittings will be solvent weld jointed as per manufacturer or as per Indian standard.

4. Sub-mains and laterals
   a. Pipe will be solvent weld jointed supplied in standard 6 meter lengths.
   b. PVC fittings upstream of the sub-main /isolation valve will be at pressure rating 50% greater than the pipe rating.
   c. Pipe ends should be cut square and shaving removed
   d. All joints will be primed and left to cure for one hour undisturbed

5. Laying of pipe work.
   a. Pipes will be laid in the routes and sizes as indicated on the drawings. In the case where multiple pipes or electrical conduits are laid in the same trench, they must be located side by side, not crossing each other or

stacked one upon the other. Minimum 50 mm gap shall be maintained between two pipelines, when two or more pipelines laid in the same trench.

b. All pipe laying and jointing will be performed in situ in the trench on the prepared bedding; not assembled above ground and placed in the trench at a later stage.
c. At the end of each day's work, all open ends of pipework and conduit will be plugged and staked to prevent entry of vermin, dirt, water or moisture and movement of the pipe.
d. Where pipe is required to pass over or under drainage pipe, the Contractor is to ensure a minimum clearance of 50 mm between the irrigation pipe and the drainage pipe.

6. Crossings

Electrical Cables

a. High voltage cables
A separate PVC electrical conduit will be installed for the high voltage cables. The high voltage cables must not share a conduit with low voltage cables
b. Low voltage cables
This conduit must be separated by minimum 300 mm from the high voltage conduit (if any).
c. Conduit
The size of the conduit will allow easy pulling of cables. So the minimum size of conduit used will be 25 mm. if the number of cables increased to 7 then go for 40 mm conduit. If the conduit is exposed to sunlight in any place, it will be UV resistant.

Road crossing

a. Pressure pipe
Where the pipe work goes under a road, the contractor will install:
i) U-PVC pipe sleeve of sufficient diameter to allow easy installation of the PVC pipe.
ii) GI pipe of equivalent internal diameter to the PVC pipe.
b. Depth
The minimum depth of the sleeve and conduits will be 600 mm measured to the top of the sleeve.
c. Ends of sleeve and conduits
These will be clearly marked above ground for ease of future location.

Pathways & internal maintenance road crossings

a. Pressure pipe
Where the pipe work goes under pathways, the contractor will install uPVC pipe sleeve of sufficient diameter to allow easy installation of the PVC pipe.
b. Depth
The top the pipe and conduits will be a minimum 450 mm below the base of the pathways.

7. **Trench Work**

a. Mixing of soil layers
When the depth of the trench extends through different soil structures (e.g., sand capping, topsoil, clay, and native earth), the contractor will:
i) Remove each layer and place it separately on the surfaces.
ii) Refill the trench to restore the original layers of soil.
iii) Mixing of the different soil layers is not limited.

b. Mainline excavation
i) Trenching for mainlines will be performed by hand digging only
ii) The depth of trench for mainline shall be minimum 600 mm from the finish ground level.

iii) The material removed whilst digging will be placed no closer than 300 mm to the top edge of the completed trench and there will be a minimum of loose soil left in the bottom of the trench prior to pipe laying.

c. Sub-main/Lateral line excavation

i) Trenching for lateral lines will be performed by hand digging or by backhoe with a maximum bucket width of 300 mm, to minimize disturbance to the surrounding area.
ii) The depth of trench for sub mainline shall be minimum 450 mm from the finish ground level.
iii) These trenches will be straight with the bed level and graded.

d. Back Filling

i) Where trench work encounters unsuitable bedding material such as hard clay, rock, shale, loose stones, excessive tree roots, etc. a 100 mm bed of sand or loam will be placed below pipe in the trench prior to pipe laying.
ii) This policy will apply to back filling of all trenches, where the pipe will be covered with 100 mm of sand or loam to prevent similar debris coming in contact with the pipe or control cables. Under no circumstances will construction debris of any kind be included in any back fill material.
iii) Allowances should be made for back filling during the heat of the day to minimize the effects of thermal expansion and contraction on pipe already laid.
iv) Trenches will be back filled on the same day as they are excavated. i.e. trenched will not be excavated until required. This is to prevent flooding of trenches and floatation of pipes.

