

जयपुर विकास प्राधिकरण, जयपुर

कमरा नं. 102, प्रथम तल, नागरिक सेवा केन्द्र, रामकि गोर व्यास भवन, इन्दिरा सर्किल जवाहर लाल नेहरू मार्ग,
जयपुर-302004

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क्रमांक / जविप्रा / अधि.अभि. / 13 / 2023-24 / डी-852

दिनांक: 21.07.2023

निविदा सूचना

निविदा सूचना: जविप्रा / अधि.अभि.-13 / 22 / 2023-24

जयपुर विकास प्राधिकरण द्वारा भअचरोल दिल्ली रोड पर 50 बेडों के सैटेलाइट हास्पिटल का निर्माण कार्य जिसकी अनुमानित लागत राशि रु 2033.00 लाख के लिए ऑनलाईन बिड्स दिनांक 14.08.2023 को सायं 6:00 बजे तक आमन्त्रित की जाती है। निविदा बोली का ऑनलाईन आवेदन व भुगतान जविप्रा पोर्टल पर करने की अन्तिम तिथि 14.08.2023 को सायं 6:00 बजे तक है। निविदा बोली के दस्तावेजों का विस्तृत विवरण www.sppp.rajasthan.gov.in, www.eproc.rajasthan.gov.in and www.jda.urban.rajasthan.gov.in पर देखा जा सकता है।

(UBN No.....)

निविदा में भाग लेने वालों को निम्न शर्तों की पूर्ति करनी होगी।

1. निविदादाता जयपुर विकास प्राधिकरण की वेबसाइट www.eproc.rajasthan.gov.in पर पंजीकृत हो एवं निविदा में भाग लेने के लिए बोलीदाता को आवेदन करने के लिए दस्तावेज शुल्क, अमानत राशि 1, आर.आई.एस.एल. प्रोसेसिंग शुल्क ऑनलाईन जमा करनी होगी।
2. ऑनलाईन निविदा प्रस्तुत करने के लिए निविदादाताओं का राजस्थान सरकार के ई-प्रोक्यूरमेंट पोर्टल www.eproc.rajasthan.gov.in पर पंजीकृत हो।

अधिशायी अभियन्ता-13
जविप्रा, जयपुर।

JAIPUR DEVELOPMENT AUTHORITY

{Office Location}

No:- JDA/EE-13/2023-24/D-852

Dated: 21.07.2023

NOTICE INVITING BID

NIB No.: JDA/EE-13/22/2023-24

UBN No.:

Online Bids are invited up-to 06:00 PM of 14/08/2023 for **“Construction of 50 bedded Satellite Hospital at Achrol (Delhi Road), Zone 13, JDA, Jaipur.”** The last date for Applying Bid and making online payment on JDA portal is up-to 06:00 PM of 14/08/2023. The estimated cost of NIB is Rs. 2033.00 Lacs. Details may be seen in the Bidding Document at our office or the State Public Procurement Portal website www.sppp.rajasthan.gov.in, www.eproc.rajasthan.gov.in and www.jda.urban.rajasthan.gov.in/jda

To participate in the bid, bidder must:

- A. Participate in Tender & Deposit Payment on ‘Online Tender Participation’ Portal of JDA at <https://jda.urban.rajasthan.gov.in/jda> or by Single-Sign-On at <http://service.jaipurjda.org>.
- B. Submit e-Bid on ‘e-Procurement Portal’ of GOR at www.eproc.rajasthan.gov.in

Executive Engineer-13

Jaipur Development Authority, Jaipur

OFFICE OF THE JAIPUR DEVELOPMENT AUTHORITY, JAIPUR

NIB No.- : JDA/EE 13/22/2023-24	
Name & Address of the Procuring Entity	➤ Name :Executive Engineer-13, Jaipur Development Authority ➤ Address : Room No. 102 1st floor, Court Building, JDA Campus, Indira Circle, JawaharLal Nehru Marg, Jaipur-302004 (Rajasthan) ➤ Email :mohit.jda@rajasthan.gov.in
Name of work	➤ Construction of 50 bedded Satellite Hospital at Achrol (Delhi Road), Zone 13, JDA, Jaipur
Bid Procedure	➤ EPC Mode, Two Envelope System; open competitive bidding as per e-Bid procedure at http://eproc.rajastha.gov.in
Bid Evaluation Criteria (Selection Method)	➤ L1 (eg. Least Cost based Selection (LCBS)-L1)
Websites for downloading Bidding Document, Corrigendum's, Addendums, etc.	➤ Websites: www.sppp.rajasthan.gov.in, www.eproc.rajasthan.gov.in, www.jda.urban.rajasthan.gov.in
Estimated Procurement Cost	➤ INR 2033.00 (Two Thousand Thirty Three Lacs only)
Website for online Bid application and payment *	➤ Website: www.jda.urban.rajasthan.gov.in ➤ For participating in the Bid, the Bidder has to apply for this Bid and pay the Bidding Document Fee, RISL Processing Fee and Bid Security Deposit, online only. ○ Bidding document fee: Rs. 1000.00 (In words One Thousand only) ○ Requisite Bid Security Deposit. Fees.-2500.00 (In words Two Thousand Five Hundred only) ○ The Bidders are required to submit Bid security, cost of Bidding documents, and Bid processing fees through online payment after registering with JDA on www.jaipurjda.org/e-services/e-tender portal. There should be a gap of 3 working days between the End date for Bid Applying, Online Payment & Bid Submission and Bid Opening date. In the absence of the requisite fee, the bid of the concerned bidder will be considered as non-responsive and shall be liable for rejection
Bid Security Deposit (in favor of Secretary, JDA, Jaipur)	➤ Amount (INR: 2% (Rs.4066000.00/-) For “AA” class contractors registered in the appropriate class with CPWD, Postal, Telegram, Railway, MES, Other State Government/Central Government undertakings/organizations of Estimated Procurement Cost. (The bidder must capable to bid in the bid as per their enlistment) ➤ 0.5 % (Rs. 1016500.00/-) Bidder registered as a contractor in the appropriate class For “AA” in JDA. ➤ In case of Departments of the State Government and undertakings, Corporations, Autonomous bodies, Registered Societies, Cooperative Societies which are owned or controlled or managed by the State Government and Government undertakings of the Central Government shall submit a bid securing declaration in lieu of bid security. ➤ If a joint Venture is allowed in the Bid then 2% (Rs40.66 Lakh/-) shall be deposited by bidders (Joint Venture firm)

Start/ End Date for Bid Applying Bid and making Online Payment on JDA portal*	➤ Start Date: 24/07/2023 at 09:30 AM onwards ➤ End Date: 14/08/2023 at 06:00 PM ➤ In case EMD in form BG Original Bank Guarantee is to be submitted in Room No No 215N Extension Building, Jaipur Development Authority, JLN Marg, Jaipur by 16.08.2023 from 9.30 AM to 18.08.2023 up to 3.30 PM (within three working days from the last date of submission of bid.)
Bid Submission on e-Procurement Portal of GOR**	➤ Start Date: 24/07/2023 at 09:30 AM onwards ➤ End Date: 14/08/2023 at 06:00 PM
Date/Time/Place of pre-Bid	➤ 01.08.2023 3:00 PM at Manthan Hall, JDA Jaipur
Date/ Time/ Place of Technical Bid Opening	➤ 21/08/2023 03:30 PM ➤
Date/ Time/ Place of Financial Bid Opening	➤ Will be intimated later to the Technically qualified bidders
Bid Validity	➤ 120 days from the bid submission deadline
Time Period	➤ 12 Month
A&F/Job No.	➤ 430/2022-23

Procedure for bidding:

1. **Two-part bid system:**

Two part (Two-envelope) (2 docket) system would be adopted, Docket-1 being for Technical Bid and Docket-2 being for Financial Bid.

Docket-1:- There will be three separate folders- Folder-1 is for proof of deposition of Bid Security, cost of bidding document and bid processing fee alongwith copy of GST registration, signed Annexure “B” and copy of enlistment as contractor/ bidder in required category. Folder-II is for bid document and folder-III is for technical bid.

Docket-2:- There will two separate folders-1 is for financial bid and 2 is for bill of quantities.

The technical bid will be opened only for bidders whose proper Bid Security, copy of GST registration, proof for deposition of bidding document fee, RISL processing fee, copy of enlistment of contractor in the required category and signed Annexure “B” are found to be in order. Bid Security will be accepted only in the form of online deposition or in the form of Bank Guarantee

SCHEDULE AND SPECIFICATIONS

SCHEDULE – A: INFORMATION USEFUL FOR THE CONTRACTORS:

The bidder should see the site and fully understand the conditions of the site before bidding and include all leads, lift etc for the material in his item rate/percentage to be quoted on the rates given in Schedule 'G'. The work shall be carried out in accordance with the Rajasthan PWD detailed specification and to the entire satisfaction of the Engineer – In – Charge of the work.

SCHEDULE – B: LIST OF THE DRAWING TO BE SUPPLIED BY THE DEPARTMENT

The drawing may be seen in the office of the undersigned.

SCHEDULE – C: LIST OF THE DRAWING TO BE SUPPLIED BY THE CONTRACTOR:

- (a) The successful bidder has to submit at least three conceptual plans for the project before the JDA committee and the committee reserves the right for approval of plan.**
- (b) The successful bidder has to submit the planning and working drawings of approved plan and finally to be vetted from MNIT or IIT at his own cost. The structural designs should be prepared using latest software's. The same will need approval by JDA before execution.**
- (c) The successful bidder must note that all activities related to project must be completed within 12 months of stipulated period.**

SCHEDULE - D: TEST OF THE MATERIALS:

The test of the materials and workmanship shall be conducted by the JDA staff as necessary. The result of such tests should confirm to the standards laid down in the Indian standard & or the standards laid down in the detailed specifications of the work by the contractor. Qualified personnel required as per the contractor enlistment rules shall have to be engaged at site by the Contractor. The authority reserves the right to engage such staff and recover the expenses from the contractor on such account in case of his failure to do so.

SCHEDULE – E: SAMPLES OF THE MATERIALS:

The sample of the materials to be used by the contractor shall be deposited 15 days in advance with the Engineer In charge and be got approved by him before use.

SCHEDULE - F: TIME OF COMPLETION:

The work should start within 10 days of the issue of the work order and complete within time limits.

SCHEDULE – G: EPC METHOD

SCHEDULE – H: SPECIAL CONDITION: Attached Separately.

SCHEDULE – I: COST OF TENDER DOCUMENTS, PROCESSING FEES & BID SECURITY.

The Bid Processing fee is payable in favor of M.D. RISL & Cost of bid document & Bid Security is payable in Favour of the Secretary, JDA, Jaipur. Bidders have to pay bid processing fees, cost of bidding documents, and Bid Security Online. **If a bidder opts to**

deposit the bid security through bank guarantee, the bank guarantee should be valid for the next seven months after the bid opening date. A copy of the such bank guarantee will be required to be attached with the bid submission documents uploaded on the E-procurement portal of GOR. The bank guarantee will be physically handed over upto prescribed time to Nodal officer of the on-line tendering system of JDA i.e. D.D(E&B) in room No. 215N Extension building, JDA, JLN marg, Jaipur, as per specified in bidding documents,

Annexure-1. Special Conditions of Contract regarding defect liability period.

Annexure-2A. Bank guarantee will be in specified Performa enclosed with this bidding document for Bid Security.

Annexure-2B. Bank guarantee will be in specified Performa enclosed with this bidding document for Performance Security.

Annexure-A. Compliance with the code of integrity and no conflict of interest (RTPP Act/Rules).

Annexure-B. Declaration by the bidder regarding qualifications (RTPP Act/Rules).

Annexure-C. Grievance Redressal during the procurement process (RTPP Act/Rules).

Annexure-D. Additional Conditions of Contract (RTPP Act/Rules).

Annexure-E. Process for Tender Participation & Depositing Payment on 'Online Tender Participation' Portal of JDA & Bid Submission on 'e-Procurement Portal' of Government of Rajasthan.

EXECUTIVE ENGINEER -13
JDA, Jaipur



Jaipur Development Authority, Jaipur

**Engineering Procurement and Construction
(EPC)**

Bid Document

For

**Construction of 50 bedded Satellite
Hospital at Achrol (Delhi Road), Zone 13,
JDA, Jaipur**

Bidding Document

Table of Contents - Summary Description

BIDDING PROCEDURES

Section I - Instructions to Bidders (ITB)

Section II - Invite Bid

Section III - Evaluation and Qualification Criteria (EQC)

Section IV–Procuring Entity’s Requirement (PER)

SectionV- Design Basis Report

SectionVI- Conditions & Specifications of Civil Works

SectionVII- Scope & Specifications of Electrical &
Mechanical Works

SectionVIII- Scope & Specifications of Horticulture &
Irrigation works

Section IX- Architectural Controlling Norms, Schedule of
Finishes / Specifications

Section X - General Conditions of Contract (GCC)

Section XI - General Conditions of Contract (GCC)

Section XI - Scope of Work, Planning, Designing &

Safety

Section XII - Schedule of Stage Payment

Section XII - DRAWINGS

SECTION I
INSTRUCTION TO BIDDERS (ITB)

Section-I : Instruction to Bidders (ITB)

Important Instruction: - The Law relating to procurement “The Rajasthan Transparency in Public Procurement Act, 2012” [hereinafter called the Act] and the “Rajasthan Public Procurement Rules, 2013” and modified thereof from time to time [hereinafter called the Rules] under the said Act have come into force which are available on the website of State Public Procurement Portal <http://sppp.raj.nic.in>. Therefore, the Bidders are advised to acquaint themselves with the provisions of the Act and the Rules before participating in the Bidding process. If there is any discrepancy between the provisions of the Act and the Rules and this Bidding Document, the provisions of the Act and the Rules shall prevail.

1.	General		
	1.1 Scope of Bid		In support of the Invitation to Bid indicated in the Bid Data Sheet (BDS), the Procuring Entity issues this Bidding Document for the procurement of works as named in the BDS and as Specified in Section V, Procuring Entity's Requirements.
	1.2 Interpretation		Throughout this Bidding Document: (a) The term “in writing” means communicated in written Form through letter, fax, e-mail etc. with proof of receipt. (b) If the context so requires, singular means plural and Vice versa; and “Day” means calendar day.
	1.3 Code of Integrity	1.3.1	Any person participating in the procurement process shall: - i. Not offer any bribe, reward or gift or any material benefit either directly or indirectly in exchange for an unfair advantage in procurement process or to otherwise influence the procurement process; ii. Not misrepresent or omit that misleads or attempts to mislead so as to obtain a financial or other benefit or avoid an obligation; iii. Not indulge in any collusion, bid rigging or anti- competitive behaviour to impair the transparency, fairness and progress of the procurement process; iv. Not misuse any information shared between the Procuring Entity and the Bidders with an intent to gain unfair advantage in the procurement process; v. Not indulge in any coercion including impairing or harming or threatening to do the same, directly or indirectly, to any party or to its property to influence the procurement process; vi. Not obstruct any investigation or audit of a procurement process; vii. Disclose conflict of interest, if any; and viii. Disclose any previous transgressions with any Entity in India or any other country during the last three years or any debarment by any other Procuring Entity.
		1.3.2	Conflict of Interest: A conflict of interest is considered to be a situation in which a party has interests that could improperly influence that party's performance of official duties or responsibilities, contractual obligations, or compliance with applicable laws and regulations.

			A Bidder may be considered to be in conflict of interest with one or more parties in this bidding process if, including but not limited to: have controlling partners/ shareholders in common; or receive or have received any direct or in direct subsidy from any of them; or have the same legal representative for purposes of this Bid; or have a relationship with each other, directly or through common third parties, that puts them in a position to have access to information about or influence on the Bid of another Bidder, or influence the decisions of the Procuring Entity regarding this bidding process; or The Bidder participates in more than one Bid in this bidding process. Participation by a Bidder in more than one Bid will result in the disqualification of all Bids in which the Bidder is involved. However, this does not limit the inclusion of the same subcontractor, not otherwise participating as a Bidder, in more than one Bid; or the Bidder or any of its affiliates participated as a consultant in the preparation of the design or technical specifications of the Works that are the subject of the Bid; or The Bidder or any of its affiliates has been hired (or is proposed to be hired) by the Procuring Entity as Engineer-in-charge/ consultant for the Contract.
		1.3.3	The Bidder shall have to give a declaration regarding compliance of the Code of Integrity prescribed in the Act, the Rules and stated above in this Clause along with its Bid.
		1.3.4	Breach of Code of Integrity by the Bidder: - Without prejudice to the provisions of Chapter IV of the Rajasthan Transparency in Public Procurement Act, in case of any breach of the Code of Integrity by a Bidder or prospective Bidder, as the case may be, the Procuring Entity may take appropriate action in accordance with the provisions of sub-section (3) of section 11 and section 46 of the Act.
	1.4 Eligible Bidders	1.4.1	Bidder should be registered in AA class category in JDA or equivalent in other departments /PSUs.
		1.4.2	JOINT VENTURE: In case the bidder comprises a joint venture or consortium, following requirements shall also be complied with: The JV will have to be formed before submission of the bid and total number of JV partners shall not exceed 2 (Two). They must designate lead partner duly authorized by all the members who will represent the J.V. Of the two partners one with higher stake will be the lead partner. For The lead partner shall be nominated as being partner-in-charge and this authorization shall be evidenced by submitting power of attorney signed by the legally authorized signatories of all the partners. The partner-in- charge (or, the lead partner) shall be

		authorized to incur liabilities and to receive instructions on the behalf of the partners of the Joint Venture, whether jointly or severally, and entire execution of the contract (including payment) shall be carried out exclusively through the partner- in-charge. The share of one of the two partners shall not be less than 26% and rest of the share (minimum 51%) shall be held by other partner (For example if share of one partner is 26% then for other partner it will be 74%.) The JDA will only send communication to the lead partner, which will be deemed to have been sent to all the J.V. partners. Similarly, any negotiation and / or agreement with the lead partner shall be deemed to have been concluded with all the J.V. partners. All the members of J.V. shall be bound by the said communication and all acts/ deeds of the lead member. Any one of the partners alone, should fulfill the Technical Criteria Similarly Any one of the partners alone, should fulfill the Financial Criteria. For rest of the eligibility criteria, qualification of the two partners may be clubbed together. The individual partner of J.V. alone or with other partners cannot participate in the same bid. For calculation of bid capacity, turn over and work liability of all the firms of joint venture shall be considered together. Attested copy of the MoU / Agreement/ Power of attorney entered into by the joint venture / consortium members duly notarized shall be submitted along with the Technical Bid with intended percentage participation nomination of lead member and division of responsibility to clearly define the work of each member etc. All the members of the joint venture/ consortium shall be jointly and severally liable for the execution of the Contract. In the event of default by any member of the joint venture/ consortium in the execution of his part of the contract, the partner-in-charge will have the authority to assign the work to any other party acceptable to the employer to ensure the execution of the part of contract. If initially the bid has purchased and submitted by the any partner or by the JV firm, in case JV bid accepted, the work order will be issued in favour of name of JV and the bidder will submit details of JV bank account to which payment is to be deposited by JDA. The experience certificate will be issued as per percentage of the shareholders defined in JV agreement of the two partners.
	1.4.3	A Bidder/JV constituting the bidder, shall have the nationality of India. A Bidder shall be deemed to have nationality of a country if the Bidder is a citizen or constituted or incorporated, and operates in conformity with the provisions of the Laws of that country. This criterion shall also apply to the

			determination of the nationality of proposed Sub-Contractors or suppliers for any part of the Contract including related services
		1.4.4	A Bidder should not have a conflict of interest in the procurement in question as stated in the RTPP Rule 81 and this Bidding document.
		1.4.5	A Bidder debarred under section 46 of the RTPP Act shall not be eligible to participate in any procurement process undertaken by any Procuring Entity, if debarred by the State Government; and a Procuring Entity, if debarred by such Procuring Entity.
		1.4.6	Bidder should be registered in AA class category in JDA or equivalent in other departments /PSUs.
		1.4.7	(i) Any change in the constitution of the firm, etc., shall be notified forth with by the Bidder in writing to the Procuring Entity and such change shall not relieve any former partner/ member of the firm, etc. from any liability under the Contract. (ii) No new partner/partners shall be accepted in the firm by the Bidder in respect of the contract unless he/they agree to abide by all its terms, conditions and deposit with the Procuring Entity a written agreement to this effect. The Bidder's receipt for acknowledgement or that of any partners subsequently accepted as above shall bind all of them and will be sufficient discharge for any of the purpose of the Contract. (iii) The status of the lead partner/ representative of the Joint Venture, Consortium or Association as a major stake holder shall not change without the consent of the Procuring Entity. New major stake holder must agree to abide by all terms and conditions of the Contract.
		1.4.8	Each Bidder/ JV shall submit only one Bid
		1.4.9	Bidder/JV should be registered under the GST Act and submit the proof of registration before signing the Contract agreement. He is also required to provide proof of Permanent Account Number (PAN) given by Income Tax Department.
2	BID DOCUMENT		
	2.1 Sections of the Bidding Document	2.1.1	The Bidding Document consists of two volumes (volume I & II). Volume I comprises three parts (part I, II, & III) which includes Sections as indicated below, and should be read in conjunction with any Addenda issued in accordance with ITB Clause 2.3 [Amendment of Bidding Document]. (A) Volume-I Part I: Bidding Procedures Section I. Instructions to Bidders (ITB) Section II. Bid Data Sheet (BDS) Section III. Evaluation and Qualification Criteria Part II: Requirements Section IV. Procuring Entity's Requirements.

			Part III: Contract Section V(A) - General Conditions of Contract [GCC] Section V(B). Special Conditions of Contract [SCC] Section V (C). Contract Forms (B) Volume-II : Financial bid
		2.1.2	The Invitation for Bids (NIB) issued by the Procuring Entity is also part of the Bidding Document.
		2.1.3	The Bidding Document shall be uploaded on the e-procurement portal, eproc.raj.nic.in along with the Notice Inviting Bids. The complete Bidding Document shall also be placed on the State Public Procurement Portal, sPPP.raj.nic.in. The prospective Bidders may download the bidding document from these portals. The price of the Bidding Document and processing fee of e-bid shall have to be paid to the Procuring Entity in the amount and manner as specified in NIB and e-procurement portal.
		2.1.4	The Procuring Entity is not responsible for the completeness of the Bidding Document and its addenda, if they were not downloaded correctly from the e-procurement portal or the State Public Procurement Portal
		2.1.5	The Bidder is expected to examine all instructions, forms, terms and specifications in the Bidding Document. Failure to furnish all information or authentic documentation required by the Bidding Document may result in the rejection of the Bid.
	2.2 Clarification of Bidding Document and Pre-Bid Meeting	2.2.1	The Bidder shall be deemed to have carefully examined the conditions, specifications, size, make and drawings, etc. of the Works and Related Services to be provided. If any Bidder has any doubts as to the meaning of any portion of the conditions or of the specifications, drawings etc., it shall, before submitting the Bid, refer the same to the Procuring Entity and get clarifications. A Bidder requiring any clarification of the Bidding Document shall contact the Procuring Entity in writing or e-mail at the Procuring Entity's address indicated in the BDS. The Procuring Entity will respond to all raised queries in pre bid meeting. Minutes of pre bid meeting shall be uploaded on the e-procurement portal, state public procurement portal and shall be sent to all bidders who will participating in pre bid meeting prior to the dead line of submission of bids as specified in ITB Sub-Clause 4.2.1 [Deadline for Submission of Bids]. The pre bid minutes issued by procurement entity shall then become part of the bid document and shall read as addendum to bid document.
		2.2.2	The Bidder or his authorized representative may attend the pre bid meeting on the specified date and time as mentioned in NIB. The purpose of pre bid meeting will be to clarify issues and to answer question on any matter related to this procurement that may be raised. If required, site visit may be arranged by the procuring entity.