e. Compaction

i) Compaction should take place only after suitable bedding and back filling has been completed to the satisfaction of the Employer's Representative.
ii) Compaction can be achieved by either:
- plate compaction in layers not exceeding 300 mm
- wheel rolling with a suitable vehicle after 450 mm of cover is provided
iii) Regardless of which method is used, it will remain the Contractor's responsibility to ensure reinstatement of trench subsidence during both the contract and the defects liability period.

f. Fixing & Staking

The Fixing & staking of the mainline, valve and controller will be done by the contractor subject to approval by the Employer's Representative.
The contractor will supply the stakes as follows:
a. Each will be 1 m long.
b. The top of the stake will be flanged to make it highly visible from a distance of 200 m to prevent damage from machinery.
Different colour flags if required will be used for
- Quick Coupling valves
- Mainline
- Controller

8. **Thrust Blocks**

Mainline concrete thrust blocks will be placed on all fittings that are subject to unbalanced thrust forces created by pressure and fluid movement. That is, at all mainline bends, tees, reductions, expansion, caps, isolation valves etc. Excavation of the thrust bearing surfaces will be at right angles to the line of thrust and located in either solid, undisturbed soil or soil which has been compacted specifically for that purpose. In case of bigger pipes (80 mm dia and above), thrust blocks of cement concrete 1:2:4 (1 cement: 2 coarse sand: 4 graded stone aggregate of 20 mm nominal size) shall be constructed on all bends. The thrust blocks must have cured for 24 hours before pressure testing.

DATA SHEETS

SUBMERSIBLE PUMPSET

Sr.No	Particulars	Unit	Bidder to indicate
1.	Designation	-	
2.	Number offered	-	
3.	Tag numbers	-	
4.	Pump make and model number	-	
5.	Type of pump	-	
6.	Design capacity	m3/hr	
7.	Total head	MLC	
8.	Shut- off head	MLC	
9.	Hydrostatic test pressure	Kg/cm2(g)	
10.	Efficiency at duty point	%	
11.	NPSH required	MLC	
12.	Pump speed	RPM	
13.	Pump bkw	kW	
14.	Minimum continous flow	m3/hr	
15.	Maximum allowable size of solids	mm	
16.	Installation	-	
17.	Method of lubrication	-	
18.	Type of impeller	-	

19.	Type of coupling	-	
20.	Type and make of seal	-	
21.	Type and make of bearing	-	
22.	Discharge pipe orientation	-	
23.	Suction nozzle size	-	
24.	Discharge nozzle size	-	
25.	Power input to motor at duty point	kW	
26.	Motor make and model number	-	
27.	Motor type	-	
28.	Motor rating	kW	
29.	Motor speed	RPM	
30.	Motor efficiency	%	
31.	Class of insulation	-	
32.	Starting current	A	
33.	Degree of protection		
34.	Cable size	C x mm2	
35.	Weight of pump, driver and cables	Kg	
36.	Accessories	-	
37.	Performance guarantee		
37.1	Capacity	m3/hr	
37.2	Differential head	MLC	

37.3	Power consumption	kW	

GATE VALVES

Sr. No.	Particulars	Unit	Bidders Data
1.0	Make	-	
2.0	Material	-	
3.0	Pressure Rating	Kg/cm^2	
4.0	Class	-	
5.0	Size	mm	

NON RETURN VALVES

Sr. No.	Particulars	Unit	Bidders Data
1	**General**	-	
1.1	Make	-	
1.2	Type	-	
1.3	Applicable standard	-	
2	**Size ,Location & quantity**	-	
2.1	Pressure Rating	Kg/cm^2	
3	**Material of Construction**	-	
3.1	Body, disc, bonnet	-	
3.2	'O' ring	-	
3.3	Nuts	-	
3.4	Bolts	-	

4	**Hydro Test Pressure**	-	
4.1	Body	Kg/cm^2	
4.2	Seat	Kg/cm^2	

BALL VALVES

Sr. No.	Particulars	Unit	Bidders Data
1	**General**	-	
1.1	Make	-	
1.2	Type	-	
2	**Material of Construction**		
2.1	Body & body connector	-	
2.2	Ball	-	
2.3	Seat	-	
2.4	Stem	-	
2.5	Body Seal	-	
2.6	Stem seal	-	
3	**Design parameters**		
3.1	Size	mm	
3.2	Rating	Kg/cm^2	
4	**Testing**		
4.1	Shell	Kg/cm^2	
4.2	Seat	Kg/cm^2	

QUICK COUPLER VALVE

Sl. No.	Particulars	Unit	Bidder to indicate
1.	Manufacturer	-	
2.	Size	mm	
3.	Material of Valve Body	-	
4.	Material of the Cover	-	
5.	Material of the Cover Key	-	
6.	Max. Design Pressure	Kg/cm^2	

Sl. No.	Particulars	Unit	Bidder to indicate
1.	Manufacturer	-	
2.	Size	mm	
3.	Material of Pipe	-	
4.	Reinforcement Method Used	-	
5.	Colour of the Pipe	-	
6.	Burst Pressure	Kg/cm^2	

GARDEN HOSE

VALVE BOX

Sl.no.	Particulars	Unit	Bidder to indicate
1.	Manufacturer	-	
2.	Size	mm	
3.	Material of Body & Cover	-	
4.	Colour of the Box	-	

5.	Max. Sustainable load	N	
6.	Cover Locking facility	-	

PREFERRED VENDOR LIST

SL NO	Equipment	Manufacturer
1.	Submersible open well monobloc pumps	Kirloskar / Crompton / Laxmi/KSB
2.	PVC pipes & fittings	Jain / Finolex / Supreme/Astral
3.	Gate valves	Leader / Zoloto / Kirloskar Brothers Ltd
4.	Gunmetal Valves (Sluice & Check)	Zoloto / Sant / Leader
5.	Solenoid valve	Rainbird / Toro / Hunter
6.	Ball valves	Chemtech Industrial valves P. Ltd /
		G M Engineers / Hawa Engineers Ltd
7.	QCV, Key, Swivel elbow	Jain / Rainbird / Harit
13.	Cables	Finolex / Polycab

PROCEDURE UNDER E-TENDERING

INSTRUCTIONS TO APPLICANTS

DEFINITIONS:

a) Tender portal: The e-Procurement Portal of Government of Odisha introduced for the process of e-Tendering which can be accessed on https://www.tendersodisha.gov.in.
b) Use of valid Digital Signature Certificate of appropriate class (Class II or class III) issued from registered certifying authorities (CA) as stipulated by Controller of Certifying Authorities (CCA), Government of India such as n- Code, Sify, TCS, MTNL, e-Mudhra is mandatory for all users.
c) For all purpose, the server time displayed in the e-Procurement portal shall be the time to be followed by all the users.
Words in capital and not defined in this document shall have the same meaning as in the Request for Proposal ("BID").

1. PARTICIPATION IN BID:

1.1 PORTAL REGISTRATION:

The Contractor/Bidder intending to participate in the bid is required to register in the portal using his/her active personal/official e-mail ID as his/her Login ID and attach his/her valid Digital signature certificate (DSC) to his/her unique Login ID. He / She has to submit the relevant information as asked for about the firm/contractor. The portal registration of the bidder/firm is to be authenticated by the State Procurement Cell after verification of original valid certificates/documents such as (i) PAN and (ii) Registration Certificate (RC) / VAT Clearance Certificate (for procurement of goods) /GST Certificate of the concerned bidder. The time period of validity in the portal is at par with validity of RC/ VAT Clearance/GST Certificate. Any change of information by the bidder is to be re authenticated by the State Procurement Cell. After successful authentication bidder can participate in the online bidding process.