		2.2.3	The Bidder is requested, to submit questions in writing, to reach the Procuring Entity not later than one week before the date of Pre-Bid Meeting.
		2.2.4	At any time prior to the deadline for submission of the Bids, the Procuring Entity, suo motto, may also amend the Bidding Document, if required, by issuing an addendum which will form part of the Bidding Document
		2.2.5	Non-attendance at the Pre-Bid Conference will not be a cause for disqualification of a Bidder.
	2.3 Amendment of Bidding Document	2.3.1	Any addendum issued shall be part of the Bidding Document and shall be uploaded on the State Public Procurement Portal and the e-procurement portal.
		2.3.2	To give prospective Bidders reasonable time in which to take an addendum into account in preparing their Bids, the Procuring Entity may, at its discretion, extend the deadline for the submission of the Bids, pursuant to ITB Sub-Clause 4.2 [Deadline for Submission of Bids], under due publication on the State Public Procurement Portal and the e-procurement portal and newspapers.
3	Preparation of Bids		
	3.1 Cost of Bidding	3.1.1	The Bidder shall bear all costs associated with the preparation and submission of its Bid, and the Procuring Entity shall not be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.
		3.1.2	The Bidder shall furnish the scanned attested copies of following documents with its Bid: - i. Partnership Deed and valid registration certificate with the Registrar of Firms in case of Partnership Firms and private entity are also permitted. Power of Attorney in favour of the partner signing/submitting the Bid, authorizing him to represent all partners of the firm. ii. GST registration certificate and Permanent Account Number (PAN) given by the Income Tax Department. iii. Address of residence and office, telephone numbers, e-mail address iv. Certificate of Registration and Memorandum of Association issued by Registrar of Companies in case of a registered company and in case of any other statutory or registered body, certificate of incorporation or registration issued by concerned authorities. Power of attorney in favour of the person signing the Bid. v. Where permitted to bid as Joint Venture, Consortium or Association, letter of formal intent to enter in to an agreement or an existing agreement in the form of a Joint Venture, Consortium or Association.
	3.2 Language of Bid	3.2.1	The Bid, as well as all correspondence and documents relating to the Bid between Bidder and the Procuring Entity, shall be written in English/ Hindi. Supporting documents and printed literature that are part of the Bid may be in another language provided they are accompanied by an accurate

			translation of the relevant passages duly accepted by the Bidder in English/ Hindi in which case, for purposes of interpretation of the Bid, such translation shall govern
	3.3 Documents Comprising the Bid	3.3.1	The bidders shall submit the bid online with all pages numbered serially and by giving index of submissions. Bid should be submitted as follows : (a) Two-envelope (docket) system would be adopted, for PRE-QUALIFICATION, Docket-1 being for Technical Bid and Docket-2 being for Financial Bid. Docket-1:- There will be three separate folders- Folder-1 is for proof of deposition of Bid Security, cost of bidding document and bid processing fee alongwith copy of GST registration, Annexure "B" (RTPP Act/Rules) is mandatory to be fulfilled & signed with seal and copy of enlistment as contractor/ bidder in required category. Folder-II is for bid document and folder-III is for technical bid. (b) The technical bid will be opened only of whose bidders that proper Bid Security, copy of GST registration, proof for deposition of bidding document fee, RISL processing fee, copy of enlistment of contractor in required category and signed Annexure "B" are found to be in order
		3.3.2	The Technical Bid shall contain the following: - Technical Bid Submission Sheet and Technical Bid containing the filled-up Bidding Forms and Declarations related to Technical Bid]; - proof of payment of price of Bidding Document, processing fee, Bid Security, in accordance with ITB Clause 3.10; - written confirmation authorizing the signatory of the Bid to commit the Bidder, in accordance with ITB Clause 3.11; - documentary evidence in accordance with ITB Clause 3.7 establishing the Bidder's eligibility to bid; - documentary evidence in accordance with ITB Clause 3.8 establishing the Bidder's qualifications to perform the contract if its Bid is accepted; - the Notice Inviting Bids; - any other document required in the BDS; and - Others considered necessary to strengthen the Bid submitted.
		3.3.3	The Financial Bid/ Price Proposal shall contain the following: Financial Bid/ Price Proposal Submission Sheet and the applicable Price Schedules, in accordance with ITB Clauses 3.4, 3.5; Any other document required in the Bid documents.

	3.4 Bid Submission Sheets and Price Schedules	3.4.1	The Bidder shall submit the Technical Bid and Financial Bid using the Bid Submission Sheets provided. These forms must be completed without any alterations to their format, and no substitutes shall be accepted. All blank spaces shall be filled in with the information requested.
		3.4.2	The Bidder shall submit as part of the Financial Bid, the Price Schedules for Works, using the forms
	3.5 Bid Prices	3.5.1	Total Price which the Bidder wants to charge for the entire Works with all its contingencies in accordance with drawings and specifications shall be quoted (in figures and words) by the Bidder. The quoted amount shall be specified in the financial bid in order to regulate the amount to be added to or deducted from the fixed sum on account of additions and alterations not covered by the Contract. Payments shall be linked to various stages of completion of the Works specified in Activity Schedule given in Section V C Special Condition of Contract.
		3.5.2	Prices quoted by the Bidder shall be fixed during the Execution of the work and not subject to variation on any account, unless otherwise specified in the BDS. A Bid submitted with an adjustable price quotation shall be treated as non-responsive and shall be rejected, pursuant to ITB Clause 5.7 [Responsiveness of Bids]. However, if in accordance with the BDS, prices quoted by the Bidder shall be subject to adjustment during the performance of the Contract, a Bid submitted with a fixed price quotation shall not be rejected, but the price adjustment shall be treated as zero.
		3.5.3	All duties, taxes and other levies payable by the Bidder under the contract, or for any other cause, shall be included in the rates and prices, and the total Bid Price submitted by the Bidder.
	3.6 Currencies of Bid	3.6.1	The rates quoted by the Bidder shall be in Indian Rupees. All payments shall be made in Indian Rupees only.
	3.7 Documents Establishing the Eligibility of the Bidder	3.7.1	To establish their eligibility in accordance with ITB Clause 1.4 [Eligible Bidders], Bidders shall: complete the eligibility declarations in the Bid Submission Sheet and Declaration Form. If the Bidder is an existing or intended Joint Venture [JV], Consortium or Association in accordance with ITB Sub-Clause 1.4.1, shall submit a copy of the Agreement, or a letter of intent to enter into such Agreement. The respective document shall be signed by all legally authorized signatories of all the

			parties to the existing or intended JV, Consortium or Association as appropriate; and the existing or intended JV shall authorize an individual/ partner in one of the firms as lead partner of the JV to act and commit all the partners of JV for the Bid.
	3.8 Documents Establishing the Qualifications of the Bidder	3.8	To establish its qualifications to perform the Contract, the Bidder shall submit as part of its Technical Proposal the documentary evidence indicated for each qualification criteria specified in Section III, [Evaluation and Qualification Criteria].
	3.9 Period of Validity of Bids	3.9.1	Bids shall remain valid for 120 days after the Bid submission deadline date as specified by the Procuring Entity. A Bid valid for a shorter period shall be rejected by the Procuring Entity as non-responsive
		3.9.2	In exceptional circumstances, prior to the expiration of the Bid validity period, the Procuring Entity may request Bidders to extend the period of validity of their Bids. The request and the responses shall be made in writing. The Bid Security in accordance with ITB Clause 3.10 [Bid Security] shall also be got extended for Ninety days beyond the dead line of the extended validity period. A Bidder may refuse the request without forfeiting its Bid Security or a Bid Securing Declaration. A Bidder granting the request shall not be permitted to modify its Bid.
	3.10 Bid Security	3.10.1	All the eligible bidders should submit Bid Security Deposit as ➤ EMD shall be @2% of estimated procurement cost i.e. Rs. 40.00 Lakhs for the bidder registered in appropriate equivalent class in Other Department or 0.5% of estimated procurement cost i.e. Rs. 10.00 Lakhs for bidder registered in AA class in JDA. ➤ Bid Security deposit can be deposited either online or in the form of Bank Guarantee in favour of Secretary, JDA, Jaipur payable at Jaipur. The bidder will provide details of BG viz No., issue date, expiring date etc on online tendering system of JDA. ➤ A copy of this BG is to be attached with the document during uploading.
		3.10.2	Bid Security of a Bidder lying with the Procuring Entity in respect of other Bids awaiting decision shall not be adjusted towards Bid Security for this Bid. The Bid Security originally deposited may, however

			be taken into consideration in case Bids are re-invited.
		3.10.3	The issuer of the Bid Security and the confirmer, if any, of the Bid Security, as well as the form and terms of the Bid Security, must be acceptable to the Procuring Entity.
		3.10.4	Prior to submitting its Bid, a Bidder may request the Procuring Entity to confirm the acceptability of a proposed issuer of a Bid Security or of a proposed confirmer, if different than as specified in ITB Clause 3.10.3. The Procuring Entity shall respond promptly to such a request.
		3.10.5	The bank guarantee presented as Bid Security shall be got confirmed from the concerned issuing bank. However, the confirmation of the acceptability of a proposed issuer or of any proposed confirmer does not preclude the Procuring Entity from rejecting the Bid Security on the ground that the issuer or the confirmer, as the case may be, has become insolvent or is under liquidation or has otherwise ceased to be creditworthy.
		3.10.6	The Bid Security of unsuccessful Bidders shall be refunded soon after final acceptance of successful Bid and signing of Contract Agreement and submitting Security deposit by successful Bidder pursuant to ITB Clause 6.4 [Security deposit].
		3.10.7	The Bid Security from a Bidder shall be recovered /forfeited in the following cases namely :- (a) When the Bidder withdraws, or modifies his Bid after opening of Bids; or (b) when the Bidder does not execute the agreement in accordance with ITB Clause 6.3 [Signing of Contract] after issue of letter of acceptance/ placement of Work order within the specified time period; or (c) when the Bidder fails to commence the Works as per Work Order within the time specified; or (d) when the Bidder does not deposit the Security deposit in accordance with ITB Clause 6.4 [Security deposit]; in the prescribed time limit after the work order is placed; or (e) if the Bidder breaches any provision of the Code of Integrity prescribed for Bidders in the Act and Chapter VI of the Rules or as specified in ITB Clause 1.3 [Code of Integrity]; or (f) if the Bidder does not accept the correction of its Bid Price pursuant to ITB Sub-Clause 5.5 [Correction of Arithmetical Errors].
		3.10.8	In case of the successful bidder, the amount of Bid Security may be adjusted in arriving at the amount of the Security deposit, or refunded if the successful bidder furnishes the full amount of Security deposit. No interest will be paid by the Procuring Entity on the amount of Bid Security.
		3.10.9	The Procuring Entity shall promptly refund the Bid Security of the Bidders at the earliest of any of the following events, namely: - (a) The expiry of validity of Bid Security; (b) The execution of agreement for

			procurement/O&M and Security deposit is furnished by the successful bidder on part of execution/O&M hence shall be refunded in two parts accordingly. (c) The cancellation of the procurement process; Or The withdrawal of Bid prior to the deadline for presenting Bids, unless the Bidding Document stipulates that no such withdrawal is permitted.
		3.10.10	The Bid Security of a Joint Venture, Consortium or Association must be in the name of the Joint Venture, Consortium or Association that submits the Bid. If the Joint Venture, Consortium or Association has not been legally constituted at the time of Bidding, the members of the proposed consortium or JV shall enter in to an Agreement to form a legally constituted JV after the issue of Letter of Acceptance/Letter of Intent to them and also declare a partner as the lead partner in whose name the Bid Security may be submitted.
	3.11 Format and Signing of Bid	3.11.1	All pages of the Technical and Financial Bid except Form “B” shall be digitally signed by the Bidder or authorized signatory on behalf of the Bidder. This authorization shall consist of a written confirmation and shall be attached to the Bid. In case of a Joint Venture, Consortium or Association, if the Joint Venture, Consortium or Association has not been legally constituted at the time of Bidding, all the members of the proposed Joint Venture, Consortium or Association shall digitally sign the Bid.
4	Submission and Opening of Bids		
	4.1 Sealing and Marking of Bids	4.1.1	Bidders shall submit their Bids to the Procuring Entity electronically only on the e-procurement portal, www.eproc.rajasthan.gov.in . In submission of their Bids, the Bidders should follow the step by step instructions given on the e-procurement portal
		4.1.2	The Bidder shall enclose the Technical Bid and the Financial Bid in separate covers. The proof of payment of price of Bidding Document, processing fee and Bid Security shall be enclosed in third cover. The price of Bidding Document and Bid Security shall be paid in the name of the Procuring Entity and the processing fee shall be paid in the name of RISL.
	4.2 Deadline for Submission of Bids	4.2.1	Bids shall be submitted electronically only up to the time and date specified in the Notice Inviting Bids and BDS or an extension issued thereof.
	4.3 Withdrawal, Substitution and Modification of Bids	4.3.1	A Bidder may withdraw, substitute or modify its Bid after it has been submitted by submitting electronically on the e-procurement portal. A written Withdrawal/ Substitutions/ Modifications etc. Notice on the e- procurement portal, duly digitally signed by the Bidder or his authorized representative, and shall include a copy of the authorization in accordance with ITB Sub- Clause 3.11.1 [Format and Signing of Bid]. The corresponding Withdrawal, Substitution or Modification of the Bid must accompany the respective written Notice. All Notices must be received by the Procuring Entity on

			the e-procurement portal prior to the deadline specified for submission of Bids in accordance with ITB Sub-Clause 4.2. [Deadline for Submission of Bids].
		4.3.2	No Bid shall be withdrawn, substituted or modified in the interval between the deadline for submission of the Bid and the expiration of the period of Bid validity specified in ITB Clause 3.9. [Period of Validity of Bids] or any extension thereof.
	4.4 Bid Opening	4.4.1	The electronic Technical Bids shall be opened by the Bid opening committee constituted by the Procuring Entity at the time, date and place specified in the Bid Data Sheet in the presence of the Bidders or their authorized representatives, who choose to be present.
		4.4.2	The Bidders may choose to witness the electronic Bid opening procedure online.
		4.4.3	The Financial Bids shall be kept unopened until the time of opening of the Financial Bids. The date, time and location of electronic opening of the Financial Bids shall be intimated to the bidders who are found qualified by the Procuring Entity in evaluation of their Technical Bids.
		4.4.4	The Bid opening committee shall prepare a list of the Bidders or their representatives attending the opening of Bids and obtain their signatures on the same. The list shall also contain the representative's name and telephone number and corresponding Bidders' names and addresses. The authority letters brought by the representatives shall be attached to the list. The list shall be signed by all the members of Bids opening committee with date and time of opening of the Bids.
		4.4.5	First, covers marked as "WITHDRAWAL" shall be opened, read out, and recorded and the covers containing the corresponding Technical Bids and Financial Bids shall not be opened. No Bid shall be permitted to be withdrawn unless the corresponding withdrawal notice contains a valid authorization to request the withdrawal and is readout and recorded at Bid opening. If the withdrawal notice is not accompanied by the valid authorization, the withdrawal shall not be permitted and the corresponding Technical Bid shall be opened. Next, covers containing Scanned copy of online payments and registration certificate shall be opened, read out, and recorded. Next, covers marked as "SUBSTITUTION Technical Bid" shall be opened, read out, recorded. The covers containing the Substitution Technical Bids and/ or Substitution Financial Bids shall be exchanged for the corresponding covers being substituted. Only the Substitution Technical Bids shall be opened, read out, and recorded. Substitution Financial Bids will remain unopened in accordance with ITB Sub-Clause 4.4.4. No Bid shall be substituted unless the corresponding substitution notice contains a valid

			authorization to request the substitution and is read out and recorded at Bid opening Covers marked as "MODIFICATION Technical Bid" shall be opened thereafter, read out and recorded with the corresponding Technical Bids. No Technical Bid and/ or Financial Bid shall be modified unless the corresponding modification notice contains a valid authorization to request the modification and is read out and recorded at opening of Technical Bids. Only the Technical Bids, both Original as well as Modification is to be opened, read out, and recorded at the opening. Financial Bids, both Original as well as Modification, will remain unopened in accordance with ITB Sub-Clause 4.4.4.
		4.4.6	All other covers containing the Technical Bids shall be opened one at a time and the following read out the name of the Bidder, whether there is a modification or substitution; whether proof of payment of Bid Security payment of price of the Bidding Document and processing fee have been enclosed Any other details as the Bids opening committee may consider appropriate
		4.4.7	After all the Bids have been opened, their hard copies shall be printed and shall be initialled and dated on the first page and other important papers of each Bid by the members of the Bids opening committee. Only Technical Bids shall be read out and recorded at the bid opening and shall be considered for evaluation. No Bid shall be rejected at the time of opening of Technical Bids except Alternative Bids (if not permitted) and Bids not accompanied with the proof of payment of the required price of Bidding Document, processing fee form "B"and Bid Security.
		4.4.8	The Bids opening committee shall prepare a record of opening of Technical Bids that shall include, as a minimum: the name of the Bidder and whether there is a withdrawal, substitution, modification, or alternative offer (if they were permitted), any conditions put by Bidder and the presence or absence of the price of Bidding Document, processing fee and Bid Security. The Bidders or their representatives, who are present, shall sign the record. The members of the Bids opening committee shall also sign the record with date.
		4.4.9	After completion of the evaluation of the Technical Bids, the Procuring Entity shall invite Bidders who have submitted substantially responsive Technical Bids and who have been determined as being qualified to attend the electronic opening of the Financial Bids. The date, time, and location of the opening of Financial Bids will be intimated in writing by the Procuring Entity. Bidders shall be given reasonable notice of the opening of Financial Bids.
		4.4.10	The Procuring Entity shall notify Bidders in writing whose Technical Bids have been rejected on the grounds of being substantially non-responsive and not qualified in accordance with the requirements of the Bidding Document

		4.4.11	The Bids opening committee shall conduct the electronic opening of Financial Bids of all Bidders who submitted substantially responsive Technical Bids and have qualified in evaluation of Technical Bids, in the presence of Bidders or their representatives who choose to be present at the address, date and time specified by the Procuring Entity.
		4.4.12	All covers containing the Financial Bids shall be opened at the time & date and the following read out and recorded- the name of the Bidder; whether there is a modification or substitution; the Bid Prices; any other details as the Bids opening committee may consider appropriate After all the Bids have been opened, their hard copies shall be printed and shall be initial and dated on the first page of each Bid by the members of the Bids opening committee. All the pages of the Price Schedule and letters, Bill of Quantities attached shall be initialled and dated by the members of the committee. Key information shall be encircled and unfilled spaces in the Bids shall be marked and signed with date by the members of the Bids opening committee.
		4.1.13	The Bids opening committee shall prepare a record of opening of Financial Bids that shall include as a minimum: the name of the Bidder and whether there is a withdrawal, substitution, or modification, the Bid Price, any conditions, any discounts and alternative offers (if they were permitted). The Bidders or their representatives, who are present, shall sign the record. The members of the Bids opening committee shall also sign the record with date.
5.	Evaluation and Comparison of Bids		
	5.1 Confidentiality	5.1.1	Information relating to the examination, evaluation, comparison, and post-qualification of Bids, and recommendation of contract award, shall not be disclosed to Bidders or any other persons not officially concerned with such process until information on Contract award is communicated to all Bidders.
		5.1.2	Any attempt by a Bidder to influence the Procuring Entity in its examination of qualification, evaluation, comparison of the Bids or Contract award decisions may be resulting in the rejection of its Bid, in addition to the legal action which may be taken by the Procuring Entity under the Act and the Rules.
	5.2 Clarification of Technical or Financial Bids	5.2.1	To assist in the examination, evaluation, comparison and qualification of the Technical or Financial Bids, the Bid evaluation committee may, at its discretion, ask any Bidder for a clarification regarding his Bid. The committee's request for clarification and the response of the Bidder shall be in writing.
		5.2.2	Any clarification submitted by a Bidder with regard to His Bid that is not in response to a request by the

			Bid evaluation committee shall not be considered.
		5.2.3	No change in the prices or substance of the Bid shall be sought, offered, or permitted, except to confirm the correction of arithmetical errors discovered by the Bid evaluation committee in the evaluation of the financial Bids.
		5.2.4	No substantive change to qualification information or to a submission, including changes aimed at making an unqualified Bidder, qualified or an unresponsive submission, responsive shall be sought, offered or permitted.
	5.3 Deviations, Reservations and Omissions in Technical or Financial Bids	5.3.1	During the evaluation of Technical or Financial Bids, the following definitions apply: i.) "Deviation" is a departure from the requirements specified in the Bidding Document; ii.) "Reservation" is the setting of limiting conditions or withholding from complete acceptance of the requirements specified in the Bidding Document; and iii.) "Omission" is the failure to submit part or all of the information or documentation required in the Bidding Document.
	5.4 Nonmaterial Non-conformities in Technical or Financial Bids	5.4.1	Provided that a Technical or Financial Bid is substantially responsive, the Procuring Entity may waive any non-conformities (with recorded reasons) in the Bid that do not constitute a material deviation, reservation or omission.
		5.4.2	Provided that a Technical or Financial Bid is substantially responsive, the Procuring Entity may request the Bidder to submit the necessary information or documentation, within a reasonable period of time, to rectify nonmaterial nonconformities or omissions in the Bid related to documentation requirements. Request for information or documentation on such nonconformities shall not be related to any aspect of the Financial Proposal of the Bid. Failure of the Bidder to comply with the request may result in the rejection of its Bid.
	5.5 Correction of Arithmetical Errors in Financial Bid	5.5.1	Provided that a Financial Bid is substantially responsive, the Bid evaluation committee shall correct arithmetical errors during evaluation of Financial Bid on the following basis: i. if there is a discrepancy between the unit price and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price shall be corrected, unless in the opinion of the Procuring Entity there is an obvious misplacement of the decimal point in the unit price, in which case the total price as quoted shall govern and the unit price shall be corrected; ii. if there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected; and iii. if there is a discrepancy between words and figures, the amount in words shall prevail,

			unless the amount expressed in words is related to an arithmetic error, in which case the amount in figures shall prevail subject to (i) and (ii) above.
		5.5.2	If the Bidder that submitted the lowest evaluated Bid does not accept the correction of errors, its Bid shall be disqualified and its Bid Security shall be forfeited or its Bid Securing Declaration shall be executed.
	5.6 Preliminary Examination of Technical or Financial Bids	5.6.1	The Procuring Entity shall examine the Technical or Financial Bids to confirm that all documents and technical documentation requested in ITB Sub-Clause 3.3 [Documents Comprising the Bid] have been provided, and to determine the completeness of each document submitted.
		5.6.2	The Procuring Entity shall confirm, following the opening of the Technical or Financial Bids, that the following documents and information have been provided: i. Bid is signed, as per the requirements listed in the Bidding documents; ii. Bid has been sealed as per instructions provided in the Bidding documents; iii. Bid is valid for the period, specified in the Bidding documents; iv. Bid is accompanied by Bid Security or Bid securing declaration; v. Bid is unconditional and the Bidder has agreed to give the required security deposit; vi. Price Schedules in the Financial Bids are in accordance with ITB Clause 3.4 [Bid Submission Sheets and Price Schedules]; vii. written confirmation of authorization to commit the Bidder; viii. Declaration by the Bidder in compliance of Section 7 and 11 of the Act; and ix. Other conditions, as specified in the Bidding Document are fulfilled.
	5.7 Responsiveness of Technical or Financial Bids	5.7.1	The Procuring Entity's determination of the Responsiveness of a Technical or Financial Bid is to be based on the contents of the Bid itself, as defined in ITB Sub-Clause 3.3 [Documents Comprising the Bid].
		5.7.2	A substantially responsive Technical or Financial Bid is one that meets without material deviation, reservation, or omission to all the terms, conditions, and specifications of the Bidding Document. A material deviation, reservation, or omission is one that: if accepted, would- i. affect in any substantial way the scope, quality, or performance of the Goods and Related Services specified in Section V, Schedule of Supply; or limits in any substantial way, inconsistent with the Bidding Document, the Procuring Entity's rights or the Bidder's obligations under the proposed Contract; or (b) if rectified, would unfairly affect the competitive position of other Bidders presenting substantially responsive Bids.
		5.7.3	The Procuring Entity shall examine the technical

			aspects of the Bid in particular, to confirm that requirements of Section IV, Procuring Entity's Requirements have been met without any material Deviation, reservation, or omission.
		5.7.4	If a Technical or Financial Bid is not substantially responsive to the Bidding Document, it shall be rejected by the Procuring Entity and may not subsequently be made responsive by the Bidder by Correction of the material deviation, reservation, or omissions.
	5.8 Examination of Terms and Conditions of the Technical or Financial Bids	5.8.1	The Procuring Entity shall examine the Bids to confirm that all terms and conditions specified in the GCC and the SCC have been accepted by the Bidder without any material deviation or reservation.
		5.8.3	The Procuring Entity shall evaluate the technical aspects of the Bid submitted in accordance with ITB Clauses 3.3 [Documents Comprising the Bid] and to confirm that all requirements specified in Section IV [Procuring Entity's Requirements] of the Bidding Document and all amendments or changes requested by the Procuring Entity in accordance with ITB clause 2.3 [Amendment of Bidding Document] have been met without any material deviation or reservation.
	5.9 Evaluation of Qualification of Bidders in Technical Bids	5.9.1	The determination of qualification of a Bidder in evaluation of Technical Bids shall be based upon an examination of the documentary evidence of the Bidder's qualifications submitted by the Bidder, pursuant to ITB Clause 3.8 [Documents Establishing the Qualifications of the Bidder] and in accordance with the qualification criteria indicated in Section III [Evaluation and Qualification Criteria]. Factors not included in Section III, shall not be used in the Evaluation of the Bidder's qualification.
	5.10 Evaluation of Financial Bids	5.10.1	The Procuring Entity shall evaluate each Financial Bid, the corresponding Technical Bid of which has been determined to be substantially responsive
		5.10.2	To evaluate a Financial Bid, the Procuring Entity shall only use all the criteria and methodologies defined in this Clause and in Section , Evaluation and Qualification Criteria. No other criteria or methodology shall be permitted.
		5.10.3	To evaluate a Financial Bid, the Procuring Entity shall consider the following: i). the Bid Price quoted in the Financial Bid; ii) price adjustment for correction of arithmetical errors in accordance with ITB Clause 5.5[Correction of Arithmetical Errors]; iii) Adjustment of bid prices due to rectification of nonmaterial nonconformities or omissions in accordance with ITB Sub Clause 5.4.3 [Nonmaterial Nonconformities in Bids], if applicable.
		5.10.14	If the Bid, which results in the lowest evaluated Bid Price, is considered to be seriously unbalanced, or front loaded, in the opinion of the Procuring Entity, the Procuring Entity may require the Bidder to produce detailed rate analysis for any or all items to demonstrate the internal consistency of those rates with the construction methods and schedule

			proposed. If the rate justification is not satisfactory submitted by the bidder, the bid of such bidder may be rejected.
	5.11 Negotiations		
	5.11.1		To the extent possible, no clarifications shall be Conducted after the pre-Bid stage. All clarifications needed to be sought shall be sought in the pre-Bid stage itself.
	5.11.2		Negotiations may be undertaken only with the lowest Bidder when the rates quoted are considered much higher than the prevailing market rates.
	5.11.3		The Competent committee shall have full powers to undertake negotiations. Detailed reasons and results of negotiations shall be recorded in the proceedings.
	5.11.4		The lowest Bidder shall be informed about negotiations in writing either through messenger or by registered letter and e-mail (if available). A minimum time of seven days shall be given for calling negotiations. In case of urgency, the competent committee, after recording reasons, may reduce the time, provided the lowest Bidder has received the intimation and consented to holding of negotiations.
	5.11.5		Negotiations shall not make the original offer made by the Bidder inoperative. The competent committee shall have option to consider the original offer in case the Bidder decides to increase rates originally quoted or imposes any new terms or conditions.
	5.11.6		In case of non-satisfactory achievement of rates from lowest Bidder, the Bid evaluation committee may choose to make a written counter offer to the lowest Bidder and if this is not accepted by him, the committee may decide to reject and re-invite Bids or to make the same counter-offer first to the second lowest Bidder, then to the third lowest Bidder and so on in the order of their initial standing in the bid evaluation and work order be awarded to the Bidder who accepts the counter-offer.
	5.11.7		In case the rates even after the negotiations are considered very high, fresh Bids shall be invited.
	5.12 Procuring Entity's Right to Accept Any Bid, and to Reject Any or All Bids	5.12.1	The Procuring Entity reserves the right to accept or reject any Bid, and to annul the Bidding process and reject all Bids at any time prior to Contract award without assigning any reasons thereof and without there by incurring any liability to the Bidders.
6.	Award of Contract		
	6.1 Procuring Entity's Right to Vary Quantities	6.1.1	If the Procuring Entity does not procure any subject matter of procurement or procures less than the quantity specified in the Bidding Document due to change in circumstances, the Bidder shall not be entitled for any claim or compensation except Otherwise provided in the Bidding Document.
	6.2 Acceptance of the successful Bid and award of contract	6.2.1	The Procuring Entity after considering the recommendations of the Bid Evaluation Committee and the conditions of Bid, if any, financial implications, samples, test reports, etc., shall accept or reject the successful Bid.

		6.2.2	Before award of the Contract, the Procuring Entity shall ensure that the price of successful Bid is reasonable and consistent with the required specifications.
		6.2.3	A Bid shall be treated as successful only after the competent authority has approved the procurement in terms of that Bid.
		6.2.4	The Procuring Entity shall award the contract to the Bidder whose offer is the lowest in accordance with the evaluation criteria.
		6.2.5	Prior to the expiration of the period of validity of Bid, the Procuring Entity shall inform the successful Bidder in writing, by registered post or email, that its Bid has been accepted.
	6.3 Signing of Contract	6.3.1	In the written intimation of acceptance of its Bid sent to the successful Bidder, it shall also be requested to execute an agreement in the format given in the Bidding Document on a non-judicial stamp of requisite value at his cost and deposit the Security deposit or a Security deposit Declaration, if applicable, within a period specified in the BDS. In case the successful bidder is a JV still to be legally constituted, all parties to the JV shall sign the Agreement.
		6.3.2	If the Bidder, whose Bid has been accepted, fails to sign a written procurement contract or fails to furnish the required Security deposit or Security deposit Declaration within the specified time period, the Procuring Entity shall forfeit the Bid Security of the successful bidder / execute the Bid Securing Declaration and take required action against it as per the provisions of the Act and the Rules.
		6.3.3	The Bid Security, if any, of the Bidders whose Bids could not be accepted shall be refunded soon after the contract with the successful Bidder is signed and his Security deposit is obtained. Until a formal contract is executed, LOA shall constitute a binding contract.
	6.4 Security deposit	6.4.1	Security deposit shall be solicited from the successful Bidder except State Govt. Departments and undertakings, corporations, autonomous bodies, registered societies, co-operative societies which are owned or controlled or managed by the State Government and undertakings of Central Government. However, a Security deposit Declaration shall be taken from them.
		6.4.2	(i) The amount of Security deposit shall be Ten percent (10%) of the amount of the Work Order. The currency of Security deposit shall be Indian Rupees.
		6.4.3	Security deposit shall be furnished in one of the following forms as applicable- a). Deposit through eGRAS; or b). Bank Draft or Banker's Cheque of a Scheduled Bank in India in favour of Secretary, JDA, Jaipur; or c). National Savings Certificates and any other script/ instrument under National Savings Schemes for promotion of small savings issued by a Post Office in Rajasthan, if the same can be pledged

			under the relevant rules. They shall be accepted at their surrender value at the time of Bid and formally transferred in the name of the Procuring Entity with the approval of Head Post Master; or d). Bank guarantee in favour of Secretary JDA, Jaipur payable at Jaipur. It shall be got verified from the issuing bank. Other conditions regarding bank guarantee shall be same as specified in ITB Sub-Clause 3.10 [Bid Security]; or e). Fixed Deposit Receipt (FDR) of a Scheduled Bank. It shall be in the name of the Procuring Entity on account of Bidder and discharged by the Bidder in advance. The Procuring Entity shall ensure before accepting the Fixed Deposit Receipt that the Bidder furnishes an undertaking from the bank to make payment/ premature payment of the Fixed Deposit Receipt on demand to the Procuring Entity without requirement of consent of the Bidder concerned. In the event of forfeiture of the Security deposit, the Fixed Deposit shall be forfeited along with interest earned on such Fixed Deposit. f). The successful Bidder at the time of signing of the Contract agreement, may submit option for deduction of Security deposit from each running and final bill @ 10% of the amount of the bill.
		6.4.4	Security deposit furnished in the form of a document mentioned at options (a) to (e) of Sub-Clause 6.4.3 above, shall remain valid for a period of sixty days beyond defect liability period.
		6.4.5	Failure of the successful Bidder to submit the Security deposit in accordance to 6.4.3 above and sign the Contract accordingly shall constitute sufficient grounds for the annulment of the award and forfeiture of the Bid Security. In that event, the Procuring Entity may either cancel the procurement process or if deemed appropriate, award the Contract at the rates of the lowest Bidder, to the next lowest evaluated Bidder whose offer is substantially responsive and is determined by the Procuring Entity to be qualified to perform the Contract satisfactorily.
		6.4.6	Forfeiture of Security deposit: Amount of Security deposit in full or part may be forfeited in the following cases: - when the Bidder does not execute the agreement in accordance with ITB Clause 6.3 [Signing of Contract] within the specified time; after issue of letter of acceptance; or when the Bidder fails to commence the Works as per Work order within the time specified; or when the Bidder fails to complete Contracted Works satisfactorily within the time specified; or when any terms and conditions of the contract is breached; or to adjust any established dues against the Bidder from any other contract with the Procuring Entity; or if the Bidder breaches any provision of the Code of Integrity prescribed for the Bidders specified in the Act, Chapter VI of the Rules and this Bidding Document.

			Notice of reasonable time will be given in case of forfeiture of Security deposit. The decision of the Procuring Entity in this regard shall be final.

SECTION II

INVITE BID

SCHEDULE AND SPECIFICATIONS

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क्रमांक / जविप्रा / अधि.अभि. / 13 / 2023-24 / डी-852

दिनांक: 21.07.2023

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JAIPUR DEVELOPMENT AUTHORITY

{Office Location}

No:- JDA/EE-13/2023-24/D-852

Dated: 21.07.2023

NOTICE INVITING BID

NIB No.: JDA/EE-13/22/2023-24

UBN No.:

Online Bids are invited up-to 06:00 PM of 14/08/2023 for **“Construction of 50 bedded Satellite Hospital at Achrol (Delhi Road), Zone 13, JDA, Jaipur.”** The last date for Applying Bid and making online payment on JDA portal is up-to 06:00 PM of 14/08/2023. The estimated cost of NIB is Rs. 2033.00 Lacs . Details may be seen in the Bidding Document at our office or the State Public Procurement Portal website www.sppp.rajasthan.gov.in, www.eproc.rajasthan.gov.in and www.jda.urban.rajasthan.gov.in/jda

To participate in the bid, bidder must:

- A. Participate in Tender & Deposit Payment on ‘Online Tender Participation’ Portal of JDA at <https://jda.urban.rajasthan.gov.in/jda> or by Single-Sign-On at <http://service.jaipurjda.org>.
- B. Submit e-Bid on ‘e-Procurement Portal’ of GOR at www.eproc.rajasthan.gov.in

Executive Engineer-13

Jaipur Development Authority, Jaipur

OFFICE OF THE JAIPUR DEVELOPMENT AUTHORITY, JAIPUR

NIB No.- : JDA/EE 13/22/2023-24	
Name & Address of the Procuring Entity	➤ Name :Executive Engineer-13, Jaipur Development Authority ➤ Address : Room No. 102 1st floor, Court Building, JDA Campus, Indira Circle, JawaharLal Nehru Marg, Jaipur-302004 (Rajasthan) ➤ Email :mohit.jda@rajasthan.gov.in
Name of work	➤ Construction of 50 bedded Satellite Hospital at Achrol (Delhi Road), Zone 13, JDA, Jaipur
Bid Procedure	➤ EPC Mode, Two Envelope System; open competitive bidding as per e-Bid procedure at http://eproc.rajastha.gov.in
Bid Evaluation Criteria (Selection Method)	➤ L1 (eg. Least Cost based Selection (LCBS)-L1)
Websites for downloading Bidding Document, Corrigendum's, Addendums, etc.	➤ Websites: www.sppp.rajasthan.gov.in , www.eproc.rajasthan.gov.in , www.jda.urban.rajasthan.gov.in
Estimated Procurement Cost	➤ INR 2033.00 (Two Thousand Thirty Three Lacs only)
Website for online Bid application and payment *	➤ Website: www.jda.urban.rajasthan.gov.in ➤ For participating in the Bid, the Bidder has to apply for this Bid and pay the Bidding Document Fee, RISL Processing Fee and Bid Security Deposit, online only. ○ Bidding document fee: Rs. 1000.00 (In words One Thousand only) ○ Requisite Bid Security Deposit. Fees.-2500.00 (In words Two Thousand Five Hundred only) ○ The Bidders are required to submit Bid security, cost of Bidding documents, and Bid processing fees through online payment after registering with JDA on www.jaipurjda.org/e-services/e-tender portal. There should be a gap of 3 working days between the End date for Bid Applying, Online Payment & Bid Submission and Bid Opening date. In the absence of the requisite fee, the bid of the concerned bidder will be considered as non-responsive and shall be liable for rejection
Bid Security Deposit (in favor of Secretary, JDA, Jaipur)	➤ Amount (INR: 2% (Rs.4066000.00/-) For "AA" class contractors registered in the appropriate class with CPWD, Postal, Telegram, Railway, MES, Other State Government/Central Government undertakings/organizations of Estimated Procurement Cost. (The bidder must capable to bid in the bid as per their enlistment) ➤ 0.5 % (Rs. 1016500.00/-) Bidder registered as a contractor in the appropriate class For "AA" in JDA. ➤ In case of Departments of the State Government and undertakings, Corporations, Autonomous bodies, Registered Societies, Cooperative Societies which are owned or controlled or managed by the State Government and Government undertakings of the Central Government shall submit a bid securing declaration in lieu of bid security. ➤ If a joint Venture is allowed in the Bid then 2% (Rs40.00 Lakh/-) shall be deposited by bidders (Joint Venture firm)

Start/ End Date for Bid Applying Bid and making Online Payment on JDA portal*	➤ Start Date: 24/07/2023 at 09:30 AM onwards ➤ End Date: 14/08/2023 at 06:00 PM ➤ In case EMD in form BG Original Bank Guarantee is to be submitted in Room No No 215N Extension Building, Jaipur Development Authority, JLN Marg, Jaipur by 16.08.2023 from 9.30 AM to 18.08.2023 up to 3.30 PM (within three working days from the last date of submission of bid.)
Bid Submission on e-Procurement Portal of GOR**	➤ Start Date: 24/07/2023 at 09:30 AM onwards ➤ End Date: 14/08/2023 at 06:00 PM
Date/Time/Place of pre-Bid	➤ 01.08.2023
Date/ Time/ Place of Technical Bid Opening	➤ 21/08/2023 03:30 PM ➤
Date/ Time/ Place of Financial Bid Opening	➤ Will be intimated later to the Technically qualified bidders
Bid Validity	➤ 120 days from the bid submission deadline
Time Period	➤ 12 Month
A&F/Job No.	➤ 430/2022-23

Procedure for bidding:

1. **Two-part bid system:**

Two part (Two-envelope) (2 docket) system would be adopted, Docket-1 being for Technical Bid and Docket-2 being for Financial Bid.

Docket-1:- There will be three separate folders- Folder-1 is for proof of deposition of Bid Security, cost of bidding document and bid processing fee alongwith copy of GST registration, signed Annexure "B" and copy of enlistment as contractor/ bidder in required category. Folder-II is for bid document and folder-III is for technical bid.

Docket-2:- There will two separate folders-1 is for financial bid and 2 is for bill of quantities.

The technical bid will be opened only for bidders whose proper Bid Security, copy of GST registration, proof for deposition of bidding document fee, RISL processing fee, copy of enlistment of contractor in the required category and signed Annexure "B" are found to be in order. Bid Security will be accepted only in the form of online deposition or in the form of Bank Guarantee

SCHEDULE AND SPECIFICATIONS

SCHEDULE – A: INFORMATION USEFUL FOR THE CONTRACTORS:

The bidder should see the site and fully understand the conditions of the site before bidding and include all leads, lift etc for the material in his item rate/percentage to be quoted on the rates given in Schedule 'G'. The work shall be carried out in accordance with the Rajasthan PWD detailed specification and to the entire satisfaction of the Engineer – In – Charge of the work.

SCHEDULE – B: LIST OF THE DRAWING TO BE SUPPLIED BY THE DEPARTMENT

The drawing may be seen in the office of the undersigned.

SCHEDULE – C: LIST OF THE DRAWING TO BE SUPPLIED BY THE CONTRACTOR:

- (a) **The successful bidder has to submit at least three conceptual plans for the project before the JDA committee and the committee reserves the right for approval of plan.**
- (b) **The successful bidder has to submit the planning and working drawings of approved plan and finally to be vetted from MNIT or IIT at his own cost. The structural designs should be prepared using latest software's. The same will need approval by JDA before execution.**
- (c) **The successful bidder must note that all activities related to project must be completed within 12 months of stipulated period.**

SCHEDULE - D: TEST OF THE MATERIALS:

The test of the materials and workmanship shall be conducted by the JDA staff as necessary. The result of such tests should confirm to the standards laid down in the Indian standard & or the standards laid down in the detailed specifications of the work by the contractor. Qualified personnel required as per the contractor enlistment rules shall have to be engaged at site by the Contractor. The authority reserves the right to engage such staff and recover the expenses from the contractor on such account in case of his failure to do so.

SCHEDULE – E: SAMPLES OF THE MATERIALS:

The sample of the materials to be used by the contractor shall be deposited 15 days in advance with the Engineer In charge and be got approved by him before use.

SCHEDULE - F: TIME OF COMPLETION:

The work should start within 10 days of the issue of the work order and complete within time limits.

SCHEDULE – G: EPC METHOD

SCHEDULE – H: SPECIAL CONDITION: Attached Separately.

SCHEDULE – I: COST OF TENDER DOCUMENTS, PROCESSING FEES & BID SECURITY.

The Bid Processing fee is payable in favor of M.D. RISL & Cost of bid document & Bid Security is payable in Favour of the Secretary, JDA, Jaipur. Bidders have to pay bid processing fees, cost of bidding documents, and Bid Security Online. **If a bidder opts to deposit the bid security through bank guarantee, the bank guarantee should be valid for the next seven months after the bid opening date. A copy of the such bank guarantee will be required to be attached with the bid submission documents uploaded on the E-procurement portal of GOR. The bank guarantee will be physically handed over upto prescribed time to Nodal officer of the on-line tendering system of JDA i.e. D.D(E&B) in room No. 215N Extension building, JDA, JLN marg, Jaipur, as per specified in bidding documents,**

Annexure-1. Special Conditions of Contract regarding defect liability period.

Annexure-2A. Bank guarantee will be in specified Performa enclosed with this bidding document for Bid Security.

Annexure-2B. Bank guarantee will be in specified Performa enclosed with this bidding document for Performance Security.

Annexure-A. Compliance with the code of integrity and no conflict of interest (RTPP Act/Rules).

Annexure-B. Declaration by the bidder regarding qualifications (RTPP Act/Rules).

Annexure-C. Grievance Redressal during the procurement process (RTPP Act/Rules).

Annexure-D. Additional Conditions of Contract (RTPP Act/Rules).

Annexure-E. Process for Tender Participation & Depositing Payment on 'Online Tender _Participation' Portal of JDA & Bid Submission on 'e-Procurement Portal' of Government of Rajasthan.

**EXECUTIVE ENGINEER -13
JDA, Jaipur**

SPECIAL CONDITIONS

SCHEDULE 'H'

01. If there is any typographical error or otherwise in the 'G' Schedule, the rates given in the relevant BSR on which Schedule 'G' has been prepared, shall prevail.
02. The bidder shall follow the provisions of the builder labour regulation and abolition Act, 1970 & Rule, 1971.
03. The JDA shall have the right to cause an audit for technical examination of the work and the final bills of the bidder including all supporting vouchers, abstracts etc. to be made within two years after payment of the final bills and if as a result of such audit, any amount is found to have been overpaid / excess in respect of any work done by the bidder under the contract or any work claimed by him to have been done under this contract and found not to have been executed, the bidder shall be liable to refund such amount and it shall be lawful for the JDA to recover the such sum from him in the manner prescribed in special condition no. 8 or any other manner legally permissible and if it is found that the bidder was paid less than that was due to him under the contract in respect of work executed by him under it, the amount of such underpayment shall be paid by the JDA to the bidder.
4. Wherever any claim against the bidder for the payment of a sum of money arises out of under the contracts, the JDA shall be entitled to recover the sum by appropriating in part or whole of the performance security of the bidder, In the event of the security being insufficient or if no security has been taken from the bidder then the balance of the total sum recoverable as the case may be deducted from any sum then due or which at any time their contract with the JDA should this sum be sufficient to recover the full amount recoverable. The bidder shall pay to JDA on demand the balance remaining due. The JDA shall further have the right to affect such recoveries under P.D.R. Act.
5. The rate quoted by the bidder shall remain valid for a period of 120 days from the date of opening of the bids.
6. By submission of the Bid the bidder agrees to abide by all printed conditions provided in the PWD manual from 64 (Chapter 3-para 36) and subsequent modification.
7. No conditions are to be added by the bidder and the conditional Bid is liable to be rejected.
8. If any bidder withdraws his Bid prior to the expiry of said validity period given at S. No. 5 or mutually extended prior or makes modifications in the rate, terms and conditions of the Bid within the said period which are not acceptable to the authority or fails to commence the work in the specified period, fails to execute the agreement the authority shall without prejudice to any, other right or remedy, be at liberty to forfeit the amount of bid security given in any form absolutely. If any bidder, who has submitted a Bid does not execute the agreement or start the work or does not complete the work and the work has to be put to rebidding he will stand debarred for six months from participating of Bidding in JDA in addition to forfeiture of bid security/ Performance Security and other action under agreement
9. Any material not conforming to the specifications collected at the site have to be removed by the bidder within a period of 3 days of the instruction, issued by the Engineer -In charge in writing failing which, such material shall be removed by the Engineer-In charge at risk and cost of the bidder after the expiry of 3 days period.
10. The material collected at the site and paid provisionally shall remain under the watch and ward of the bidder till it is consumed fully on the work.
11. The rates provided in the Bidding documents are inclusive of all Taxes and royalties otherwise specified.
12. No extra lead of earth/material shall be paid over and above as specified in 'G' Schedule, Source/ borrow pit area for the earth shall have to be arranged by the Bidder at his own cost.
13. Undersigned has full right to reject any or all Bids without giving any reasons.
14. As per the Supreme Court decision "All contracts with Governments shall require registration of workers under the building and other construction workers (Regulation of Employment and Conditions of Service) Act, 1996 and extension of benefits to such workers under the etc."
15. Special Conditions of the Contract regarding the Defect Liability Period (DLP) for works costing Rs. 25.00 lacs and more shall be applicable (Annexure-I).
16. The Bidder is required to submit a copy of their enlistment as a contractor.

17. Conditions of RPWA-100 will be mandatory & acceptable to the bidder.
18. The bidder will have to install display boards at the site of work as directed by Engineer in charge.
19. All the provisions of THE RAJASTHAN TRANSPARENCY IN PUBLIC PROCUREMENT ACT, 2012 and Rules, 2013 and amendments issued from time to time by the Finance Department, GOR shall be applicable. If there are any contradictions in existing special conditions and provisions of THE RAJASTHAN TRANSPARENCY IN PUBLIC PROCUREMENT ACT, 2012 and Rules 2013 provisions of THE RAJASTHAN TRANSPARENCY IN PUBLIC PROCUREMENT ACT, 2012 and Rules 2013 shall prevail.
20. In case the rate received in the bid is below than BSR rate, additional Performance security shall be deposited by the bidder as per Rule 75 (A) of RTPP Rules.
21. The Annexure "B" (RTPP Act/Rules) is mandatory to be fulfilled & signed with seal by the bidder failing which the bid shall summarily be rejected without asking for any clarification.
22. Contractors enlisted in JDA, should be get reviewed periodically. The registered bidder who has not been reviewed within a period of 5 years 3 months, shall not be allowed to participate in the bid. Contractors enlisted in other departments shall be as per the provision of PWF&AR

Executive Engineer -13
JDA, Jaipur

SPECIAL CONDITIONS OF CONTRACT REGARDING DEFECT LIABILITY PERIOD (DLP) FOR WORKS COSTING**RS. 25.00LACS AND MORE****Table-1**

S.No.	Type of work	DLP Period
1.	Bridge Work	5 Years
2.	CD Work	5 Years
3.	CC Road. PQC Work	5 Years
4.	CC tiles/Krebs/medians	5 Years
5.	Drains	3 Years
6.	Roads	
	(i)Two-layer WBM/GSB	6 months or one full rainy season whichever is later
	(ii)For Renewal/Strengthening	
	(a)BT up to 30 mm thickness	1 Years
	(b)BT above 30 mm to up to 40 mm	2 Years
	(c)BT above 40 mm to up to 90 mm	3 Years
	(d)BT above 90 mm thickness	5 Years
	(iii) New Roads	
	(a) BT up to 90 mm	3 Years
	(b) BT more than 90 mm	5 Years
7.	Compound wall	3 Years
8.	Building Work	
	(i) Work pertaining to Sanitary work electrical works, Joinery works and painting work.	2 Years
	(ii) Work pertaining to the Building structure and other civil works	5 Years
9.	Electric work except for maintenance	3 years
10.	Sewer/Water supply including STP and water supply-related work except for maintenance works.	3 Years

1. ROAD-WORKS

- 1.1 The Defect Liability Period (DLP) for all Road works excluding patch repair work shall be as per the above table. Road works executed by the Contracting agency shall be maintained by them at their own cost for completion (DLP) from the actual date of completion of work as per the clause in the Contract Agreement and Special Condition of the Contract.
- 1.2 No extra payment shall be made to the contracting agency on account of maintenance of Road works and removal of defect during the Defect Liability Period.
- 1.3 The word "Road Works" means all new Road Works construction, widening, strengthening, up-gradation and renewal works
- 1.4 The word "Maintenance of Road Works during Defect Liability Period" means
 - (i) Routine maintenance of Road Works,
 - (ii) To remove the defect as & when appear in part and the entire structure of Road Works, in the specified time and keeping the Road Surface with good riding quality and
 - (iii) Damages due to improper drainage/drains, local flooding, depressions on roads etc.
- 1.5 The contracting agency shall do the routine maintenance of Road works, including pavement, road side and cross drains including surface drains to the required standards and keep the entire road surface and structure in Defect free conditions during the entire period of routine maintenance, which begins at the completion of the construction work and ends after complete (DLP).
- 1.6 The routine maintenance shall consist of the routine maintenance operation defined in the manual for the maintenance of roads of MoRTH and shall be carried out accordingly.
- 1.7 The routine maintenance activities and their periodicity.

S.No.	Name of Item/Activity	Frequency of operations in one year
1	Restoration of rain cuts and dressing of berms.	Once in a year, generally after rains.