1.2 Bidders participating through Joint Venture shall declare the authorized signatory through Memorandum of Understanding duly registered and enroll in the portal in the name and style of the Joint venture Company. It is mandatory that the DSC issued in the name of the authorised signatory is used in the portal. For participating in the tender, the authorized signatory holding Power of Attorney shall be the Digital Signatory. In case the authorized signatory holding Power of Attorney and Digital Signatory are not the same, the bid shall be considered non-responsive.

1.3 Any third party/company/person under a service contract for operation of e- Procurement system in the State or his/their subsidiaries or their parent companies shall be ineligible to participate in the procurement process that are undertaken through the e-Procurement system irrespective of who operates the system.

2. LOGGING TO THE PORTAL:

The Contractor/Bidder is required to type his/her Login ID and password. The system will again ask to select the DSC and confirm it with the password of DSC as a second stage authentication. For each login, a user's DSC will be validated against its date of validity and also against the Certificate Revocation List (CRL) of respective CAs stored in system database. The system checks the unique Login ID, password and DSC combination and authenticates the login process for use of portal.

3. DOWNLOADING OF BID:
The bidder can download the tender of his choice and save it in his system and undertake the necessary preparatory work off-line and upload the completed tender at his convenience before the closing date and time of submission.

4. CLARIFICATION ON BID:
The bidder may ask question related to tender online in the e-procurement portal within the period of seeking clarification. The Officer inviting the bid /Procurement Officer-Publisher will clarify queries related to the tender.

5. PREPARATION & SUBMISSION OF BID

5.1 Detailed BID may be downloaded from Tender Portal for detail study and preparation of his bid and the Application may be submitted online following the instructions appearing on the screen.

5.2 The following shall be the form of various documents in the Application:

A. Only Electronic Form (to be uploaded on the Tender Portal)

(a) Power of Attorney for signing the Application
(b) If applicable, the Power of Attorney for Lead Member of JV;
(c) Copy of Memorandum of Understanding between JV partners, if applicable.
(d) Copy of Memorandum of Understanding with Associate, if applicable.
(e) Technical proposal as per format prescribed as per clause no 102 of BID
(f) Bid Security Declaration for validity of 180 day as mentioned in the Instruction to Bidder or as per DTCN
(g) Price Bid as per BOQ.
(h) Other documents as per requirement of BID.
5.3 The Applicant shall upload scanned copies of the documents as specified in
5.2(A) above on the Tender Portal in designated locations of Technical Proposal and Price Bid(BOQ) before 17:00 hours Indian Standard Time on the Application due date i.e. on 14.07.2021 (date to be specified).
5.4 It may be noted that the scanned copies can be prepared in file format i.e. PDF and/or JEPG only. The Applicants can upload a single file of size of 5 MB only but can upload multiple files.
5.5 The bidder shall log on to the portal with his /her DSC and more to the desired tender for up loading the documents in appropriate place one by one simultaneously checking the documents.
5.6 Bids cannot be submitted after due date and time. The bids once submitted cannot be viewed, retrieved or corrected. The Bidder should ensure correctness of the bid prior to uploading and take print out of the system generated summary of submission to confirm successful uploading of bid.
The bids cannot be opened even by the OIT or the Procurement Officer Publisher/ opener before the due date and time of opening.
5.7 Each process in the e-procurement is time stamped and the system can detect the time of log in of each user including the Bidder.
5.8 The Bidder should ensure clarity/legibility of the document uploaded by him to the portal.
5.9 The system shall require all the mandatory forms and fields filled up by the contractor during the process of submission of the bid/tender
5.10 The bidder should check the system generated confirmation statement on the status of the submission.
5.11 The Bidder should upload sufficiently ahead of the bid closure time to avoid traffic rush and failure in the network.
5.12 The tender inviting officer is not responsible for any failure, malfunction or breakdown of the electronic system used during the e-procurement process.
5.13 The Bidder is required to upload documents related to his eligibility criteria and qualification information and Price Bid(BOQ) duly filled in.
5.14 The Bidder will not be able to submit his bid after expire of the date and time of submission of bid (server time). The date and time of bid submission shall remain unaltered even if the specified date for the submission of bids declared as a holiday for the Officer Inviting the Bid.

6. SIGNING OF BID:

The 'online bidder' shall digitally sign on all statements, documents, certificates uploaded by him, owning responsibility for their correctness /authenticity as per IT ACT 2000. If any of the information furnished by the bidder is found to be false / fabricated / bogus, his EMD/ Bid Security shall stand forfeited & his name shall be recommended for blocking of portal registration and the bidder is liable to be blacklisted.

7. SECURITY OF BID SUBMISSION:

7.1 All bid uploaded by the Bidder to the portal will be encrypted.
7.2 The encrypted Bid can only be decrypted / opened by the authorized openers on or after the due date and time.

8. RESUBMISSION AND WITHDRAWAL OF BIDS:

8.1 Resubmission of bid by the bidders for any number of times before the final date and time of submission is allowed.
8.2 Resubmission of bid shall require uploading of all documents including price bid a fresh.
8.3 If the bidder fails to submit his modified bids within the pre-defined time of receipt, the system shall consider only the last bid submitted.
8.4 The bidder should avoid submission of bid at the last moment to avoid system failure or malfunction of internet or traffic jam or power failure etc.
8.5 The Bidder can withdraw his bid before the closure date and time of receipt of the bid by uploading scanned copy of a letter addressing to the Procurement Officer Publisher (Officer Inviting Tender) citing reasons for withdrawal. The system shall not allow any withdrawal after expiry of the closure time of the bid.

9 OPENING OF THE BID:

9.1 Bid opening date and time is specified during tender creation or can be extended through corrigendum. Bids cannot be opened before the specified date & time.
9.2 All bid openers have to log-on to the portal to decrypt the bid submitted by the bidders.
9.3 The bidders & guest users can view the summary of opening of bids from any system. Contractors are not required to be present during the bid opening at the opening location if they so desire.
9.4 In the event of the specified date of bid opening being declared a holiday for the Officer inviting the Bid, the bids will be opened at the appointed time on the next working day.
9.5 Combined bid security for more than one work is not acceptable.

10. EVALUATION OF BIDS:

10.1 All the opened bids shall be downloaded and printed for taking up evaluation.
The officer authorized to open the tender shall sign and number on each page of the documents downloaded and furnish a certificate that "the documents as available in the portal containing--- nos of pages".
10.2 The bidder may be asked in writing/ online to clarify on the uploaded documents provided in the Technical Bid, if necessary, with respect to any doubts or illegible documents. The officer inviting tender may ask for any other document of historical nature during Technical evaluation of the tender. Provided in all such cases, furnishing of any document in no way alters the Bidder's price bid. Non submission of legible documents may render the bid non-responsive.
10.3 The bidders will respond in not more than 7 days of issue of the clarification letter, failing which the bid of the bidder will be evaluated on its own merit.
10.4 The Technical evaluation of all the bids shall be carried out as per information furnished by Bidders.
10.5 The Procurement Officer-Evaluators; will evaluate bid and finalize list of responsive bidders.
10.6 The financial bids of the technically responsive bidders shall be opened on the due date of opening. The Procurement Officer-Openers shall log on to the system in sequence and open the financial bids.
10.7 The Financial Bid will be opened on the notified date & time in the presence of bidders or their authorised representative who wish to be present.
10.8 At the time of opening of "Price Bid(BOQ)", bidders whose technical bids were found responsive and qualified will be opened.
10.9 The responsive bidders' name, bid prices will be announced.
10.10 Procurement Officer-Openers shall sign on each page of the downloaded Price Bid(BOQ).
10.11 Bidder can witness the principal activities and view the documents/summary reports for that particular work by logging on to the portal with his DSC from anywhere.
10.12 System provides an option to Procurement Officer Publisher for reconsidering the rejected bid with the approval of concern Chief Engineer / Head of Department.
10.13 The L-1 bidder shall have to produce the original documents in support of the scanned copies and statements uploaded in the portal within 5 days of opening of price bid.

DISCLAIMER

The Applicant must read all the instructions in the BID and submit the same accordingly