2	Making up of shoulders.	As and when required.
3	Maintenance of Bituminous surface road and/or gravel road/WBM road including filling pot holes and patch repairs etc.	As and when required.
4	Insurance of proper functioning of drains including civil maintenance and desalting of drains. (If constructed by the same Road agency or not)	As and when required.
5	Maintenance of road signs. (If installed by the same Road agency)	Maintenance as and when required. Repainting once in every one and a half years.
6	Road Marking, Kerb Stone / Dand. (If done by the same Road agency)	Thermoplastic Paint Maintenance as and when required. Repainting once in everyone & a half year. Ordinary Paint Maintenance as and when required. Repainting thrice in every year.
7	Damages beyond the control of the agency.	Road cuts made by various agencies for utility, duly permitted by JDA / JNN will have to be repaired by the agency on the same rates of the contract agreement till DLP.

2. General

2.1 Inspection of works during the Defect Liability Period

2.1.1 The contracting agency shall undertake a joint detailed inspection along with Engineer-in-charge/A.En., at least once in three months in case of all Road works. The Engineer-in-charge can reduce this frequency in case of an emergency. The Contracting agency shall forward to the engineer in-charge the record of inspection and rectification immediately after the joint inspection. The Contracting agency shall pay particulars attention to those road sections, which are likely to be damaged during rainy season.

2.1.2 One register has to be maintained by every AEN for recording the inspection details of works in his jurisdiction under defect liability period.

2.2 Conditions regarding Performance Security

2.2.1 Security for DLP-

The contracting agency shall have to furnish Performance Security in the form of Bank Guarantee valid from the actual date of completion, which shall be assigned by the Engineer-in-charge.

2.2.2 The release of PS amount shall be as per following table 2 :-

S.No.	DLP Period	1 Year	2 Years	3 Years	5 Years
1.	After 1 year	100%	40%	20%	10%
2.	After 2 year		60%	20%	10%
3.	After 3 year			60%	10%
4.	After 4 year				20%
5.	After 5 year				50%

The Performance Security will be released as per the above table after a satisfactory performance certificate issued by Engineer-In-Charge:-

2.2.3 Forfeiture of Performance Security

In case the contracting agency fails to rectify the defects within the stipulated period notified to him by the Engineer-in-charge concerned under the contract agreement, the Engineer-in-charge shall serve a final notice for 5 days time reckoned from the date of issue of notice to rectify the defects. In case the contracting agency not responding to the notice and fails in the rectification of defects the Engineer-in-charge will get the defect removed at the risk and cost of the contracting agency. Action such as encashment of Bank Guarantee and action under enlistment rules etc. shall also be taken against the contracting agency by the competent authority.

1.2.4 Force Majeure

The defect that arises due to earthquakes, cyclones, and natural calamities shall not be the responsibility of contracting agency.

2.2.5 Various conditions for managing DLP are as under :-

- (i) At the time of completion of work, final component shall be worked out for each individual item like BT/CC/tiles/ drains etc. (as per different categories in Table-I), DLP shall be operative based upon type of individual item ex:- CC-5 years, BT-1/2/3/5 years, Drain-3 years etc.

- (ii) If any work, amount is less than Rs. 25 lacs but later on due to extra/excess work, if amount of final work crosses more than Rs. 25 lacs, DLP shall be operative as per rule for each individual item.
- (iii) Similarly, if any work is more than Rs. 25 lacs but after finalization amount of work is less than Rs. 25 lacs, DLP should be operative for six months or rainy season whichever is later.
- (iv) During DLP period if contractor fails to repair any work even after the issue of 7 days written notice, the same work shall be got executed by the respective Executive Engineer at the contractor's risk and cost. This process shall be applicable throughout the DLP period. After completion of DLP period in such works contractor should be debarred and blacklisted, from JDA for three years as per RTPP rule 2012 and 2013 where his defaults twice in a single agreement or in two different works.
- (v) Quarterly Inspection as per rules shall be carried out and DLP registers shall be maintained by respective Executive Engineers to monitor the DLP repairs.
- (vi) Special and regular inspection shall also be carried out as per order no. JDA/XEN & TA to DE-I/2014-15/D-223 dated 12.03.2015 and order no. SE (PMGSY) CIRCULAR 2006/D-115 dated 04.05.2006 Point no. 3.
- (vii) In case JDA feels to take up work on any existing DLP road due to any reason, the following procedure should be adopted:
- (a) At the time of withdrawal total liability of repairs as per DLP conditions to be carried out and the contractor shall be asked to complete the same. After completion of assessed repairs, DLP period shall be released after deduction amt. as per following table-III.

Table-3

% Recovery on withdrawal of DLP of work order	1 Year	2 Year	3 Year	4 Year	5 Year
DLP period					
1 Year	1.12	-	-	-	-
2 Year	2.55	1.43	-	-	-
3 Year	4.38	3.26	1.83	-	-
5 Year	9	7.88	6.45	4.62	2.47

Note:- Calculation is to be done on a quarterly basis.

- (b) In case the Contractor fails to carry out these repairs, same shall be carried out at his risk and cost. If the total amt. of such repairs works out to be more than the total retained amount of PS same shall be recovered from other works and as per PDR rules. The amount as per Table 3 is also to be deducted in addition to this amount.
- (viii) Based upon the type of work, DLP conditions for works to be carried out during the DLP period with their frequency of the respective type of work shall be prepared by respective SE's after approval of these periods.
3. In case patch repairs/civil maintenance works costing more than Rs. 25.00 Lakhs, defect liability period will as per clause 37(C) of Contract Agreement.

Executive Engineer ()
JDA, Jaipur

Specified Bank Guarantee Performa for Bid Security

Section - 6

Form of (Bank Guarantee) -En cashable at the branch of the bank in Jaipur City.

To
Secretary,
Jaipur Development Authority,
Jaipur

Sub:

Bank Guarantee No. _____ dated _____ for [amount of Security in figures] [in words] on behalf of _____ [Name of the Bidder] against Bid Security for the.....JDA

Jaipur WHEREAS, _____ [name of Bidder with address] (**hereinafter called "the Bidder"**) has submitted his Bid dated for the work of(here in after called " the Bid ").

KNOW ALL PEOPLE by these presents that we _____ (Name of Bank) of having our registered office at _____[name of country] having our registered office at _____ (hereinafter called "the Bank") are bound unto Secretary, Jaipur Development Authority. (Hereinafter called "the Employer") in the sum of Rupees _____ **[Amount of Security in figures]** _____ (in words) only for which payment will and truly to be made to the said Employer, the Bank binds itself, its successors, and assigns by these presents.

That on demand of JDA , this Bank Guarantee is cashable at the following branch in Jaipur City.

1. Name of Bank:

2. Name of the branch with branch code:

3. Address:

4. E-Mail Id:

5. Telephone No.

6. Fax No.:

SEALED with the Common Seal of the said Bank this _____ day of _____ of 20____.

THE CONDITIONS of this obligation are:

- (1) if the Bidder withdraws his Bid during the period of Bid validity specified in the Form of Bid;
- (2) if the Bidder refuses to accept the correction of errors in his bid;

- (3) If the Bidder, having been notified of the acceptance of his Bid by the Employer during the period of Bid validity;
 - (a) fails or refuses to execute the Form of Agreement in accordance with the Instructions to Bidders, or

(b) fails or refuses to furnish the Performance Security, in accordance with the Instructions to Bidders;

We undertake to pay to the Employer up to the above amount upon receipt of his first written demand, without the Employer having to substantiate his demand, provided that in his demand the Employer will note that the amount claimed by him is due to him owing to the occurrence of one or more of the above conditions, specifying the occurred condition or conditions.

This Guarantee will remain in force up to and including the date 30 days after the date of expiration of the Bid Validity, as stated in the Instructions to Bidders, or any such extension thereto as may be agreed by the Bidder, a notice of which extension(s) to the Bank is hereby waived. Any demand in respect of this Guarantee should reach the Bank no later than the above date.

The amount covered under the above Bank Guarantee shall be automatically credited in the accounts of JDA in ICICI Bank, JDA Campus, Jaipur through **ISFC code No ICICI 006754. Bank Account No. 675401700518** on the date of expiry or its validity, unless the agencies get it re-validated well before its expiry date or produce NOC from JDA in writing for its release.

Date _____ Signature of the Bank _____

Witness _____ Seal _____
[Signature, Name, and Address]

[Note: To be furnished on appropriate non-judicial stamps & should be valid for the next 7 months from the bid opening date]

Specified Bank Guarantee Performa for Performance Security**Section - 6**

Form of (Bank Guarantee) -En cashable at the branch of the bank in Jaipur City.

To

Secretary, Jaipur Development Authority, Jaipur

Sub:.....

Bank Guarantee No. _____ dated _____ for [amount of Security in figures] [in words] on behalf of _____ [Name of the Bidder] against Performance Security for the.....**JDA Jaipur**
 WHEREAS, _____ [name of Bidder with address] (**hereinafter called "the Bidder"**) has submitted his Bid dated for the work of(herein after called " the Bid ").

KNOW ALL PEOPLE by these presents that we _____

_____ (Name of Bank) of having our registered office at _____[name of country] having our registered office at _____ (hereinafter called "the Bank") are bound unto Secretary, Jaipur Development Authority. (Hereinafter called "the Employer") in the sum of Rupees _____ [**Amount of Security in figures**] _____ (in words) only for which payment will and truly to be made to the said Employer, the Bank binds itself, its successors, and assigns by these presents.

That on demand of JDA, this Bank Guarantee is cashable at the following branch in Jaipur City.

1. Name of Bank:
2. Name of the branch with branch code:
3. Address:
4. E-Mail Id:
5. Telephone No.
6. Fax No.:

SEALED with the Common Seal of the said Bank this _____ day of _____ of 20 ____.

We undertake to pay to the Employer up to the above amount upon receipt of his first written demand within valid period of this guarantee.

This Guarantee will remain in force up to and including the date 30 days after the date of expiration of the Bid Validity, as stated in the Instructions to Bidders, or any such extension thereto as may be agreed by the Bidder, a notice of which extension(s) to the Bank is hereby waived. Any demand in respect of this Guarantee should reach the Bank no later than the above date.

The amount covered under the above Bank Guarantee shall be automatically credited to the accounts of JDA in ICICI Bank, JDA Campus, Jaipur through **ISFC code No ICICI 006754. Bank Account No. 675401700518** on the date of expiry or its validity, unless the agencies get it re-validated well before its expiry date or produce NOC from JDA in writing for its release.

Date _____ Signature of the Bank _____

Witness _____ Seal _____

[Signature, Name and Address]

[Note: To be furnished on appropriate non-judicial stamps.]

Annexure A
(RTPP Act/Rules)

Compliance with the Code of Integrity and No Conflict of Interest

Any person participating in a procurement process shall-

- (a) Not offer any bribe, reward or gift or any material benefit either directly or indirectly in exchange for an unfair advantage in the procurement process or to otherwise influence the procurement process;
- (b) Not misrepresent or omit that misleads or attempts to mislead so as to obtain a financial or other benefit or avoid an obligation;
- (c) Not indulge in any collusion, Bid-rigging or anti-competitive behavior to impair the transparency, fairness and progress of the procurement process;
- (d) Not misuse any information shared between the procuring entity and the bidders with an intent to gain an unfair advantage in the procurement process;
- (e) Not indulge in any coercion including impairing or harming or threatening to do the same, directly or indirectly, to any party or to its property to influence the procurement process;
- (f) Not obstruct any investigation or audit of a procurement process;
- (g) Disclose conflict of interest, if any; and
- (h) Disclose any previous transgressions with any entity in India or any other country during the last three years or any debarment by any other procuring entity.

Conflict of interest:

The Bidder participating in a bidding process must not have a Conflict of Interest.

A Conflict of interest is considered to be a situation in which a party has interests that could improperly influence that party's performance of official duties or responsibilities, contractual obligations, or compliance with applicable laws and regulations.

A bidder may be considered to be in conflict of interest with one or more parties in the bidding process if, including but not limited to:

- (a) Have controlling partners/shareholders in common; or
- (b) Receive or have received any direct or indirect subsidy from any of them; or
- (c) Have the same legal representative for purposes of the bid; or
- (d) have a relationship with each other, directly or through common third parties, that puts them in a position to have access to information about or influence on the bid of another bidder, or influence the decisions of the procuring Entity regarding the bidding process; or
- (e) The bidder participates in more than one bid in a bidding process. Participation by a bidder in more than one bid will result in the disqualification of all bids in which the bidder is involved. However, this does not limit the inclusion of the same subcontractor, not otherwise participating as a bidder, in more than one bid; or
- (f) the bidder or any of its affiliates participated as a consultant in the preparation of the design or technical specifications of the goods, works or services that are the subject of the Bid; or
- (g) Bidder or any of its affiliates has been hired (or proposed to be hired) by the procuring entity as engineer-in-charge/consultant for the contract.

Declaration by the Bidder regarding Qualifications

Declaration by the Bidder

In relation to my/our Bid submitted to for procurement of in response to their Notice inviting Bids No.....Dated.....I/we hereby declare under Section 7 of Rajasthan Transparency in Public Procurement Act, 2012 that:

1. I/we possess the necessary professional, technical, financial and managerial resources and competence required by the Bidding Document issued by the Procuring Entry;
2. I/we have fulfilled my/our obligation to pay such of the taxes payable to the union and the state government or any local authority as specified in the Bidding Document.
3. I/we are not insolvent, in receivership, bankrupt or being wound up, not have my/our affairs administered by a court or a judicial officer, not have my/our business activities suspended and not the subject of legal proceedings for any of the foregoing reasons;
4. I/we do not have, and our directors and officers not have, been convicted of any criminal offense related to my/our professional conduct or the making of false statements or misrepresentations as to my/our qualifications to enter into a procurement contract within a period of three years preceding the commencement of this procurement process, or not have been otherwise disqualified pursuant to debarment proceedings;
5. I/we do not have a conflict of interest as specified in the Act, Rules and the Bidding Document, which materially affects fair competition;

Date:

Signature of the bidder

Place:

Name:

Designation:

Address:

Note:- Annexure "B" is mandatory to be fulfilled & signed with seal by the bidder failing which the bid shall summarily be rejected without asking any clarification.

Grievance Redressal during Procurement Process

The designation and address of the First Appellate Authority :

For works costing up to Rs. 300.00Lakhs - Jaipur Development Commissioner, JDA, Jaipur.

For works costing above Rs. 300.00Lakhs - Executive Committee, JDA, Jaipur.

The designation and address of the Second Appellate Authority:

For works costing up to Rs. 300.00Lakhs - Executive Committee, JDA, Jaipur.

For works costing above Rs. 300.00Lakhs - Principle Secretary/ACS, Urban Development
& Housing Department, GOR, Jaipur.

(1) Filing an appeal: -

if any bidder or prospective bidder is aggrieved that any decision, action or omission of the procuring entity is in contravention to the provisions of the Act or the rules or the guidelines issued there under, he may file an appeal to First Appellate authority, as specified in the Bidding document within a period of ten days from the date of such decision or action, omission, as the case may be, clearly giving the specific ground or grounds on which, he feels aggrieved:

Provided that after the declaration of a bidder as successful the appeal may be filed only by a bidder who has participated in procurement proceedings:

Provided further that in case a procuring entity evaluates the technical bids before the opening of the financial bids, an appeal related to the matter of financial bids may be filed only by a bidder whose technical bid is found to be acceptable.

(2) The officer to whom an appeal is filed under Para (1) shall deal with the appeal as expeditiously as possible and shall Endeavour to dispose it of within thirty days from the date of the appeal.

(3) If the officer designated under Para (1) fails to dispose of the appeal filed within the period specified in Para (2), or if the bidder or prospective bidder or the procuring entity is aggrieved by the order passed by the first appellate authority, the bidder or prospective bidder or the procuring entity, as the case may be, may file a second appeal to the second appellate authority specified in the bidding document in this behalf within fifteen days from the expiry of the period specified in Para (2) or of the date of receipt of the order passed by the first appellate authority, as the case may be.

(4) Appeals not to lie in certain cases: -

No appeal shall lie against any decision of the procuring entity relating to the following matters, namely: -

- (a) Determination of the need of procurement
- (b) Provisions limiting the participation of bidders in the bid process
- (c) The decision of whether or not to enter into negotiations
- (d) Cancellation of a procurement process
- (e) Applicability of the provisions of confidentiality

(5) Form of Appeals: -

- (a) An appeal under Para (1) or (3) above shall be in the annexed form along with as many copies as there are respondents in the appeal.
- (b) Every appeal shall be accompanied by an order appealed against, if any, Affidavit verifying the facts stated in the appeal and proof of payment of fee,

(c) Every appeal may be presented to the first appellate authority or second

The appellate authority, as the case may be, in person or through registered post or authorized representative.

(6) Fee for filing Appeal: -

- (a) Fee for the first appeal shall be rupees two thousand five hundred and for the second appeal shall be rupees ten thousand, which shall be non-refundable.
- (b) The fee shall be paid in the form of a bank demand draft or banker's cheque of a scheduled bank in India payable in the name of the appellate authority concerned.

(7) Procedure for disposal of Appeal: -

- (a) The first appellate authority or second appellate authority as the case may be, upon the filing of the appeal, shall issue notice accompanied by a copy of the appeal, affidavit and documents, if any, to the respondents and fix a date of hearing
- (b) On the date fixed for hearing, the first appellate authority or the second appellate authority, as the case may be shall-
 - (i) Hear all the parties appeal presenting before him; and
 - (ii) Peruse or inspect documents, relevant records or copies thereof relating to the matter.
- (c) After hearing the parties, perusal or inspection of documents and relevant records or copies thereof relating to the matter, the appellate authority concerned shall pass an order in writing and provide a copy of the order to the parties to appeal free of cost.
- (d) The order passed under sub-clause (c) above shall also be placed on the state public procurement portal.

Additional Conditions of Contract

1. Correction of arithmetical errors

Provided that a financial bid is substantially responsive, the procuring entity will correct arithmetical errors during the evaluation of financial Bids on the following basis:

- (i) if there is a discrepancy between the unit price and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price shall be corrected unless in the opinion of the procuring entity, there is an obvious misplacement of the decimal point in the unit price, in which case the total price as quoted shall govern and the unit price shall be corrected;
- (ii) if there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected; and
- (iii) if there is a discrepancy between words and figures, the amount in words shall prevail, unless the amount expressed in words is related to an arithmetic error, in which case the amount in figures shall prevail subject to (i) and (ii) above.

If the Bidder that submitted the lowest evaluated bid does not accept the correction of errors, its bid shall be disqualified and its bid security shall be forfeited or its bid securing declaration shall be executed.

2. Procuring Entity's Right to Vary quantities.

- (i) At the time of award of the contract, the quantity of goods, works or services originally specified in the bidding documents may be increased or decreased, by a specified percentage, but such increase or decrease shall not exceed fifty percent, of the quantity specified in the bidding documents. It shall be without any change in the unit prices or other terms and conditions of the bid and the conditions of the contract.
- (ii) If the Procuring entity does not procure any subject matter of procurement or procures less than the quantity specified in the bidding document due to change circumstances, the bidder shall not be entitled to any claim or compensation except otherwise provided in the conditions of the contract.
- (iii) In case of procurement of goods or services, additional quantity may be procured by placing a repeat order on the rates and conditions of the original order. However, the additional quantity shall not be more than 25% of the value of goods of the original contract and shall be within one month from the date of expiry of the last supply. If the supplier fails to do so, the procuring entity shall be free to arrange for the balance supply by limited bidding or otherwise and the extra cost incurred shall be recovered from the supplier.

3. Dividing quantities among more than one bidder at the time of award (In case of procurement of Goods):-

As a general rule, all the quantities of the subject matter of procurement shall be procured from the Bidder, whose Bid is accepted. However, when it is considered that the quantity of the subject matter of procurement to be procured is very large and it may not be in the capacity of the Bidder, whose Bid is accepted, to deliver the entire quantity or when it is considered that the subject matter of procurement to be procured is of critical and vital nature, then in such cases, the quantity may be divided between the Bidder, whose Bid is accepted and the second lowest Bidder or even more Bidder in that order, in a fair, transparent and equitable manner at the rates of the Bidder, whose Bid is accepted.

Process for Tender Participation & Depositing Payment on ‘Online Tender Participation’ Portal of JDA & Bid Submission on ‘e-Procurement Portal’ of Government of Rajasthan: -

A*Process for Tender Participation & Depositing Payment on ‘Online Tender Participation’ Portal of JDA

1-Participate in tender

- Bidder can access ‘Online Tender Participation’ Portal of JDA at <https://jda.urban.rajasthan.gov.in/jda> or by Single-Sign-On at <http://service.jaipurjda.org>.
- Create user Login with a valid mobile number to register yourself for various Online Services of JDA.
- Select ‘Proceed as Citizen’ and then ‘Proceed for Subscription’ for ‘Tender Online Payment’. The prevailing plan for getting registered for tendering process of JDA is Rs. 500.00 with a validity period of 3 Years (renewable).
- After successful payment, re-login and upload required documents for KYC (Know Your Client) compliance as per the type of entity viz. Individuals/ Company/ Partnership Firms/ Trusts & foundations. Besides, Bank Passbook / Cancelled Cheque consisting of Bank Account, IFSC Code is mandatory to be uploaded, to refund the bid security of unsuccessful bidder.
- After receiving the payment successfully and approving KYC documents the bidder will be authenticated by JDA for taking part in Tender.

2-Deposit Tender Fee, RISL processing fee and Bid Security (EMD)

- Option-1:** Payment Gateway (Aggregator)
The facility to make payment through Debit Card, Credit Card, Net banking etc., will be available. User can use this facility from anywhere any time till the closing date & time of bid participation.
- Option-2:** Electronic Fund Transfer (EFT: NEFT/RTGS)
If the bidder selects payment mode as EFT (NEFT/RTGS), “Paying Slip for EFT (NEFT/RTGS)” will be generated by the system for the complete amount. The payment can be made from any Bank any Branch using this Paying Slip through NEFT/RTGS (Claim against payment made through EFT in any other JDA bank account will not be acceptable and bidder stands disqualified from participation in the bid applied for). After successful transaction through NEFT/RTGS, as per the standard procedures it may take 4 to 24 hours in process of confirmation of EFT through Auto-Process depending on the time of EFT done. Therefore, option to make payment through EFT (NEFT/RTGS) will be available till 48 hours prior to closing date of bid participation.

3-Deposit Bid Security (EMD)

The Bid Security (EMD) can be submitted through Bank Guarantee (BG). Bidder may opt Bank Guarantee (BG) against Bid Security (EMD), for which bidder requires to prepare BG before applying in the tender. The detail of BG requires to be fed on ‘Online Tender Participation’ Portal of JDA before paying balance amount (Tender Fee + RISL Processing Fee). This balance amount will be paid through Payment Gateway only, option to make balance payment through EFT (RTGS/NEFT) will not be available.

4-Obtain Bid Participation Receipt

After confirming payment, the bidder will get Bid Participation Receipt based on which user will get the payment details along with other details for bidding on e-Procurement portal of GOR.

- In case of BG as the remaining payment will be done through Payment Gateway, on successful transaction the ‘Bid Participation Receipt’ will be generated on real time basis.
- In case complete payment is done through Payment Gateway, on successful transaction the ‘Bid Participation Receipt’ will be generated on real time basis.
- In case complete payment is done through EFT (NEFT/RTGS), on confirmation of payment from ICICI Bank (Auto Process) ‘Bid Participation Receipt’ will be available on Login of Bidder on JDA portal.

B-**Bid Submission on ‘e-Procurement Portal’ of Government of Rajasthan

- Online e-Bid can be submitted after registration at e-Procurement Portal of Government of Rajasthan

- 2- It is mandatory to upload Bid Participation Receipt with the bid submission.
- 3- Details of online payment available on Tender Participation Portal of JDA have to be filled in 'offline payment' section of e-Procurement portal.

Note

- 1- Bidder (authorized signatory) shall submit their offer on-line in electronic formats both for technical and financial proposal.
- 2- In case, any of the bidders fails to pay the Tender Fee, BSD, and RISL Processing Fee, online (subject to confirmation), its Bid shall not be accepted.
- 3- To participate in online bidding process, Bidders must procure a Digital Signature Certificate (Type III) as per Information Technology Act-2000 using which they can digitally sign their electronic bids. Bidders can procure the same from any CCA approved certifying agency, i.e., TCS, Safecrypt, nCode etc. Bidders who already have a valid Digital Signature Certificate (DSC) need not procure a new DSC. Also, bidders must register on <http://eproc.rajasthan.gov.in> (bidders already registered on <http://eproc.rajasthan.gov.in> before 30-09-2011 must register again).
- 4- JDA will not be responsible for delay in online submission due to any reason. For this, bidders are requested to upload the complete bid well advance in time so as to avoid 11th hour issues like slow speed; choking of web site due to heavy load or any other unforeseen problems.
- 5- Bidders are also advised to refer "Bidders Manual Kit" available at eProc website for further details about the e-Tendering process.
- 6- Training for the bidders on the usage of e-Tendering System (eProcurement) is also being arranged by DoIT&C, GoR on a regular basis. Bidders interested in training may contact e-Procurement Cell, DoIT&C for booking the training slot.

Contact No: 0141-4022688 (Help desk 10 am to 6 pm on all working days) e-mail: eproc@rajasthan.gov.in

Address: e-Procurement Cell, JDA, Yojana Bhawan, Tilak Marg, C-Scheme, Jaipur

- 7- The procuring entity reserves the complete right to cancel the bid process and reject any or all of the Bids.
- 8- No contractual obligation whatsoever shall arise from the bidding document/ bidding process unless and until a formal contract is signed and executed between the procuring entity and the successful bidder.
- 9- Procurement entity disclaims any factual/ or other errors in the bidding document (the onus is purely on the individual bidders to verify such information) and the information provided therein are intended only to help the bidders to prepare a logical bid-proposal.
- 10- The provisions of RTPPA Act 2012 and Rules thereto shall be applicable for this procurement. Furthermore, in case of any inconsistency in any of the provisions of this bidding document with the RTPPA Act 2012 and Rules thereto, the later shall prevail.

Jaipur Development Authority, Jaipur. Bid Participation Receipt	
	Date & Time:-
Bid Detail	
Bid ID:	Procurement Entity:-
Bid Title:	
Bid Value:	Bid Opening Place:
Bidder Detail	
Name of Entity:	Mobile No.:
Registration Type:	Instrument Amount:
Payment Mode:	Payment Channel:
Instrument No.:	Instrument Date:

Dates Detail		
Sr. No.	Event Name	Event Date
1	Publishing Date	
2	Bid Opening Date	

Specific Instrument for eProc Rajasthan			
Instrument Type			
Instrument Number	Head Name	Amount	Date
	Tender Fee		
	RISL Processing Fee		
	Bid Security Deposit		
Issuer Detail: Jaipur Development Authority		Challan Number:	

More details about Registration Process, Terms and Conditions and FAQ along with contact detail is available on JDA website www.jda.urban.rajasthan.gov.in.

Section III

Evaluation and Qualification Criteria (EQC)

JAIPUR DEVELOPMENT AUTHORITY, JAIPUR

SPECIAL CONDITION OF THE CONTRACT FOR **Pre-Qualification** OF CONTRACTORS

Name of work Construction of 50 bedded Satellite Hospital at Achrol (Delhi Road), Zone 13, JDA, Jaipur

Special conditions of contract of PRE-QUALIFICATION as detailed here under, shall be applicable in addition to all other terms and conditions already prescribed under standard agreement forms/rules and regulations to contract:

1. Procedure:

Procedure for PRE-QUALIFICATION would be as follow:

- (b) Two-envelope (docket) system would be adopted, for PRE-QUALIFICATION, Docket-1 being for Technical Bid and Docket-2 being for Financial Bid.

Docket-1:- There will be three separate folders- **Folder-1** is for proof of deposition of Bid Security, cost of bidding document and bid processing fee alongwith copy of GST registration, Annexure "B" (RTPP Act/Rules) is mandatory to be fulfilled & signed with seal and copy of enlistment as contractor/ bidder in required category. Folder-II is for bid document and folder-III is for technical bid.

Docket-2:- There will two separate folders-1 is for financial bid and 2 is for bill of quantities.

- (c) The technical bid will be opened only of whose bidders that proper Bid Security, copy of GST registration, proof for deposition of bidding document fee, RISL processing fee, copy of enlistment of contractor in required category and signed Annexure "B" are found to be in order. The bid Security will be accepted only in from of online deposition or in form of Bank Guarantee
- (d) The Technical Bid envelope would be opened on the date.....at.....pm in the chamber of Superintending Engineer.....
- (e) The Financial Bid envelope would be opened only of those bidders who fulfill all the PRE-QUALIFICATION CRITERIA.

2. Criteria:

Criteria for PRE-QUALIFICATION would be as follows:-

- 2(a)** The bidder should have completed/ executed "Similar work" in the last 7 financial years (including the current year, if opted by the bidder) as under:

One work costing not less than Rs. 10.00 crore;

or

Two works each costing not less than Rs. 7.00 crore;

or

Three works each costing not less than Rs. 5.00 crore

"Similar work" shall mean —Construction of a buildings like Hospitals/premium residential buildings/hotels/guest houses/buildings related to hospitality with RCC framed structure or Composite framed structure of atleast 3 storey with water supply, sanitary works , Internal/external electrification work, HVAC work, Fire Fighting and Interior& furnishing work in single agreement.

RCC framed structure/Composite frames structures should consist of Columns, beams & slabs of RCC or Structural Steel/Prestress concrete. The bidder shall submit abstract of cost of completed similar work(s) along with supporting documents and certificate issued by the experience issuing authority in support of this.

Note:-1

1. Mumty and machine room shall not be reckoned in storey.
2. Each basement, stilt/Mezzanine constructed in the building shall be considered as a storey.
3. The value of executed work shall be brought to current costing level by enhancing the actual value of work at simple rate of 10% per annum, calculated from the date of completion to previous day of last date of submission of bid.

Note:-2

- (i) The bidder should enclose work orders, completion/ executed certificates of completed/ executed works.
- (ii) In case of JV, the works of both the partners may be considered in case of more than one similar nature works are to be considered.
- (iii) The starting & completion date of the work is to be in between above said financial year. If not, then maximum work (70%) is to be completed in the above said financial year.
- (iv) If a bidder has submitted a certificate having different components/ nature of work then a proper completion certificate of required similar nature work & experience is to be enclosed.
- (v) Certificate issued by Govt. of India, State Govts., Union Territory, Govt. Undertakings, Autonomous Bodies, private entities or trusts registered under companies act or other relevant acts shall only be considered.

2(b) The bidder should have a minimum 5 years of experience with design and/ or execution of building with Interior and architectural finishing work projects.

2(c) The bidder should have achieved an annual financial turnover of at least 60% of the Estimated Cost of the work bid cost in any one of last seven financial years (including current year, if opted by the bidder).

Note:-

- (i) The bidder should enclose certificate of Turn Over from Chartered Accountant for last Seven financial year & audited balance sheet of the year which is considered by the bidder in criteria 2(c).
- (ii) If current year or last year has been opted by bidder whose balance sheet is not submitted till the submission of bid then certificate from Chartered Accountant should be enclosed.

2(d) The bidder should give self declaration to deploy the machinery and equipment as specified in Schedule-III for the execution of this work.

2(e) Bid Capacity: Bidders who meet the minimum qualification criteria will be qualified only if available bid capacity is equal to or more than the total Bid Value.
The available bid capacity will be calculated as under:

Bid capacity= (AxNx3-B)

Where A= Maximum value of civil engineering work executed in any one year during the last Seven financial years (updated to preset Price level) taking in to account the completed as well as works in progress. However, the bidder may opt current year in the seven year assessment period (Annexure-IV).

N= Number of year prescribed for completion of the work of which bids are invited. In present case value of N shall be-1

B= Value, at present price level of existing commitments and ongoing works to be executed during "N" period (period prescribed for completion of the works for which the bids are invited)

Note:-

- (i) **Certificate from Chartered Accountant should be enclosed by bidder clearly indicated maximum value of Engineering Work in one Financial Year.**
- (ii) The present price level for turn over and cost of completed work for the previous year's value shall be increased @ 10% every year, Arithmetically.

2(f) Bidders Net Worth: Minimum Net worth of bidder should be Rs. 10.00 crores (Rs Ten crores) in any of the last 7 financial year .. The supporting document in the form of CA certificate and Audited balance sheet shall be submitted by the bidders for establishing their net worth.

2(g) The bidder should have a minimum 5 years of experience with design and/ or execution of building with Interior and architectural finishing work projects. In case of JV or consortium, the experience of either partner shall be considered. Both completed and ongoing projects shall be considered provided the bidder furnishes work orders and/ or completion certificates in support and verification of the information

2(h) The bidder should have completed the construction work with interiors and all services and amenities of at least one Resort / Hotel project with three star amenities in last ten years.

Note:-

- (i) The bidder should enclose completion certificate and photographs of completed/ executed works.

2(i) **Litigation History:-** Bidder should provide an accurate information on any litigation or arbitration resulting from contracts completed or under execution by him over the last Seven years. The maximum value (updated at the present price level) of disputed amount claimed in the litigation/arbitration resulting from contracts executed in last five years shall be deducted from the calculated Bid Capacity of the bidder. The details shall be furnished in Schedule VI.

2(j) The bidder should propose a panel of expert(s) as under:

- a) Project Head with a recognized degree in B Tech (Civil) or equivalent from a reputed institute and at least Ten (10) years of total professional experience
- b) Two Nos. Civil Engg with experience of minimum 03 years;
- c) Electrical Engineer with experience of minimum 03 years.
- d) Safety Engg. With relevant qualification and with experience of minimum 03 years.

The bidder should enclose duly attested CVs of the above experts.

Specialized Agencies: The tenderer must associate himself with agencies of the appropriate eligibility for each of specialized nature of items / work listed below individually. Such works shall be got executed only through associated agencies specialized in these fields. The tenderer whose tender is accepted shall indicate the name(s) of his associated specialized agencies those fulfilling the eligibility criteria laid down below after award of work and at least 30 days before commencement of such items / work but within 90 days of award of work whichever is earlier for the approval of the JDA of that component, whose decision shall be final and binding. If the tenderer, having valid electrical license if applicable for E.I. works, himself fulfills the eligibility criteria laid down below for associated specialized agencies, then the tenderer shall not require to associate with himself the associated specialized agency.

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

any kind, shall be entertained from the Contractor on account of delay attributable to the selection/rejection of the Specialized Agencies.

2(I) Scope of work : The qualified bidder has to prepare and submit conceptual drawing with minimum facilities as under (The design and amenities should be of minimum 3 star category):

Construction of 50 bedded Satellite Hospital, (G+2) complete with detailed designs and drawings ,structural works, civil works and finishing works, MEP works, Interior works, and other development works with following minimum requirements:-

A) Ground Floor:-

1. Reception
2. Registration Desk
3. Waiting Lounge on each floor
4. Common Toilets on each floor
5. Housekeeping Room on each floor
6. Passenger/Stretcher Lifts -2 nos (13 passenger capacity each)
7. Service Lift- 1 Nos
8. Guard Hut
9. Waste Collection Room
10. Oxygen generation Plant required for 50 bedded hospital
11. Electric Sub Station
12. Land escaping and parking place development within the premises

B) First Floor & Second Floor

1. Common passages
2. Service counter on each floor
3. Common Toilets
4. Service counters on each floor
5. Waiting Lounge on each floor
6. Fire Staircase

Note:-

- (I) The present price level for turnover, cost of completed work & disputed amount of similar nature, the previous years value shall be given weightage of 10% per years as follows:-

	Financial Year	Factors
(a)	For current year	1.00
(b)	For First last financial year	1.00
(c)	For second last financial year	1.10
(d)	For third last financial year	1.21
(e)	For fourth last financial year	1.33
(f)	For Fifth last financial year	1.46
(g)	For sixth last financial year	1.60
(h)	For seventh last financial year	1.76
(i)		

3. The bidder should furnish the following documents along with the technical bid;
- (a) Information regarding financial resources and capability in Schedule-I.
 - (b) Information regarding works executed in the last seven years in Schedules-II.
 - (c) Certificates from the concerned Engineer-In-Charge in support and verification of the information furnished in Schedule-II.
 - (d) Self declaration regarding machinery and equipment required for deployment, as detailed in Schedule-III.
 - (e) Information regarding details of maximum value of civil engineering works executed in any one year during the last seven years taking into account the completed as well as works in progress in schedule-IV.
 - (f) Information regarding existing commitments and ongoing works to be completed in schedule-V.
 - (g) Information regarding details of litigation or arbitration contracts to be furnished in schedule-VI.
 - (h) Calculation of Bid capacity in schedule-VII.
 - (i) Self declaration as per Annexure I.
 - (j) Details regarding evaluation criteria in schedule-VIII.

Note:- These schedules are mandatory to fill by the bidder, failing which the information be treated as NIL.

4. Important:

- (a) The bidder must ensure that all the information required in the Document is furnished by him completed in all respects. He would not be allowed to withdraw any document, or to rectify any information furnished therein, after submitting the bid.
- (b) The bidder should give self-declaration that the information furnished in schedule I to VIII is correct. If any information is found incorrect, the offer of the bidder shall be rejected and action be taken as per rules.
- (c) Bidders must do paging of all enclosure of bid documents.

5. Rejection of bids:

The department reserves the rights to reject any bid or to disqualify any or all the bidders, without assigning any reasons at any stage.

- (I) If bid is not accompanied with the requisite documents mentioned in clauses 3(a) to 3(i) or is not in accordance with procedure specified in para 1, or is not accompanied with bid security, copy of GST registration, proof for deposition of bidding document fee, RISL processing fee, Annexure "B" (RTPP Act/Rules) is mandatory to be fulfilled & signed with seal by the bidder and registration of contractor in required category it would be liable for rejection.
- (II) Furnish of incorrect or concealment of any information required in the bid documents would render the bid liable for rejection.
- (III) The bidder shall prepare bid in the digital/ electronic mode for uploading on e-procurement portal in the format/type of file specified in evaluation qualification criteria" all the documents uploaded should be digitally signed with DSC of authorized signatory, deemed as all the pages of the uploaded documents are signed."
- (IV) The self-declaration and annexure "B" enclosed by the bidder regarding qualifications of RTPP Act, 2012 and Rules, 2013 along with bid documents, should be signed by the participating bidders before uploading bid documents otherwise the bid will be rejected as per officer order No. 194 dated 06.09.2022.

In case of joint venture

In case the bidder comprises a joint venture or consortium, following requirements shall also be complied with:

- a. In case the bidder comprises a joint venture or consortium, following requirements shall also be complied with: The JV will have to be formed before submission of the bid and total number of JV partners shall not exceed 2 (Two). They must designate lead partner duly authorized by all the members who will represent the J.V. Of the two partners one with higher stake will be the lead partner. For The lead partner shall be nominated as being partner-in-charge and this authorization shall be evidenced by submitting power of attorney signed by the legally authorized signatories of all the partners.
- b. The partner-in- charge (or, the lead partner) shall be authorized to incur liabilities and to receive instructions on the behalf of the partners of the Joint Venture, whether jointly or severally, and entire execution of the contract (including payment) shall be carried out exclusively through the partner- in- charge.
- c. The share of one of the two partners shall not be less than 26% and rest of the share (minimum 51%) shall be held by other partner (For example if share of one partner is 26% then for other partner it will be 74%.) The JDA will only send communication to the lead partner, which will be deemed to have been sent to all the J.V. partners. Similarly, any negotiation and / or agreement with the lead partner shall be deemed to have been concluded with all the J.V. partners. All the members of J.V. shall be bound by the said communication and all acts/ deeds of the lead member.
- d. Any one of the partners alone, should fulfill the Technical Criteria Similarly Any one of the partners alone, should fulfill the Financial Criteria. For rest of the eligibility criteria, qualification of the two partners may be clubbed together.
- e. The individual partner of J.V. alone or with other partners cannot participate in the same bid.
- f. Bid capacity is to be calculated by clubbing turn over and all work in hand of both the firms of joint venture.
- g. Attested copy of the MoU / Agreement/ Power of attorney entered into by the joint venture / consortium members duly notarized shall be submitted along with the Technical Bid with intended percentage participation nomination of lead member and division of responsibility to clearly define the work of each member etc.
- h. All the members of the joint venture/ consortium shall be jointly and severally liable for the execution of the Contract.
- i. In the event of default by any member of the joint venture/ consortium in the execution of his part of the contract, the partner-in-charge will have the authority to assign the work to any other party acceptable to the employer to ensure the execution of the part of contract.
- j. If initially the bid has purchased and submitted by the any partner or by the JV firm, in case JV bid accepted, the work order will be issued in favour of name of JV and the bidder will submit details of JV bank account to which payment is to be deposited by JDA.
- k. The experience certificate will be issued as per percentage of the shareholders defined in JV agreement of the two partners.

**EXECUTIVE ENGINEER ZONE-13
JAIPUR DEVELOPMENT AUTHORITY
JAIPUR**

SCHEDULE-I
FINANCIAL RESOURCES AND CAPABILITY
(Reference clause 3(a))

1. Name of Bidder:-
2. Total financial turnover achieved by the bidder in the last seven financial years;

S.No.	Year	Turnover
(i)		
(ii)		
(iii)		
(iv)		
(v)		
(vi)		
(vii)		

Note: Balance Sheets and Profit & Loss Accounts is to be enclosed by the bidder which is considered by him as per criteria 2(a).

3. Total financial Turnover projected in the current financial year.
4. Has the bidder ever been debarred from tendering for Central Government/State Government/any Government undertaking?
Yes/No, If yes, give details.
5. Has bidder ever been declared insolvent?
Yes/No, If yes, give details.
6. Name(s) and Address of Branch/(s) for bidder's Bankers.

I/We hereby certify that the above information is correct to the best of my/our knowledge and belief.
Date:

SCHEDULE-II
(Reference clause 3(b)& 3(c))
DETAILS OF QUANTITIES OF WORKS EXECUTED DURING LAST FIVE FINANCIAL YEARS

S. No.	Name of Works (with agreement No. & Date)	Client	Place (district/state)	Financial Year	Principal Items of workAs per 2(a)

Note:- Certificates from concerned Engineers-in-charge should be enclosed in support and verification of the above statement.

Date:

SCHEDULE-III
(Reference clause 3(d))

Self Declaration

I/We.....Proprietor/Partner/ Authorized signatory of
M/s.....under take the oath that I/We will deploy the machinery and
equipment listed below as and when required in the execution of this work.

S. No.	Name of Machinery	Minimum Requirement	Availability	
			Owned	Leased
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				

I/We hereby certify that the above information is correct to the best of my/our knowledge and belief.

Signature of Bidder

Note:- This self-declaration is mandatory to be signed by the bidder failing which the bid shall summarily be rejected without asking any clarification.

SCHEDULE-IV
(Reference clause 3(e))

DETAILS OF MAXIMUM VALUE OF CIVIL WORKS EXECUTED IN ANY ONE YEAR DURING LAST FIVE YEARS.

FINANCIAL YEAR IN LAST FIVE YEARS	COST OF WORK EXECUTED IN FINANCIAL YEAR

SCHEDULE-V
(Reference clause 3(f))

DETAILS OF EXISTING COMMITMENTS & ON GOING WOERKS TO BE COMPLETED

S. No.	Name of Works (with agreement No. & Date)	Client	Cost of work as per Work Order	Stipulated date of commencement	Stipulated date of completion	Value of balance work on date of tender	Likely date of completion of balance work

SCHEDULE-VI
(Reference clause 3(g))

DETAILS OF LITIGATION OR ARBITRATION CONTRACTS

S. No.	Name of Works (with agreement No. & Date)	Client	Work Order	Disputed Amount claimed in Litigation/ Arbitration	Date of Raising Disputed Amount	Actual Award Amount, if the case is Decided	Cause of Litigation & matter in Dispute

SCHEDULE-VII
(Reference clause 3(h))

BID CAPACITY

1.	A= Maximum value of civil Engineering works Executed in any one year during the last Seven Years (Updated to present price level)	Lacs	Certified details enclosed at Page No.....
2.	N= Number of years prescribed for completion of the work for which bids are invited	1	
3.	B= Value, at present price level of existing Commitments and ongoing works to be Completed during the next N Period.	Lacs	Certified details enclosed at Page No.....

Bid Capacity= A x N x 3-B

= Lacs

Details Regarding Evaluation Criteria

Name of work :-

S. No.	Item	Minimum Requirement (As per Bid)	Remark			
				Year	Qty.	Page No.
1	Copy of GST Reg. Certificate					

2	Copy of Registration certificate					
3	1. Proof of Bid Security deposition 2. Proof of bidding document cost deposition 3. Proof of RISL fees deposition.					
4	The bidder should have completed/ executed "Similar work" in the last 5 financial years (including the current year, if opted by the bidder) as under: One work costing not less than Rs. 10.00 crore; or Two works each costing not less than Rs. 7.00 crore; or Three works each costing not less than Rs. 5.00 crore					
5	The bidder should have completed at least one work of construction of independent like Hospitals/premium residential buildings/hotels/guest houses/buildings related to hospitality with Interior & furnishing work in last Seven financial years.					
6	The bidder should have achieved an annual financial turnover of at least 60% of the Estimated Cost of the work bid cost in any one of last seven financial years (including current year, if opted by the bidder)					
7	Bidders Net Worth: Minimum Net worth of bidder should be Rs. 10.00 crores (Rs Ten crores) in any of the last Seven financial year. The supporting document in the form of CA certificate and Audited balance sheet shall be submitted by the bidders for establishing their net worth.					
8	The bidder should have a minimum 5 years of experience with design and/ or execution of building with Interior and architectural finishing work projects. In case of JV or consortium, the experience of either partner shall be considered. Both completed and ongoing projects shall be considered provided the bidder furnishes work orders and/ or completion certificates in support and verification of the information.					
9	The bidder should have completed the construction work with interiors and all services and amenities of at least one Resort / Hotel project with three star amenities in last ten years.					
7	The bidder should give declaration to deploy the machinery and equipment as specified in schedule-III, for the execution of this work. Duly Self attested.					
8	Bid Capacity (A x N x 3 - B) Here A is Maximum value of civil engineering work executed in any one of last 7 financial years. N is number of Years Prescribed for completion of the work. B is value at present price level of existing commitments and ongoing.					
9	Declaration in support of information furnished by bidder in Annexure-I					
10	Schedule-VI (Details of Litigation).					
11	Signed Annexure "B" (RTPP Act/Rules)					

Note:- This sheet must be prepared and submitted by the bidders.



Self Declaration

I/We.....Proprietor/Partner/Authorized signatory of
M/s.....under take the oath that the information furnished by me/us in
schedule I to VIII of the assessment Bid
for.....is correct to
the best of my/our knowledge. If any information id found to be incorrect JDA has right to reject the Bid
and to take action against me/us as per rules.

.....
Proprietor/Partner/Authorized signatory
M/s.....
.....

Note:- This Self Declaration is mandatory to be signed by the bidder failing which the bid shall summarily be rejected without asking any clarification.

SECTION-IV

PROCURING ENTITY'S REQUIREMENTS

BRIEF PARTICULARS AND SCOPE OF THE WORK

Construction of 50 bedded Satellite Hospital at Achrol (Delhi Road), Zone 13, JDA, Jaipur

1. The project site is located approx. 40 km from Jaipur Railway Station and approx. 42 km from Jaipur Airport, at Jaipur-Delhi Highway, Achrol, Jaipur.
2. The work is to be executed on Engineering, Procurement and Construction (EPC) Mode basis. In EPC Mode, the architectural and engineering design and drawings for the work, Procurements and construction including interior and furnishing shall be done by EPC contractor. Necessary approvals will be given by department.
3. **The total plot area is about 10000.00 Sqm.**
Contractor shall be required to do all civil, electrical, horticulture works, all external development works in plot area
i.e. C/O Internal roads and lanes, footpaths, parking areas, Anti termite Treatment, Main gates including its gate building structure, boundary wall of campus, common areas, water supply lines, sewers lines, storm drains, U.G water tanks and various Pump rooms with pumps, STP, Parks and landscape gardens, street lighting, High masts and other lighting, power back up and their all equipment's, firefighting lines and system, cable trenches and cable laying in trenches and underground conduits/ducts including feeder pillars & related items, D.G sets, Internal EI with wiring, CCTV, water channel bund, horticulture development and all other civil, MEP, Horticulture related incidental development works, open parking,

landscaping ,terrace floor ,Retaining wall construction, interior and furnishing works as per tender drawings andalso detailed working drawings, if any as per requirement of work, issued

byJDA during execution of work and also as per detail ed items and specifications elaborated in this bid document.

4. The scope of Construction 50 bedded Satellite Hospital, Jaipur (G+2) with complete with civil, development, MEP and furnishing works under this contract shall also include,

Detailed design and drawings for project w.r.t architectural, civil, structural works, also MEP works i.e. Internal EI with wiring, fan-fittings, lift, HVAC, Fire fighting and Alarm, CCTV, EPABX, Data and LAN, UPS, Solar PV power generation, plumbing, sanitary and all other Civil and Electrical services in the building, landscaping works, all finishing details, etc. as per tender drawings and also detailed working drawings, if any as per requirement of work, approved by JDA during execution of work and also as per detailed specifications elaborated in this bid document shall

be required to be prepared by contractor, get them approved from department, execute and complete the work in all respects and hand over to Engineer-in-charge.

Note: All the excess earth is to be disposed off at contractor's cost with all lead and lift.

5. Relevant IS codes, National Building Code 2016, and other standards specifications shall be followed in general except otherwise mentioned in

biddocument.

- I. The detailed Design Basis Report (DBR), Technical Specifications, conceptual drawings and conditions for each function like Civil, Electrical, Plumbing, Fire, STP, External Development, Landscape, Street lighting, Lift, furnishing etc. are elaborated in this tender document.
 - II. The Design Basis Reports are the minimum standards that the construction agency has to fully comply with. If there is any change or departure from DBR/s, the same shall be got approved from JDA.
6. The tender is for the Ground+ 1 Floors 50 bedded Satellite Hospital **(structure will be designed for + 4 Floors)** as per requirements along with outer development, interior and other relevant service.
 7. The brief scope of work is as follows:
 - (i) Architectural, Structural designing, and construction of the buildings as mentioned and as per built up area given below:

Sl. No.	Description	Approximate Built-up Area (to be constructed as per details given in this Tender document)
1.	50 bedded Satellite Hospital (Ground floor, & 1 st floor) Mumty, Water tank and lift room, etc.	<u>5350.00 Sqm</u>
2.	Site development	Outer development of complete plot area including compound walls, Retaining walls, Parking and gates as per designs.

4.	Miscellaneous&Allied WorksaspernormsofNBC2016andmentionedinthis document: i) Detailed design and drawings for this building. ii) Architectural, civil, structural, finishing, interior and furnishing works iii) Plumbing & Sanitary. iv) External Water Supply & Sewerage, Storm Water Drainage System, a. Rain Water Harvesting including Recharge Wells. v) Elevators/Lifts. vi) Electrical Services, HT substation equipment's, LT distribution system, DG sets, rising mains, UPS, aviation obstruction lights. vii) Interior, Furnishing, machines and equipments. viii) Fire Fighting & Fire Alarms system. ix) Water supply & Pumps. Gas lines and gas bank. x) Site Development & Landscaping including roads, Foot paths, Walkways, sports facilities, C/W with gates, guardrooms, Horticulture works & irrigation system. xi) Internal EI with wiring, fan-fittings, HVAC, CCTV, EPABX, Data xii) Underground water tank with pump house etc. xiii) External Lighting, , Signage, works CCTV, Boom Barrier, Bollard. xiv) External Service Connections. xv) Arrange conferences, site visits, inaugural and handing over functions, holding meeting etc. xvi) Anti termite Treatment
5.	Allied services as per requirements of service provider or regulatory body.

(ii) The general parameters (subject to change) of Architectural Designing are :

Description	Parameter
Total Plot Area	10000.00 sqm
Hospital Building	Multi-Storied Building with RCC framed/prestressed concrete construction using traditional form work including foundation on Raft/piles as required. <u>The structure design will be for G+4 floors.</u> Superstructure/finishing/interior/furnishing works as per specifications/images/conceptual drawings approved by JDA, Jaipur. Height of each floor as per requirement and conceptual drawings approved.
Landscaping outer development & Horticulture work	The scope of work includes open parking, landscaping, outer Development, horticulture work including irrigation system as mentioned in this document.

Interior and Furnishing work	The scope of work includes furnishing work including all interior, furnishes, etc. to make the complete building and facilities functional with design and specifications as mentioned in this document.

- (iii) The Land plan forming part of this NIT are indicative only. There can be changes in the scope of work as per requirement of JDA, Fire Services etc. Agency shall carry out such changes which occur due to Building by laws or statutory requirements.
- (iv) The following studies are to be conducted initially by the agency:
- a.** Topographical survey, Geo-technical investigation
 - b.** Local Area Survey for the services (electrical, plumbing, Telecom and other required services)
 - c.** Sufficient Photographs & Videography of whole campus (in four copies) for record purpose
- (v) Design of all civil, electrical & mechanical and horticulture services their integration and installation and commissioning. Development of area, social infrastructure, boundary wall, internal roads, Street lighting, and other amenities etc. required for functioning of Hospital including following the instructions of JDA/Local Authority etc. for connections of internal roads with public roads.
- (vi) The Agency is required to complete the project on EPC basis within controlled architectural norms as mentioned in the Scope of Work, Technical Specifications & Architectural Drawings

including development of entire site area upto & including the boundary wall. The scope of work is to be carried out complete in all respect including furnishing and services. Rates quoted by the Agency shall be considered for entire scope of work which includes all activities/work starting from the given concept to completion till handing over of completed project in functional state from all perspective. The quoted amount is inclusive of defect liabilities period of 5 years for structure and services which includes electrical installations, plumbing, firefighting, lifts, machines and equipment etc. after acceptance of project as complete and functional, by the competent authority any damage in services would be borne by the Agency till the defect liability. The Agency is required to connect all the external services like Water Supply, Sewerage, Drainage, Electric Supply, LAN/WAN, Telephone Lines etc. to the main lines of the authorities/service providers like PHED/ Nagar Nigam Jaipur / BSNL or any other agency and this shall be considered as integral part of Scope of work and deemed to be included in the quoted price of the agency. The Agency will obtain all mandatory approvals for functionality and Completion, fire NOC, PHED NOC, Lift NOC, JVVNL or any other approvals required to declare all assets eligible for bringing into use.

It shall be deemed that the Agency has satisfied himself with the nature and location of the work, general and local conditions and particularly

those pertaining to transport including restriction of movement of traffic / vehicles etc., handling, availability and storage of materials, availability of labour, weather conditions at site and general ground/sub soil conditions. Agency is expected to quote their rates accordingly and nothing extra shall be payable for any reason/s whatsoever it may be.

JDA shall bear no responsibility for the lack of such knowledge and also the consequences thereof to the Agency. The information and site data shown in the drawings and mentioned in the tender documents are furnished for general information and guidance only. The JDA in no case shall be held responsible for the accuracy thereof or/and deductions, interpretations or conclusions drawn therefrom by the Agency and no claim shall be entertained whatsoever on this account; if the site conditions/information is different or otherwise incorrect. It will be presumed that the Agency has satisfied himself for all possible contingencies, situations, bottle necks and acts of coordination which may be required between different agencies.

Neither any hindrance shall be entertained because of these constraints if so occurs at any stage.

- (vii) The scope of work includes architectural design with in the control of Architectural parameters given in this document or prescribed later by JDA, Structural Design, and design of all required services, obtaining permission for Tree Cutting / or Translocation of Trees required as per site conditions. The work is to be executed on EPC basis. The scope is inclusive of topographic survey, survey for locating and executing service connections, Geo-technical investigation and all Preparatory / Ancillary works. The cost of labor, material, tools and plants and machinery required for execution of the whole project as per approved Layout plan & detailed design and drawings is in the scope of this work shall be

borne by the bidder.

8. The Agency is required to appoint design and execution team on site for pre and post construction works.

Requirement of Technical Representative(s) and Recovery Rates:

Applicable only for pre-construction and construction Phase work.

S.No.	Requirement of Technical Staff		Experience/Qualification		Rate of recovery per person if not appointed
	Designation	Strength	Minimum Experience (Years)	Qualification	
1.	Project Manager	1 No.	10 yr (having experience of one similar nature of work)	B Tech or Equivalent	Rs. 100000/- per month
2.	Project / site Engineer	2 No.	5 Yr.	Civil Graduate Engineer or Diploma Engineer	Rs. 50000/- per month
3.	Quality Control Engineer	1 No.	5 Yr.	Civil Graduate Engineer or Diploma Engineer	Rs. 50000/- per month
4	Safety Engineer	1 Nos	3Yr	Graduate	Rs. 50000/- per month

Note:

1. The above given strength shall be required to be deployed as and when necessity arises at site or so directed by JDA.

9. Contractor has to establish material testing labs and keep minimum construction equipments as per appendix I and appendix II.
10. The Agency shall hand over the assets after completion of work with as built drawings, service route plans, Maintenance manuals, Warranties/Guarantees or any other document required by the JDA for maintaining these establishments.
11. Electrical & Mechanical Works: Details of E & M works are given in of the tender document.
12. Samples of the materials of approved make or otherwise shall be got approved from the JDA before use in the work.
13. Shifting / Removal of Services and Statutory Approvals: Contractor shall take all necessary measures required to be taken to remove any live or dead service lines running through the plot area, cutting/shifting of trees etc, without any extra cost. After completion of the work and commissioning of building(s) along with services, he shall get completion certificate from local body, NOC from fire department and any other statutory approval related to building for handing over the assets. JDA and client i.e. JDA shall extend necessary support, as per statutory requirements, to the contractor for these approvals.

14. Topographic Survey: Contractor is advised to conduct topographical survey of the entire area land and all other services like roads, paths, drains and water bodies are located/passes out. However topographical survey of the concerned areas where buildings and roads and other development features/items are to be located is attached with bidding documents for preknowledge of topography of the site. Contractor has to verify authenticity of attached topographical survey himself. No claim for extra /additional payments owing to/about the change in site condition shall be entertained in future.

15. Contractor shall prepare and submit hard and soft drawings for structural steelwork based on latest software and detailed layout drawings for all civil and electrical services, duly supported with design as required by engineer in charge.

16. Contractor shall submit item wise detailed measurements, for record and other purposes. After completion of the work contractor shall submit as built drawings of all civil, electrical and mechanical services in Auto CAD including five sets of coloured drawings on A0/A1 size.

ESTABLISHING SITE LABORATORY AND TESTING OF MATERIALS

Equipment's for conducting necessary tests (as per applicable codes and standards) shall be provided and installed at site in the well-furnished site laboratory by the agency at his own cost. The following laboratory equipment should be in general or as and when required be set up at site laboratory:-

Sl.No.	Equipment	Numbers

1.	100MTcompression testing machine, electrical-cum-manuallyoperated)	1
2.	Slump cone,steelplate,tampingrod,steel scale,scoop	6
3.	VicatApparatuswithDeskpot	2
4.	Pumpsandpressuregaugesfor hydraulic testingofpressurepipes	2
5.	Weighingscaleplatformtype100Kg capacity	1
6.	Sets of sieves of 450 mm internal dia for coarse aggregate[100 mm, 80 mm, 40 mm; 2 mm; 12.5 mm,10 mm; 4.75 mmcompletewith lid and pan]	2
7.	Sets of sieves of 20 mm internal dia for fine aggregate [4.75mm; 2.36 mm; 1.18 mm; 600 microns; 300 microns & 150microns,with lid and pan]	2
8.	Sieve Brushes and sieve shaker capable of 20 mm and 300mmdiasieves,manuallyoperatedwithtimingswitchassembl y	2
9.	Cubemould size70mmx70mmx70mm	10
10.	Cubemould size 150mm x150mmx150mm	12
11.	Electronicbalance 600gx0.1g.,10kg and50kg	2
12.	Physicalbalanceweightupto5kg	2
13.	Digitalthermometerupto150 oc	2
14.	Measuringjars 100ml,20 ml,500ml	4Noseachsize
15.	Gauging trowels 100 mm & 20 mm with wooden handle	6
16.	Vernier calipers 12 & 6 size	3 each
17.	GI tray 600 x 450 x 50 mm, 450 x 300 x 40 mm, 300 x 250 x 40 mm	3 Nos. each
18.	Electric Motor mixer 0.25 cum capacity	3
19.	Screw gauge 0.1mm-10mm, least count 0.05	2
20.	Water testing kit	2
21.	Motorized sieve shaker	1
22.	Pruning Rods 2 Kg weight length 40 cm and ramming face 25 mm ²	2
23.	Mortar Cube vibrator	1
24.	Iron Weight of 5 kg, 2 kg, 1 kg, 500 gm, 20 gm, 100 gm	2 each
25.	Brass Weight of 50 gm, 2 gm, 10 gm, 5 gm, 2 gm, 1 gm	2 each
26.	Measuring cylinder TPX or Poly propylene capacity 100 ml, 500 ml, 250 ml, 100 ml	2 each

27.	Wash Bottles capacity 500 ml	12
28.	Thermometers 1-100 degree centigrade / max. and Min/ Dry and wet withtable	4
29.	Hammer 1lb & 2 lb	2 each
30.	Distance metre (of 100 metre)	2
31.	Measuring tape (5 metre)	4
32.	Wheel Barrow	8
33.	Floor Brushes, hair dusters, scrappers, wire brush, paint brushes, shutter steel plat oil, kerosene with stove etc.	12 each
34.	Any other equipment for site tests as outlined in BIS codes and as directed by the JDA.	-

DETAILS OF MACHINERY AND EQUIPMENTS REQUIRED TO BE DEPLOYED

Sl. No	Equipments (Owned or Leased)	Numbers
1.	Buildershoist	1
2.	Centralized concrete batch mix plant of capacity 20 cum per hour (fullyautomatic with computer control)	1
3.	Excavatorcumloader(JCB3Dmodelorequivalent).	1
4.	Compressormachinemimum20CFMwithrock Breaker.	1
5.	DGset ofminimumcapacitiesof62.5KVA.	2
6.	Minibatching plant(6cum./hr.).	1
7.	Transitmixers.	2
8.	Concretepump	1
9.	NeedleVibrators.	6
10.	Screedleveler.	1
11.	PlateVibrator	6
12.	AutomaticRingmakingmachine(Reinforcement)	2
13.	Dumper/Tipper	2
16.	Powerdrivenearthrammer(Soilcompactor).	2
17.	Totalstation.	1
18.	Watertanker(Minimumcapacityof5000liters)	6
21.	Centrifugalmonoblockwaterpumpminimum capacity2HP	10
22.	Roadroller8to10tons	1
23.	Drillingmachine	2 Nos.
24.	Steelshutteringwith necessaryprops	5000sq.mt.
25.	Laptop / Desktop Computers with latest version ofMS windows &office & (All in one with stabilizer) & colour inkjet printer (A3) for JDAsiteoffice.	2 Nos.
26.	Software- AutoCADlatestversionforsiteoffice	2 Users
27.	InspectionVehiclesfor JDA	1 Nos.
28.	Any other machinery required for completion of the work asperdecision ofJDA.	As per Actualrequirement

Note:

1. The above list is only indicative and not exhaustive. The Bidder may be ~~asked~~ to deploy more T&P as per requirement of work.
2. All the above plants & equipment's are to be deployed as and when required or as directed by JDA.

Section-V

DESIGNBASISREPORT

1. STRUCTURALWORK

The basic Design Considerations shall be followed for structural design. All building shall be of RCC framed structure constructed with traditional form work. Prestressed concrete designs may also be used at some places as per design. The height of building is upto 5 Floors in addition to one basement and Ground Floor. For height of various floors and building conceptual architectural drawings shall be referred.

Structural design:

The main considerations followed for the design of structure are:

- a) Structure safety and stability.
- b) To meet the demands of aesthetics conceived by the JDA.
- c) Availability of material, equipment and expertise.
- d) Constructability and ease of maintenance.
- e) Durability.
- f) Economy.

Design Approach:

- i) Structural Modelling: Three-dimensional model of each building will be generated using ETABS software. All the shear walls, slabs will be idealized as shell element and beams will be idealized as Beam Elements. The structure will be analysed and designed for all possible combinations of gravity loads (dead and live loads), and lateral loads (earthquake load and wind loads). Fatigue effects of persistent cyclic loads are not anticipated therefore ignored, if any.
- ii) Foundation System: Raft foundation may be adopted below the Tower Ground+4 Floors.. The raft/piled raft shall be analysed and designed by finite element techniques. It shall be modelled as plate elements in SAFE Software.

Structural System:

All the Buildings will be designed with RCC monolithic slab and shear wall system. **RCC Slabs, Beams, Columns and Brick/AAC block wall will be cast simultaneously by using Traditional formwork system. All building will be designed in accordance with the relevant Indian Code of Practice for civil works viz. IS:456:2000, IS:875, IS:1893:2016, IS:4326-1976, IS-**

13920:2016, IS 16700:2017 etc. Prestressed concrete designs may also be used at some places as per design. Final approval must be taken from JDA with vetting from NIT or IIT

All the Permanent Load shall be as per the following IS Codes:

- i) IS:875(Part I) – 1987
- ii) IS:875(Part II) – 1987
- iii) IS:875(Part III) – 2015

The latest version/amendment of BIS codes shall be applicable in all cases.

Seismic Analysis & Design:

3-D analyses shall be carried out using E-Tab software. Floor slab and all concrete walls shall be modeled as plate/shell elements. Any other analysis required for design validation by proof checking institution/agency, shall have to be also done as required.

Ductility and Durability:

Besides the strength to ensure durability of structure, minimum Concrete Mix of M25 will be used for Foundations and Floor (slab/beam) system. M25 grade of concrete for walls/columns conforming with relevant IS codes shall be used. Water connected units will be of M 30 grade. Higher grades of concrete may be used if required from design considerations.

Steel Reinforcement:

Fe500D Grade (TMT - bars) conforming with IS:1786 to be used.

a. Design Standards:

All the relevant BIS codes & specification are to be followed. Some of the important codes are listed below:

- a) IS: 456:-2000, Code of practice for Plain and Reinforced Concrete.
- b) IS: 875(Part-I,II), Code of practice for Design loads (other than earthquake)
- c) IS: 875 - 2015 (Part- III), Code of practice for Design loads (other than earthquake)
- d) IS:1893:2016 (Criteria for Earthquake Resistant Design for Structure)
- f) IS:4326:1993 (Earthquake Resistant Design & Construction of Building)

- g) IS: 13920-2016 (Ductile Detailing of Reinforced Concrete Structures Subjected to Seismic Forces)
- h) SP:16 (Design aid to IS:456)
- i) SP:34 (Concrete Reinforcement & Detailing).
- j) IS: 16700: 2017 (Criteria for Structure Safety of Tall Concrete Buildings)

2. ELECTRICAL & MECHANICAL WORK Internal Electrical Installation (IEI)

Wiring shall be done in recessed ISI rated PVC conduit with FRLS multi strand copper cable. Modular type switch, socket, fan regulator, T.V. & telephone socket outlet with GI box and double door MCB/DB shall be used.

Design of wiring shall be based on relevant IS Codes in accordance with Loading as per NBC.

Sufficient light points to be provided in various area to meet illumination level as per IS 3646 (Part-I) 1992 with up-to date amendments. Lighting design shall be adopted to ensure illumination level as per IS 3646 and also meet the LPD (light Power density) as specified by relevant IS Codes in accordance with Loading as per NBC specification. Final approval must be taken from JDA.

Recommended Values of Illumination as per BIS : 3646 (Part-I) in coherence with NBC 2016.

S.No.	Area	Illuminance In Lux
1.	Entrance Halls, Lobbies, Reception	200
2.	Waiting Rooms	150
3.	Inquiry Desks	300
4.	Gatehouses	200
5.	Lift Lobby	150
6.	Corridors, Passageway, Stairs	100
7.	Escalator, Travellators	150
8.	Consulting Rooms	300
9.	Treatment Rooms	500
10.	Rest Room	150
11.	Medical Store	150
12.	Changing Locker and Cleaner Room, Clock rooms, 100 Lavatories	100
13.	Canteens, Cafeterias, Dining room, Mess Room	200
14.	Control Rooms	300

15.	MechanicalPlant room	200
16.	ElectricalPowersupplyanddistributionRoom	200
17.	StoreRoom	100
18.	GeneralOffice	500
19.	Library	300
20.	SmallRetailShops	500
21.	Laundries	300
22.	AssemblyHall	300
23.	Auditorium	100
24.	Bank /Postoffice	300
25.	ConferenceHall/ MeetingRoom	500
26.	Workshop	300
27.	ReligionPlace	150

REFERENCEBISCODE

S.No.	ITEM	BISCode
1.	SteelConduit	IS:9537Part-II(Medium)
2.	FRLS PVC insulated flexible (Multi-Stranded)copper conductorwires	IS:694-1990
3.	M.C.B.s	IS:60898:Part-12002
4.	Phenoliclaminatedsheet	IS:2036-1974
5.	C.IJunctionBoxes	IS:2667
6.	PVCJunctionBoxes	IS:3419
7.	MSBend, coupler&elbow	IS: 2667
8.	PVCBend, coupler&elbow	IS:3419
9.	Modular typeSwitches (6A/16A)/ bell push	IS:3854-1997
10.	Modular type Three / Six Pin Socket Outlet(6A/16A)	IS:1293-2005
11.	PianotypeSwitches(6A/16A)/ bellpush	IS:3854-1997

12.	Piano type Three / Six pin socket outlet(6A/16A)	IS:1293-2005
13.	Piano step type fan regulator double module type	IS: 11037-1984
14.	Metal Boxes	Galvanized as per IS:277 as amended upto the date of tender.
15.	GI Boxes	Galvanized as per IS:277 part class P-1 as amended upto the date of tender.
16.	Telephone Cable	ITD No. Specification WS-113C
17.	MCB type sub-distribution Boards of double door construction with hinged cover in front	IS: 13032-1991

3. SUB-STATION & LT NETWORK

11/0.433 KV substations will be installed at

basement. Each substation shall include:-

- a) Dry type cast resin transformer*
- b) HT Panel (VCB)*
- c) LT panel with withdraw-able type ACBs, MCCBs.*
- d) Essential Supply Panel.*
- e) Power factor improvement panel (Thyristor based)*
- f) HT Panel (for ring main)*
- g) Earthing*
- h) Safety requirements*

From LT Panels (Non-Essential & Essential) nos. of feeder cables shall be laid from meter rooms/ risers, feeder pillars for external lighting & main panels of E & M Services.

Design of substation will be based on relevant IS Codes in accordance with Loading as per NBC. Scheme of substation shall be as per approval of JVVNL.

General Guidelines for calculating total installed capacity of substations (KVA) are given below.

The electrical load shall be worked out as per NBC and Relevant IS code or as per JVVNL norms and must be got approved by JDA.

Building Diversity Factor – as per NBC And Relevant IS Code.

Power Factor for calculating KVA load = as per NBC and Relevant IS Code Transformer

Loading Factor – as per NBC And Relevant IS Code

Future Expansion taken should be 10%

Transformer standby capacity should be minimum 33%

1. Common services

- I. All Lifts
- II. Ventilation System (Lift lobby, Lift well & fire shaft)
- III. (Normal + Fire)
- IV. Basement & Parking – Minimum 1.25 KW/1000 Sq.ft (Lighting & Power load)
- V. Fire Fighting Pumps
- VI. Water Supply Pump
- VII. STP
- VIII. Common Area (Stair Case, Lobby) Light & Power
- IX. Street Lighting

Diversity factor – 0.8 Power Factor – 0.8 Loading Factor – 0.8

The rating of transformers shall not be less than 1500 KVA. Final approval must be taken from JDA.

REFERENCE IS CODE

11 KV Breaker for MV Distribution network shall be vacuum circuit breaker type with minimum 350 MVA short circuit breaking capacity and conforming to IEC 62271-100.

Distribution Transformer (11/0.433 KV) shall be either oil type or Dry cast Resin type depending upon location of sub-station/Transformer.

Dry cast Resin type Transformer (11/0.433 KV) shall conform to IS- 11171-1985

/IEC 60726.

Oil type Distribution Transformer (11/0.433 KV) shall conform to IS 1180-Part-I (Energy Efficiency Level-2).

Air Circuit Breaker moulded case circuit breakers shall conform to IS-13947-1, Miniature circuit breakers shall conform to IEC/60947-2 or IS 8828.

4. EXTERNAL STREET LIGHTING

Traditional Decorative Electrical Poles with green rated LED luminaries shall be used for road and pathway lighting, decorative poles, down lighters, bollard for park lights and other fixtures as per the design presented by contractor subject to approval by JDA. Road lighting & park lighting shall be resized through U.G. cables. The road lighting and park lighting shall be controlled through main feeder pillars & various subfeeder pillars to cover the road & park lighting network.

DESIGN

External lighting shall be provided conforming to IS 1944 (Part- 1 & 2) 1970, National Building Code: (2016) & National Electrical Code-2005 with up to date amendment. Final approval must be taken from JDA.

CLASSIFICATION

The classification of lighting installations in public thoroughfares is based on volume, speed and composition of the traffic using them. It is left to the local engineer to decide upon the category of the lighting for the given road.

5. GENERAL PRINCIPLES

Aims of Lighting Installations

Circulation Pathways - The aim of lighting along pathways is to permit users of the pathways at night to move about with greatest possible safety and comfort, and to enhance the aesthetics of the building without compromising upon the visual comfort of the residents and micro climate's living organism. Towards this end consideration has to be given while designing the lighting on pathways junctions and pedestrian crossings so that these can be easily identified by the residents:

The level of illumination of the junction should be substantially different from the nearby roads. The Junctions may be lighted by either of the following methods:

a) Higher level of illumination—

In case this scheme is adopted the level of illumination should be 150 percent of that of the pathways.

- b) Change in height of columns – The size of columns adopted at the junctions should be higher than those adopted on roads as per relevant code and standards.

6. GUIDELINES FOR SPECIFICATIONS

Several factors contribute to good lighting and those are enumerated for guidance in various parts of IS: 1994 * recommendations are made on the various components of design of lighting installation and those required detailed calculations of the level and uniformity of illumination on the Pathway surface and of glare. Several criteria may not be satisfied for want of data such as characteristic of surface, etc. to get some idea of the extent to which the installation would perform, it may be preferable to mark a temporary trial installation of a few luminaires on a stretch of pathways to be lighted.

Table 6 to 7 gives a summary of recommendations on the various types of thoroughfares. These shall be used as ready reckoners, though for a detailed guidance references should be made to the relevant part of IS: 1994*

Note—Recommendations for Groups C, F and G lighting are under consideration.

TABLE-6 LIGHTING INSTALLATION IN PATHWAYS

S.No	Description	Std. to follow
1.	Average level of illumination on road surface Lux	8
2.	Ratio minimum/average illumination ratio	0.3
3.	Transverse variation of illumination, percent Preferred	20
4.	Type of luminaires Preferred Permitted	Cut-off Semi-Cut-off Non-cut-off
5.	Mounting height, m	7.5-9
6.	Maximum spacing of Luminaires height ratio	Cut-off=3 Semi cut off=3.5 Non-Cut-Off=4

Note: 3 – Mounting heights less than 7.5 m are undesirable except in special cases, such as roads bordered by trees.

TABLE-7 LIGHTING INSTALLATION IN PATHWAYS

S.No.	Description(1)	Remarks(2)
A	Grade Separated Junctions	
i.	Lighting by conventional street lighting technique.	
1)	General Principles	As in IS:1944(part-1 &2)-1970*
2)	Mounting height, M	10-12
3)	Luminaire	Cut-off
4)	Light sources	LED
ii.	Lighting by High-mast lighting	
1)	Minimum Service Level Value (Lux)	30
2)	Uniformity Ratio $\frac{E_{min}}{E_{avg}}$	0.4
3)	Height of masts, m	Not less than 20
4)	Choice of Luminaire	See IS:1944(Parts 1&2)-1970*

Code of practice for lighting of public thorough fares: part 1 General principles.

7. LIFTS

Provision of lifts in the Hospital will be kept as per National Building Code-2016 /Unified Building Bylaws considering no of floors, height of the building and speed of elevators which shall be submitted to JDA for approval before commencement of work. At least one lift be made barrier free as per Unified Building Bylaws & passengers capacity to minimum 13 passengers for barrier free lift. Buildings should have at least one bed lift.

8. FIRE FIGHTING (Wet Riser & Sprinkler)

Firefighting system for the Hospital Building shall be designed as per prevailing guidelines of NBC 2016 and requirement of unified building bylaws Rajasthan. Guidelines from JDA must be followed while designing.

It shall include following: -

- I. Providing Heavy duty M.S. 'C' class pipe for external fire lines in ground including Valves, Fire Hydrants, Excavation for Pipes, Laying of pipes, Painting of pipe and Making Connection to supply system.
- II. Heavy Duty M.S. 'C' Class Pipe exposed inside the building, Mains Laterals, Branches, Valves Hangers and Appurtenances.

- III. Hose Reels, Rubberized fabric lined hose pipes, Hose cabinets & Landing Valves.
- IV. Portable Fire Extinguishers.
- V. Fire Fighting Pumps.
- VI. A Static Underground Water Tank.
- VII. Terrace tank on Various Buildings as per NBC.
- VIII. All electrical works related with firefighting works.

Design Basis:

Type of the Building – Various types of buildings proposed can be classified as per NBC-2016 as follows.

Hospital & Services

Max. Height of Buildings- The heights of building is 26.21

m. References & Design Guideline Sources

An Indicative list of relevant BIS codes is as below:

- a. Unified Building Bylaws, Rajasthan.
- b. National Building Code of India - (Latest Edition, November 2016 --Part-IV, Fire & Life Safety)
- c. I.S:3844-1989 - Code of practice for installation and maintenance of internal fire hydrants and hose reel on premises.
- d. I.S:13039-1991 - Code of practice for external hydrant system provision and maintenance.
- e. I.S:2190-1992 - Code of practice for selection, and maintenance of first aid fire extinguishers.
- f. I.S:15105:2002 – Code of Practice for Design and Installation of Fixed Automatic Sprinkler Fire Extinguishing System.

The firefighting system shall be provided as per National Building Code of India 2016 (Part IV), other relevant I.S. codes and according to unified building bylaws Rajasthan.

The proposed provisions are as follows.

- I. Centralized Static Underground storage fire tanks as per NBC for Hospital. Terrace tank as per NBC shall be provided.

- II. Fire ring main as per NBC should be provided. Connected to external yard hydrants placed @ maximum 30m/c distance.
- III. Wet Riser for Hydrant & Sprinkler System shall be taken in separate hydraulic zones to control the pressure from Main Header in the Plantroom as per requirement. Pumps of Multi stage, multi outlets with low and high head shall be provided as per requirement.

Internal Hydrants

Each Fire Hose Cabinet shall be as per NBC-2016 and its latest amendments, shall also conform to the following IS Codes.

IS: 636 Type BIS:903
IS:884-1985

Hose Cabinet shall be provided in lift lobby/Podiums/Basement and will be covered with fixed glazed door.

Fire Pumps

Considering large area, it is recommended to provide the following minimum Fire Pumps (The number of Hydrants connected with each set of fire pumps will not be more than 100) in fire fighting pump room.

<u>S.No.</u>	<u>DESCRIPTION</u>	<u>DISCHARGE</u>	<u>HEAD</u>	<u>LOCATION</u>	<u>QTY</u>
<u>1)</u>	<u>Main fire pump</u>	<u>2850 LPM</u>	<u>Residual head of 3.5 kg/cm² at farthest Point</u>	<u>Plantroom</u>	<u>1 Nos.</u>
<u>2)</u>	<u>Sprinkler fire pump</u>	<u>2850 LPM</u>		<u>Plantroom</u>	<u>1 Nos.</u>
<u>3)</u>	<u>Jockey pump</u>	<u>180 LPM</u>		<u>Plantroom</u>	<u>2 Nos.</u>
<u>4)</u>	<u>Diesel Fire Pump</u>	<u>2850 LPM</u>		<u>Plantroom</u>	<u>2 Nos.</u>
<u>5)</u>	<u>Electrical operated Water Curtain pump</u>	<u>2850 LPM</u>		<u>Plantroom</u>	<u>1 Nos.</u>

All fire pumps shall be with positive suction arrangements.

All main fire pumps shall be multi-stage, multi outlet type for creating pressure zones or VFD pumps shall be provided to maintain uniform pressure.

All the fire pumps shall cut-in automatically based on the pressure settings, so as to ensure that the entire fire remain line, riser etc. are pressurized on a continuous basis.

The jockey pump shall automatically cut-out based on the pressure settings. However, the remaining fire pumps shall be off only in the manual mode.

Fire Pump Motors shall be provided with soft starters or variable frequency drive starter.

Note 22 of Table 7, Part 4 of NBC- 2016 shall be considered for planning of No. of pumps. This note states as follows.

One set of pumps shall be provided for each 100 hydrants or part thereof, with a maximum of two sets. In case of more than one pump set installation, both pump sets shall be inter connected at the delivery headers.

Sprinkler System

- i. Sprinkler System shall be provided for all the basement areas, Podium Parking's, Ground floor common areas and lobbies etc.
- ii. Pendant sprinklers shall be used @ 9 m² of built up area, with a centre to centre spacing not to exceed approximately 3.0 meters.
- iii. Upright sprinklers shall be provided for any false ceiling areas in lobbies/common areas etc. of basement and similar voids which are greater than 800 mm in height, if any.
- iv. The sprinklers shall be automatically activated at 68°C by breaking of the glass bulb in the event of fire.
- v. The sprinkler lines shall always be pressurized by automatic system consisting of an Electrical sprinkler pump. The sprinkler pump shall be backed up by the main electrical and diesel fire pumps and a separate jockey pump.
- vi. Necessary accessories such as installation control valves, Flow Switches, Inspection Test Assemblies etc. shall be provided as per the detailed requirements.
- vii. Generally, for sprinkler system design, IS 15105:2002 shall be followed (Indian Standard for Design & Installation of Fixed Automatic Sprinkler Fire Extinguishing Systems) and where required as per NBC-2016 as well as relevant NFPA Codes shall be consulted.
- viii. Sprinkler Flow switches shall be monitored by Fire Alarm Panel.
- ix. Ramps at all levels shall be protected with sprinklers.

Fire Brigade Connections:-

All connections for Fire Brigade for inlet, draw out shall be provided as per NBC-2016 and as per unified Building Bylaws.

Fire Extinguishers

The following type of portable fire extinguishers shall be provided at all levels of the towers, at strategic locations as per requirements, generally to follow IS – 2190:1992):

- a. Water expelling type as per I.S:15683 -2006
- b. ABC Powder Type as per I.S:15683 -2006
- c. 4.5kg, CO₂ type as per I.S:15683–2006
- d. Mechanical foam type fire extinguisher.

Water Curtain System

Water Curtain System is proposed for the compartment metallization of the Basements & Podiums as per the following details:

i)	Maximum area per compartment/Zone	=	As per NBC-2016
ii)	Design Density of each Nozzle	=	35- 40 LPM/Meter
iii)	Spacing of Nozzle	=	Max. 2.5 Meters C/C

Provision of water curtain pumps and storage shall depend upon final approval requirements as stipulated by Local Fire Department.

Fire Detection & Alarm System:-

Fire detection & alarm system in building shall be designed and provided as per NBC-2016 (Part-IV, Fire & Life Safety)

Each floor shall have addressable monitor modules which will link microprocessor controlled addressable main panel of each towers/buildings. Detectors in common areas shall be intelligent type.

Fire detection & alarm system in non-residential buildings shall be designed and provided as per NBC-2016 (Part-IV, Fire & Life Safety).

Valves & Accessories:-

PN rating of all valves and accessories shall be selected as per application. All valves shall have supervisory switch with signalling to fire alarm panel.

Monitoring by Fire Alarm Panel:-

Automatic Fire Alarm System shall be provided. The Fire Alarm System Panel shall also monitor the following in addition to its own function.

- i. Sprinkler Flow switches.
- ii. Water Level in all Fire tanks both underground and terrace tanks.
- iii. Hydrant & Sprinkler Pressures of all zones.
- iv. Pump ON/OFF Status.
- v. Open/ Close status of all isolation valves with supervisory switch.

Applicable Codes

IS:1239(Part 1 & 2)	--	M.S. Pipe Heavy duty
IS:14846	--	Sluice valves (PN1.6)
IS:6392-1971	--	Steel Pipe Flanges
IS:554	--	Pipe threads where pressure tight joints are Required
IS:909	--	U/G fire hydrants, sluice valve type
IS: 5312(P-1)	--	NRV
IS:778	--	Gunmetal fullway valves with wheel tested to 20 kg/cm ² class II
Butterfly valve--		They shall be of specified quality conforming to IS:13095 or BS:5155
IS:5290	--	Internal hydrants shall comprise-Single Headed Single Outlet GMLanding Valve conforming to Type -All.
IS:12585	--	Hose tubing (Thermoplastic)
IS:854	--	Hose tubing, Globe valve, Stopcock & Nozzle
IS:636	--	Hose pipes rubber lined woven jacketed (RRL) & 63 mm dia, conforming to type -All
IS:903	--	The coupling shall be of instantaneous [Branch pipe, nozzle, spring lock type Coupling etc.
IS:15683	--	Portable fire extinguishers

9. MECHANICAL VENTILATION & SMOKE

EXTRACTION DESIGN BASIS

The system shall be provided as per National Building Code of India 2016 and, unified building bylaws Rajasthan and other relevant I.S codes.

Following parameters shall be adopted for mechanical ventilation (if required) of the ~~st~~ areas:

1.	Basement Car Parking	
	i) Normal Mode	6 ACPH
	ii) Fire Mode	Additional 6 ACPH (Total 12 ACPH)
2.	Services Rooms (LT & HT Room, Pump Rooms)	20 ACPH
3.	Transformer Room	Shall be calculated based on Transformer heat dissipation nor 20 ACPH which ever is more
4.	STP Room	30 ACPH

Note:

Planning of lift well, lift lobby & staircase pressurizations shall be as per NBC 2016 if required.

In calculation of pressurization, leakage area, open & close door consideration shall be as per latest addition of ASHRAE standard/NFPA/NBC 2016 if required.

15% safety margin shall be considered in selection of pressurization fans.

In fire tower; all the staircases, lift wells & lift lobbies shall be mechanically pressurized in accordance with fire authority's approval if required.

All the pressurization systems shall be designed as per fire authority approval if required.

System Description:

Basement Ventilation:

All common areas like car parking area, sub-station, pump rooms, STP etc. shall be mechanically ventilated.

Car Park ventilation system shall be designed to give at least 6 ACPH during normal mode and during fire mode additional 6 ACPH (total 12 ACPH in case of fire) proposed as per National Building Code of India-2016 and Unified Building bylaws.

The mechanical ventilation system shall comprise of axial fans for extraction of normal exhaust air/smoke with the help of exhaust duct & MS grilles. Make up air may be drawn from ramp and cut-outs which shall be suitably located. MS powder coated louvers shall be provided at the inlet of fresh air and exhaust. If required, make up air fans shall be provided to supply fresh air through supply air GI duct & MS grilles. Make-up air shall be supplied at floor level i.e. 300 mm above the floor level having dropper from main duct by the side of column and exhaust air shall be from ceiling level.

Both makeup & exhaust fan shall be axial flow fans and shall be installed in fanrooms. All exhaust fans (normal & smoke extraction) shall be fire rated suitable for 2 hours fire rating at 250 degree Celsius. Gravity louvers shall be provided at the outlet of each fan to avoid reverse flow. The discharge of air and intake of fresh air if required shall be through masonry / RCC / CC ducts of two hours fire rating. The duct shall be designed for 12 ACPH.

Car parking normal mode fans will be operated automatically through CO sensors and fire alarm system for smoke extraction in case of Fire. Manual operation shall also be provided locally and remotely from a central location with visual indication of status of fans. The maximum sound level of car parking ventilation system shall be 70 dB(A) at 1 meter from the fan room in case of normal operation. To achieve the desired noise level in basement car parking area, fan rooms, ducts & plenums may be acoustically lined. Multiple fans may be selected to achieve air flow, sound level and maximum efficiency. Fans may also be selected as Vane Axial type for normal ventilation system for better efficiency.

As per National Building Code of India (NBC) 2016, entire basement parking area shall be compartmentalized into various zones of maximum 3000 Sqm / Zone. Compartmentation will be done by water-curtains. Ventilation and smoke extraction of each zone shall be independent.

Design Parameters:

(i) Duct design:		
Max. flow velocity in ducts for ventilation in Car Parking (normal mode)	:	9.2 m/sec (1800 fpm)
Max. flow velocity in ducts for ventilation in Car Parking (fire mode)	:	12.2 m/sec (2400 fpm)
Maximum flow velocity in ducts for ventilation in service areas (pump rooms, sub-station etc.)	:	9.2 m/sec - 10.2 m/sec (1800 – 2000 fpm)

Maximum flow velocity at ventilation grilles in carparking (normal mode) & services areas (pumprooms, substation etc.)	:	2.5/sec(500fpm)
Maximum flow velocity at pressurization grilles	:	3.8 m/sec (750 fpm)
Maximum friction	:	1cmWG/100m run
ii) Ventilation Fan		
Max. fan outlet velocity for Normal mode fans (carparking, plant/pumprooms, & Max. fan outlet velocity for Normal mode fans (carparking, plant/pumprooms, & Max. fan outlet velocity for fire mode fans (carparking, public care as smoke extraction & pressurization fans)	:	10.2m/sec(2000fpm) 12.2m/sec(2400fpm)
Fan Speed	:	Not more than 1450 RPM

Note:

All the normal mode fans shall be selected for maximum efficiency & minimum sound level.

All fans shall be AMCA certified for air flow, sound and performance. Normal mode fans shall be not less than 65% efficient.

All car parking ventilation & smoke extraction fans shall be selected for static pressure at 12 ACPH.

All fans shall be operated automatically, manually locally and remotely from central location with visual indication of status of fans.

10. PLUMBING WORKS

The scope of work which the contractor will be required to carry out is detailed as under.

(a) External Water Supply System

- Obtaining necessary approval and connection/s from PHED for entire water requirement of building proposed for work as per scope of this NIT as per Annexure-P1
- Storage
- Treatment
- Water pumping & water distribution system
- Garden Hydrant System (Irrigation system)
- Water supply system should be of Heavy Duty GI pipes with matching heavy duty fittings.

(b) Sewerage System

- Collection and Conveyance
- Connection to external Sewerage line
- Sewage Treatment Plant
- Reuse of Treated Water from STP for Flushing & irrigation within the campus.

- Surplus Treated Water from STP to be taken up to near campus boundary as per direction of JDA for onward use in other areas to be decided by the authorities.
- Sewage System of hubless C.I piping & fittings

(c) Storm Water Drainage System

- Collection and conveyance
- Disposal to external Storm Water line.

(d) Rain Water Harvesting

- Construction of Rain water harvesting recharging wells as per rain water harvesting Manual/ NBC
- Construction of desilting Chamber.
- Design as per rain water harvesting manual considering 90 mm peak hourly rainfall.

(e) Internal Plumbing Works

- Internal water supply system.
- Soil, Waste, vent & Rain water pipes.
- Disposal to 1st Manhole/storm water drain.
- All Sanitary Fixtures and fittings.

Approach for Planning

Considering the nature of activities to be conducted and the type of building to be developed, efforts in the approach for the planning of various systems, shall include the following considerations:

- There shall be enough safe, clean and potable domestic water on continuous basis to every user of all the buildings as per NBC 2016.
- Efficient disposal from toilets/Wet areas.
- Quick disposal of rain water without flooding.
- No wastage/leakage of water treated or otherwise.

Important Factors on Planning

- To plan the systems in such a way as to minimize the energy requirements.
- To make the entire system efficient and cost effective.
- To have proper operation and maintenance system, which could be controlled centrally and efficiently
- To create minimum nuisance and disturbance to the Environment.
- To assist in the development and aesthetic value of the Environment and landscaping of the project.
- To recycle and reuse the products as much as possible, i.e. recharging the underground water sources.
- To use Standard Engineering Practices.

Water Supply System

The requirement of water supply will be worked out based on parameters / guidelines provided in National Building Code-2016 and as per following details.

S. No	Description of Occupancy	Occupant Load per NBC-2016	Water Requirement As per NBC 2016		Flow to S.T.P.	
			Flushing	Domestic	Domestic	Flushing
			LPCD	LPCD	%	LPD
1.	Residents of Housing Units					
	4 bedroom dwelling unit and above.	7 Persons/Unit	45	90	80%	100%
2.	Misc Facilities (club and services)	10 Sqm/person	20	25	80%	100%

NOTE:

The Water & sewage flow requirement will be based on calculations for water consumption indicated in Annexure P1. Water schemes and sewage schemes to be worked out accordingly.

Capacities of underground tanks & sewage treatment plants to be constructed will be as per details indicated in Annexure P1

A safety factor of 10% will be added in the total water requirement.

STP Capacity will be 20 % more than as worked out above as per EIA guidelines.

Source

The source of water shall mainly be from:

- 1) Municipal water supply connection as much as possible to meet the requirements, from PHED dept. Rajasthan.
- 2) Augmentation from boring tubewells as per prevailing practice and after obtaining the necessary permissions from all the concerned authorities.
- 3) By recycling the treated effluent of the STP for Flushing and horticultural purposes.
- 4) Rainwater shall be harvested in the form of infiltration wells, to replenish the underground water aquifer.

Location for Plant Room & Storages:

It is proposed to provide Water Supply Storage and pump rooms along with firefighting pumps & Underground tanks at location which will be suitably placed and will cover the entire campus equally for buildings indicated in

Annexure P1 and related water requirements & STP capacities indicated in Annexure P2. The U.G. water tank shall be in the service area and adjacent to the Plumbing & Fire Fighting plant room having fire pumps, water supply pumps and all other related equipment located at the

ground floor level. These services shall act as a centralized system within the respective parts. In the pump room for firefighting no other equipment will be installed.

Capacities of UG & OH Storage Tanks shall be designed considering following parameters:-

-) Underground storage shall be in addition to fire fighting Storage.
-) Raw Water 50% of one day's requirement.
- i) Treated Water 50% of one day's requirement.
- v) OH Tanks - 50% of one day's requirement of building.
- v) The capacities of Raw & Treated Water Tanks at locations will be decided based on buildings proposed to be covered by the pump rooms.

*NOTE: Reference NBC & Relevant I.S Code.

Pumping, Overhead Storage & Distribution System

Water from the Domestic UG tank shall be re-lifted to the overhead tanks of the towers through the required set of pumps. The pumps shall be multiple in number and will be selected as N+N combination i.e. 100 % standby. The discharge will be selected for 4hrs of pumping for each zone in two shifts of 2hrs each. Each building shall have its own O. H tank (on terrace) as per requirement.

Water supply to overhead tanks shall be filled by multiple pumps. Operation of pumps shall be based on manual operation twice a day for each zone. Operating time during each operation will be 2 hours. Water supply pumps will be designed to supply water through two zones.

From the overhead tanks, distribution of domestic water shall take place by adopting the gravity system. Water shall be supplied by gravity to all user points. Pressure reducing valves and pressure breakers shall be provided for the lower floors as per NBC-2016 and unified building bylaws. The system shall be designed to ensure requisite pressures available in all outlets.

For Flushing of WC's & Urinals, a separate water supply system shall be provided, consisting of separate Overhead tanks on Terrace, and gravity supply through separate down-takes. This separate system for flushing shall

ensure that the treated effluent from the STP is re-used. Emergency connection for normal potable water supply shall also be made to this system.

Water supply to flushing overhead tanks will be automatic operation of pumps. The automatic operation of pumps shall be maintained with the help of diaphragm type motorized butterfly valves installed near overhead water tanks coupled with float type level controllers installed within the tanks.

Transfer pumps for flushing water shall be of variable frequency drive hydro-pneumatic system.

All water supply transfer pumps / hydro-pneumatic system shall be provided with bye-pass connection with flow meters before non-return valves to bye-pass the water into underground tank for pressure balance.

All mechanical equipment's shall have 100% backup to prevent any breakages in the system.

Materials for Water Supply

All external water supply rising mains laid in ground shall be double flanged ductile iron pipes conforming to IS:8329 and class K-9. The specials for ductile iron pipes shall be as per IS:9523 and class K-12.

- All external water supply rising main in basement ceiling and shafts shall be GI pipes(class-c) of required dia as per design.
- All water supply piping at terrace & in shafts shall be GI pipes(class-c), composite pipes could be used if required.
- All water supply distribution pipes laid within toilets in ceiling or in concealed chases shall be GI pipes(class-c), pipes and heavy duty fittings as approved by JDA if required or SS-316L could also be used.
- All the external garden hydrant system piping shall be uPVC 10 kg/cm² conforming to IS 4985.

Valves

Butterfly valves(80mm and above)

Butterfly valves shall be of centrifugal disc construction with single piece body of Cast Iron with disc of CF8 Stainless steel with nitrile seat, Stem shall be stainless steel. Butterfly valve shall conform to PN 10/16 rating and shall be provided with suitable matching flanges compatible with PN10/16 rating of valves.

Non-return valve(80mm and above)

Cast iron Non-return valves of diameter 80 mm and above shall be dual plate non-return valve of PN 10/16 rating with ductile iron disc and SS304 spring & hinge pin.

Ball valves(65mm and below)

Ball valves shall be lever operated, screwed type of gun metal ball valve of PN10/16 rating as per IS:318 with SS ball and SS stem with mild steel lever.

Non-return valve(65mm and below)

Non-return valves and 65 mm and below shall be gun metal non-return valve of PN10/16 rating(class 2) as per IS:778 with screwed ends.

Special type of control valves like, pressure reducing valves (PRV) and Solenoid valves shall be provided as per requirement to control and Regulate the flow of water PRV's shall be provided at easily accessible location, to enable repair/maintenance.

NOTE:-
 OH Tank for Fire as per NBC will be provided on each Tower.
 Capacities of OH Tanks for Domestic & Flushing Water will be decided as per requirement.

SEWERAGE SYSTEM

domestic sewage generated shall be disposed by gravity system into the first manholes around the building, which shall be finally connected to the external sewerage system as per the Master Plan. The external sewerage network shall collect the sewage, and flow by gravity for further treatment in the proposed sewage treatment plant. It is proposed to provide STP to meet the total requirement.

Type of distribution

Generally, all flow shall be by gravity up to the final disposal points. Wherever gravity flow from the discharging units into the external sewer line is not possible (i.e. wet areas in basement etc.), a local sewage pumping system

shall be provided either directly to the final disposal point, or into the external sewer line.

Final Disposal of Treated Effluent

The treated effluent from the Sewage Treatment plant shall be recycled for Flushing, Soft water and Gardening purposes etc. Surplus Treated Water from STP to be left near campus boundary, for onward use in other areas to be decided by JDA.

Appurtenances & Material Specifications for the Sewerage System

a) Pipes

i) PVC Pipes

For dia 150mm and 200mm Grade depending on site conditions with laying, jointing and bedding as per IS code.

ii) R.C.C. Pipes Class NP2

Minimum dia 250mm and above to be provided as per IS:458, for normal slopes and general site conditions.

(i) R.C.C. Pipes Class NP3

For road crossing 300mm dia and above as per IS:458, for normal slopes and general site conditions.

(ii) Ductile iron pipes

For exposed pipes running along the basement ceiling for final disposal to external sewerage system Ductile iron pipes conforming to IS:8329 and class K-9. The specials as per IS:9523 and class K-12. Jointing for these pipes shall be socket and spigot type joints.

(iii) Manholes

The manholes shall be constructed of brick masonry as per standard specifications of National Building Code and shall be having details as follows:

Type A'—Rectangular

i) Rectangular of size 900x800mm up to 0.90 meter depth.

ii) Rectangular of size 1200x900 mm up to 2.5 meter depth.

Type B'—Circular

i) Circular of size 910mm dia for depth up to 1.65 meter.

ii) Circular of size 1220mm dia for depth above 1.65m and up to 2.3 meter depth.

iii) Circular of size 1520mm dia for depth above 2.30 meter & up to 9 meter depth.

Depths of Manhole

i) On branches — 1.0 M

- ii) On lateral sand mains —1.5M– 2.0 M

Spacing

- i) Manholes shall be provided at all junctions, change of directions, change in diameters, as per connection requirement from every unit.
- ii) A distance of 30 meters on the main sewer lines, depending on dia of pipe and local conditions.

Manhole Covers (Material CI/DI)

- i) Medium duty for manholes on service roads, having approximate total weight of frame and cover as 116 Kg.
- ii) Heavy duty for manholes on main roads, having frequent heavy traffic, having approximate total weight of frame and cover 170-208 Kg.

12. SEWAGE TREATMENT

PLANT Requirements of Sewage Treatment

Plant

There shall be a system for treatment and re-use of the entire sewage generated in the project area.

Accordingly, it is proposed that the external sewerage network shall collect the sewage from all units, and flow by gravity /through sewage pumping stations for further treatment in the proposed sewage treatment plant.

Sewage system plant will be designed as per prevailing guidelines of NBC 2016 and proposed for buildings indicated in annexure P1 and as per calculations indicated in annexure P2

Sewage Treatment

Sewage treatment is achieved by the initial physical separation of solids from the raw wastewater stream, after which the removal of dissolved/suspended biological matter takes place. The main criteria for treatment of domestic effluent are its bio degradability, made possible by the existence of a balance of nutrients for the bacteria and characterized by

its biological oxygen demand (BOD). (Biochemical Oxygen Demand or BOD is the indicator for determining the speed at which biological organisms use up oxygen in a body of water)

Once the biological mass is separated or removed, the treated water is subjected to additional purification through mechanical and/or chemical processes. This treated effluent can then be discharged or recycled as per requirements.

The removed biological solid matter also is subjected to additional treatment after which it also may be disposed or recycled.

Accordingly, sewage treatment consists of 3 broad stages:

- i) Primary treatment (Removal / Screening of Solids, grit, suspended and floating matters).
- ii) Secondary treatment (Biological treatment for reduction of the BOD & COD, and separation of the biological solids and effluent).
- iii) Tertiary treatment (Additional process for improving the quality of the final effluent for disposal/re-use).

Classification of Methods of Sewage Treatment

The methods and technologies for treatment of domestic sewage vary greatly, and the predominant systems may be broadly classified under the following categories:

(a) Aerobic Systems:

These are biological treatment systems which utilize aerobic bacteria for BOD reduction in the presence of oxygen. Aerobic systems are the most widely adopted systems for domestic wastewater treatment, and may be sub-categorized as follows:

- i) Suspended Growth Systems (e.g. Extended Aeration, Activated Sludge Process etc.).
- ii) Attached Growth Systems (e.g. Rotating Biological Contactors, Floating Aerobic Bioreactors, Submerged Aerobic Fixed Film process etc.).

(b) Anaerobic Systems:

These are biological treatment systems which utilize anaerobic bacteria for BOD reduction in the absence of oxygen (E.g. Septic Tanks, Upflow Anaerobic Sludge Blanket etc.).

(c) Physical/Chemical Methods:

Methods which are biological in nature and utilize physical / chemical methods for sewage treatment. (E.g. Membrane Technology, Ultra Filtration etc.).

Acceptability:

- i) The sewage treatment plant should be acceptable to the pollution control authorities.
- ii) The system adopted for treatment should be nuisance – free to be acceptable to the users residing in and around the project area.
- iii) The STP should be in line with the concept for the master-planning

of the project, and in conformance with the architects and aesthetical requirements.

iv) The system should be environmental-friendly.

Ease of Operation & Maintenance:

The routine operation & maintenance should be manageable.

System components should broadly be of generic nature to ensure easy replacement & repairs.

Treatment Technologies to be used in the Project.

The Sewage Treatment Plant shall be provided in a Modular form, based on—MBBR System (Moving Bed Biofilm Reactor).

MBBR treatment system is based on the aeration system in which the screened raw sewage is allowed to develop the required bacterial growth in a reactor/ Aeration tank. The tank is filled with specially developed proprietary high quality plastic media which is in the form of corrugated sheets and configured as per BOD load to be treated as per manufacturer's recommendation.

The plastic media which has been specially developed by the industry for such application offers a large surface area as compared to conventional surface aerator or diffused aeration system. The media which provides large surface areas, provides efficiency in the treatment process and enable large bacterial flocks developed in the aeration to stick to the media and assist rapid aeration of the entire mass of liquid. Retention of the flocks (Sludge) by the media reduces the sludge volume. The volume of sludge developed in the process is in low and reduces pumping and handling problems. The mixed liquor then separates the sludge and the effluent in a separate gravity settling tank. Although the quantity of sludge is less in volume to be disposed off in a neat and hygienic manner and disposed off in a designated location.

Characteristics of Untreated & Treated Effluent

The likely characteristics are as below. The STP design should be capable of withstanding any variation as per actual site conditions.

Waste Water Characteristics

i)	Duration of flow to STP	:	24 hours
ii)	Peak Factor	:	3
iii)	Temperature	:	Maximum 46°C
iv)	pH	:	7.15 to 8.2
v)	Colour	:	Mild
vi)	T.S.S (mg/l)	:	250 to 350 mg/l
vii)	BOD(5) (mg/l)	:	200 to 250 mg/l
viii)	COD (mg/l)	:	300 to 400 mg/l
ix)	Oil and grease	:	10–50 mg/l

Final Effluent Characteristics after Tertiary Treatment

a)	pH	:	6.5– 9.0mg/l
b)	B.O.D.	:	<10mg/l
c)	C.O.D.	:	<50mg/l
d)	Total suspended solids	:	<10mg/l
e)	N-total	:	<10mg/l
f)	NH ₄	:	<5MG/l
g)	Faecal Coliform (MPN/100ml)	:	<230mg/l
h)	PO ₄ -P	:	<2mg/l

Different Components of the Plant

In the proposed treatment scheme, the following component unit shall be provided.

- (a) Screen chamber
- (b) Bar Screen
- (c) Oil & Grease Trap
- (d) Submersible type raw effluent re-lift pumps for equalization tank
- (e) Equalization Tank
- (f) Anoxic tank with Agitator
- (g) MBBR-reactor
- (h) Tube settler
- (i) Sludge Transfer Pumps
- (j) Sludge holding tank
- (k) Centrifuge for Sludge Disposal System
- (l) Sludge Loading Pumps
- (m) Chlorine Contact Tank
- (n) Chlorination System
- (o) Filter feed pump
- (p) Tertiary Treatment Units (Filters–PSF, ACF)
- (q) Treated Water Tanks (incl. Chlorine Dosing)
- (r) Flushing Water Supply variable frequency drive hydro-pneumatics system.
- (s) Garden Hydrant Water Supply variable frequency drive hydro-pneumatics system
- (t) Disinfection System (UV etc)
- (u) Plant Room Sump Pumps
- (v) Air Blowers etc.
- (w) Ultra-filtration plant for polishing of treated effluent from filter/activated carbon filter to reduce the BOD level less than 10 ppm.

Process Description

- (a) Raw sewage from main sewer line should be collected through gravity pipes into the screen chamber. This manually cleaned screen should be provided to remove floating and big size particles which may otherwise choke the pumps and pipelines.
- (b) After screening, the waste water should be allowed to pass through oil & grease trap to remove the grit material. The screens and Grease Trap shall be accessible so that they may be manually cleaned from time to time.

- (c) The Screened and waste water from the Grease Trap should then pass into the equalization tank to homogenize the waste water quality and also even out flow fluctuations and feed waste water of uniform quality at a constant rate to subsequent treatment units. Air mixings should be provided to mix the contents of the equalization tank. A coarse bubble aeration grid should be provided to mix the contents of the equalization tank and also to avoid septic conditions in the tank. From the equalization tank the wastewater will be pumped into an Anoxic Tank.
- (d) At Anoxic tank, in the absence of air denitrification process shall be done and from the Anoxic Tank mixed liquor will flow by gravity to MBBR Tank.
- (e) The MBBR process uses small plastic carrier elements to provide growth sites for bacteria attachment in a suspended growth medium. The carrier elements shall allow a higher biomass concentration to be maintained in the reactor. This shall increase the biological treatment capacity for the given reactor volume.
- (f) The carrier elements shall be continuously kept in suspension by the aeration system. The agitation pattern in the reactor shall be designed to provide an upward movement of the carriers across the surface of the retention screen which creates a scrubbing effect to prevent clogging. Combination of fine & coarse bubbles may be provided to provide oxygen as per detailing.
- (g) From the MBBR tank mixed liquor shall flow by gravity into the Tube settler. The solids will settle in the tank. The sludge that settles down shall be transferred to sludge holding tank via sludge loading pumps, with provision of sludge return to the bioreactor if necessary.
- (h) From the tube settler, treated wastewater will flow into chlorine contact tank. In this tank, chlorine will be added in the form of calcium or sodium hypochlorite solution by a suitable chlorinator/dosing system.
- (i) Treated water after chlorine contact tank shall be clear, odourless, low BOD, low suspended solids, which shall be acceptable as per CPCB/Environmental norms to be disposed directly to public/natural drain.
- (j) The treated water from chlorine contact tank is fed by means of filter feed pump sets to pass through dual media filters, activated carbon filters and stored in the filtered water storage tanks. The activated carbon filters shall ensure removal of all coloration and odors present in the treated effluent. Backwash of Filters shall be done intermittently as per requirements. The filtered water being stored in the filtered water tank shall again be dosed with chlorine by a suitable chlorinator/dosing system and a residual Chlorine level of 1 PPM shall be maintained.
- (k) The UV system shall be provided in STP plant room as online installation on

the treated water supply lines being supplied to the external distribution rings.

- (l) The filtered, clean and odorless water from filtered water tank is then fed through a variable frequency drive hydro-pneumatic system to the external treated effluent rings as per the master plan, from where connections are taken to the garden hydrant system and to each unit for flushing water as per detailing.
- (m) Treated water will be further treated through Ultrafiltration plant (Polishing plant) to reduce the BOD level further for water to be used for flushing purposes. From filtered water tank water will be passed on to ultra-filtration plant for finally collection in ultra-filtration tank from where it will be pumped to separate external ring supplying water to dwelling units.
- (n) Excess sludge from the tube settler will be taken periodically into sludge holding tank. In this tank sludge will be aerated for self-stabilization. Air will be shut off periodically and supernatant water will be transferred to the aeration tank creating stabilized sludge. The final sludge shall be de-watered through a centrifuge mechanism. Sludge loading arrangements shall also be provided for direct disposal of sludge to sludge tankers/trolleys.

Re-Use & Disposal of Treated Effluent

Considering the site planning and various conditions of the project, re-use of the treated wastewater from the Sewage Treatment Plant is:

- a) Use for flushing and horticultural purposes.
- b) Surplus Treated Water from STP to be left near campus boundary, for onward use in other areas to be decided by the JDA.

13. DRAINAGE & RAIN WATER HARVESTING SYSTEM

Due to urbanization of the land and sharp growth in population and thus increase in water demand for various uses, the fresh water is becoming scarce in most regions of the area. In certain areas due to almost total dependency on the underground water, the wells and bore wells are getting deeper and deeper. Also, due to increase in paved surface/roof areas, the amount of natural/percolation of rain fall is reducing very drastically.

Therefore, it has become necessary to harvest the rain water as much as possible. The drainage system needs to be planned with a view to incorporate rain water harvesting principles, as detailed in the following sections.

Rainwater Harvesting

Rain water harvesting system to be designed in accordance with requirement of following codes and standards:

- a) Unified Building Bylaws.
- b) Manual on Rain Water Harvesting & Conservation by Govt. of India, Central Public Works Department (CPWD), New Delhi, June 2002.
- c) Guidelines from Central Ground Water Board – Ministry of

d) Part -A||National Building Code ofIndia||2016

Following parameters to be considered for planning rainwater harvesting.

- Rain water harvesting tanks / recharging wells to be designed for 15 minutes rainfall of peak rain fall considered as 90 mm/hr as per rainwater harvesting manual.
- Rainwater recharging wells with boreholes shall be as per NBC-2016.

14. PROPOSED STORM WATER DRAINAGE SYSTEM

The system to be proposed after studying the site conditions and considering the following factors:

- The slope pattern of site terrain.
- The existing conditions of site and surrounding.
- The final levels and patterns of different types of roads.
- The need for incorporation of rainwater harvesting within the site area.
- Final disposal to external drainage system as per site.

Planning of drainage system shall be as follows:

- i) The rainwater from the terraces and related clean paved areas of individual Buildings shall be collected in the collection chambers and shall be ultimately connected to the main storm-water drainage system.
- ii) The network of storm water system shall be mostly catch basins and RCC pipe network, as per requirements.
- iii) For Roof Drainage: Rain water pipes for roof drainage shall be designed as per NBC-2016, Table-23 of Part-9
- iv) For design of storm water drainage system, 25 mm/hr average rainfall will be considered.

For surface and sub-surface drainage of the basement area, and for disposal of the rainwater pipes coming from the terraces, a minimum average fill of 750 mm shall be required, ranging 900 mm all-around to 600 mm at the edge of the basement retaining wall. This is recommended with a view to dispose the storm water drainage through the catch-basins and pipes system, to the external main storm water network, without entering inside the basement.

Parameters for Rainwater Calculations

(I) Areas

Total area of the Site.....	As per Site m ²
Terrace/Roof area.....	As per Site m ²
Paved/Pavement/Road area.....	As per site m ²
Greens/Landscaped/Lawn areas.....	As per site m ²

(II) Intensity of rainfall

25 mm/hr average rain fall will be considered for design of stormwater drainage system.

(I) Co-efficient of runoff factor to be adopted

Type of catchment	Coefficients
Roof catchments	
- Tiles	0.8-0.9
- Corrugated metal sheets	0.7-0.9
Ground surface coverings	
- Concrete	0.6-0.8
- Brick pavement	0.5-0.6
Untreated ground catchments	
- Soil on slopes less than 10 percent	1.0-0.3
- Rocky natural catchments	0.2-0.5

(II) Coefficient for Calculation for Capacity for Collection Wells for Harvesting

Peak Hourly per rainwater Harvesting manual	rainfall as	--	90mm/hr
Retention time for capacity of Recharge Tank		--	15 Minute

15. INTERNAL PLUMBING SYSTEMS

Sewerage/Drainage System Adopted: two pipe (stack) systems as recommended in code of practice for soil and waste pipes above ground (I.S:5329 – 1983). This implies there are separate vertical stacks as per the following:

- i) Soil Pipes shall carry the wastes from WC's & Urinals. Soil pipes shall connect directly to manhole outside the building. hubless CI Pipe system will be installed in the whole premises.
- ii) Waste Pipes shall carry the wastes from Wash Basins, Sinks, Floor Drains, etc. Waste pipes shall connect to Gully Traps outside the building, which shall in turn be connected to the external man holes. hubless CI Pipe in accordance with IS 15905 & ISO 6594 and UPVC Silent pipe system adaptable to IS 13592 and IS 14735 will be installed in the whole premises.
- iii) Rainwater Pipes shall also be provided which shall dispose outside the building into the external catch-basin chambers/external drains.

To ensure that the plumbing system is unhindered, all wet – areas shall be designed with the following structural provisions:

S.No.	Details	Requirements/Recommendation
a)	Wet Areas slab to be properly hidden in false ceiling	No sunk should be in wet areas. For balconies, 100mm sunken area is required. All Traps & Soil & Waste pipes shall be hanging at ceiling level below, by hanging the pipes with G.I structural supports/dash fasteners and proper clamping etc. with proper slope (1:60). Cleanout plugs shall be provided at the ceiling level below as per detailing. All structural Beams at ceiling level should be inverted (Upwards oriented) for balcony area only. Cutouts for traps and WC soil pipes shall be marked and provided for execution.
b)		This option is recommended for most wet areas from the point of view of easy cleaning and maintenance of the plumbing systems, as all pipes are accessible from below. Water resistant, grid false ceiling (NRC.95) shall be provided. hubless CI Pipe and UPVC Silent pipe system will be installed in the whole premises.

Requirements of Internal Shafts

S.No.	Shafts	Size/Details
a)	Main Fire Hose Cabinets for sprinkler pipes, fire fighting and drain line to terrace level	Niche of 1200 (W) x 900 (D) x 2100 (H) mm size Cut out of min. size 400 x 600 with in niche V area V for V Verticals V for Tower up to 2B + G + 8 Floors. Cabinet of above size may be provided in M.S. (Pre-fabricated) Alternately, FHC may be designed of above size in civil works as per arch/interior finishing details and only M.S. Door provided.
b)	Plumbing shafts for Main Internal Toilets	Exact Shaft size as per detailing of individual wet areas, so that all vertical pipes are exposed and approachable within the shaft. Appropriate Shaft sizes to ensure service access must be provided for plumbing shafts of all toilets. Access Doors/panels need to be provided for every shaft, at every level, for necessary maintenance/cleaning purposes. Shafts to be designed to be sealed at all floor levels. All shafts to be vertically continuous from basement to terrace level.
c)	Rainwater Pipe Shafts	Terrace/Balcony Rainwater pipes to be located in separate boxing / main plumbing shafts. Size to be reviewed as per detailing, with following minimum sizes: Appropriate Shaft sizes to ensure service for each 250mm, 200mm internal, 150mm internal Dia. Pipes And 100 mm internal Dia. Pipe.
d)	Other Shafts / Miscellaneous	Other shafts may be required as per final planning & client requirements and shall be provided as per detailing.

Fixtures and Fittings

- i) Sanitary fixtures shall be of premium quality and make, as per make list in the tender document.
- ii) All CP fittings shall be of standard quality and make, as per make list in the tender document.

Materials for Internal Plumbing Soil, Waste & Rainwater Pipes

Double stack system shall be proposed for drainage system with separate pipes for soil, waste disposal and rainwater. The soil, waste, vent & rainwater pipes shall be designed as per NBC-2016.

- i) Waste pipe from sinks, wash basins, urinals, all suspended and underground soil, waste and vent pipes and fittings shall be Centrifugally spun hubless CI Pipe internally coated with fully crosslinked epoxy

coatings, externally coated with multilayer outside coating with a zinc layer below the cover coat, with SS Coupling joints with EPDM Rubber in accordance with IS 15905 & ISO 6594.

- ii) For rainwater pipes shall be UPVC silent pipes with silent fittings.

18. DRAINAGE OF BASEMENT (If applicable)

The proposed basements and ground shall be catering to the Parking requirements for the project, and the services areas such as Plumbing & Fire Fighting Plant Room, etc. shall also be coming in the podium & basements. It is also possible that future wet areas such as Maintenance Offices, Drivers Rest areas are also provided in the ground. Provision for drainage is also to be made in case of operation of Sprinkler System. Therefore, it is necessary to do the proper planning of drainage of the basement, to cater to the following circumstances:

- i) All necessary precautions shall be taken to prevent any external stormwater from entering into the ground & basement. The site levels shall be decided in such a way that the surface flow takes place away from the entry points of ramps, stairs, etc. All cutouts/openings into the basement shall be closed/protected.
- ii) Channels shall be provided at the starting and end points of all ramps into the basements.
- iii) All upper basements shall be provided with Floor Drains, and these drains shall discharge into the drains/channels in the basements below.
- iv) The basement shall be provided with a network of drain channels, with the following details:
 - a. Minimum 250-300 mm Width.
 - b. Minimum 150 MM deep at start and a general slope of 1:250 to 1:300. Accordingly, a minimum filling of approx. 450 mm is required and the final location/layout of channels shall be depending upon the architectural plan and the proposed structural details.
 - c. Maximum length of channels shall be approx. 80 meters.
 - d. The drain channel shall be provided with proper grating as per architectural details.
- v) The drain channels in basements shall be discharging into drain sumps, which shall be having the following details:
 - a. Minimum 1800 MM Depth. (300 mm freeboard)
 - b. Minimum size of 2000x2000 MM
 - c. The Sump shall be equipped with fixed type submersible sump drainage pumps (1 + 1 Combination), which shall automatically operate based on a level indicator and controller system.
 - d. The sump pumps shall discharge the drain water outside the building into the external stormwater drainage system.

- vi) Any wet areas for toilets shall be identified by the JDA in the planning stage itself and the locations confirmed on the drawings. For such areas, a sewerage sump with automatic submersible sewage sump pumps shall be provided.
- vii) Dedicated Sumps with automatic submersible sewage sump pumps are recommended for the Plumbing & Fire Fighting Plant Rooms, DG Rooms etc. if located in the basement levels.

List of References

1. Unified Building Bylaws. 2017
2. Hand book of Water Supply and Drainage, Bureau of Indian Standards. SP-35(S&T)1987.
3. Manual of water supply & Treatment–1997, Central Public Health and Environmental Engineering Organization.
4. Manual on Sewerage and Sewage Treatment revised upto 1993 (Ministry of Urban Development, New Delhi), (Govt. of India)
5. National Building Code -2016 by Bureau of Indian Standards.
6. Code of practice for provision and maintenance of water supplies for firefighting IS:9668:1990
7. JDABSR 2013
8. Other relevant ISI codes.
9. Code of basic requirement for water supply, drainage and sanitation IS:1172:1983 by Bureau of Indian Standards.

19. WATER SUPPLY PUMPS

Work under this sub-head consists of furnishing all labour, with appropriate T&P scaffolding & staging as required to completely install pumping system for various water supply services. Without restricting to the generality of the foregoing, the work of pumps shall include the following:

- a) Centrifugal pumping system for Domestic Water Supply
- b) Pumping system for Soft Water Supply
- c) Pumping system for Garden Hydrant System
- d) Sump pumps for disposal of Drainage from Basements
- e) Sump pumps for disposal of Sewage from Basements
- f) Controller & Indication System for Tanks & Pumps
- g) Motor control panels, power and control cabling and allied electrical works.
- h) Pipes, valves, accessories, hangers, supports, delivery and suction feeders and connection to proposed pipework.

20. IRRIGATION

WORKS Design Consideration

s

Source

Due to acute shortage of water in Jaipur primarily treated effluent from STP will be utilized to cater irrigation water requirements.

Water Demand

- 9 Water demand for landscaping areas shall be calculated from NBC-2016 Part- as 6-8 liter/m sq./day for lawns. For shrubs and trees, the lower value can be adopted.

Type of Irrigation System to Be Adopted

Following irrigation systems shall be planned.

- a. Land irrigation system through ring mains with the help of garden hydrant points comprising valves and chamber for surface irrigation of lawns.
- b. Drip irrigation system for shrubs, trees and plants distributing water through a network of valves, pipes, tubing, and emitters.
- c. As the water is being used from STP spray sprinkler system is not suggested.

Key Factors to Be Considered in Plan Ring of Irrigation System

- a) The irrigation system shall be designed considering the wind direction, slope and proposed grade, type of soil percolation and type of vegetation to be watered.
- b) Spray irrigation to be designed to avoid dry spots and spray on top of paved areas and unplanted surfaces.
- c) Spray irrigation to be avoided in areas of width less than 3 meters.
- d) Irrigation hydrants shall be unobtrusively located and generally at the edge of shrub planting and additionally in close proximity to a drainage chamber and catch basin to avoid waterlog.
- e) Hydrant points shall not be located inside chamber to minimize waterlog from leaking pipes causing various health related hazards. Hydrants shall be located 200 mm above the ground level.

Distribution System

- a. The entire distribution for irrigation system will be through network of independent pipes connected to STP, planned at two locations within the campus. The lines feeding to irrigation system shall be independent of those lines which are feeding to cater flushing water requirements.
- b. The entire network of irrigation system will be divided in zones with the help of isolation valves and sub mains feeding garden hydrant and drip irrigation system.
- c. The entire water for garden hydrant system/Drip irrigation system will be pumped with help of multiple automatic pumps placed in STP plant room.

Materials

- a. All garden hydrant system mains and sub mains and branches shall be uPVC pipes as per IS: 4985 of class 10 kg/cm² rating with matching fittings.

- b. For drip irrigation system LLDP drip tubing of 10kg/cm² rating with all matching fittings and special e.g. coupling, tees, bends and reducer etc., with solenoid valve assemblies shall be provided.
- c. All pumping system shall be vertical inline stainless steel pump placed in the STP plant room. All electrical works for the pumps including control cables shall be included.
- d. Suitable filtration units, disc filters, pressure gauges, air release valves shall be provided as accessories for irrigation system.
- e. Materials of valves used in the irrigation system shall be as already specified in water supply section of DBR.
- f. Confirmation about adequacy of water head available at site for safe operating of the system shall be proposed by the agency.

21. SOLID WASTE MANAGEMENT

The proposed solid waste management shall be garbage chute system comprises of the following:

Refuse chute enclosures: Refuse chutes used for conveyance of garbage and rubbish from upper floors of a building to a cellar or other location shall be constructed with an enclosure of brick masonry at least eight inches in thickness or of reinforced concrete at least six inches in thickness. Two separate chute shall be installed, one for dry and other one for wet refuse.

Refuse Chute : 450 mm dia Garbage chute made of 1.2 mm stainless steel (Grade -304) pipe and necessary fittings. This chute shall be anchored with necessary fasteners and stainless steel clamps of approved quality to the structural members of the Chute enclosures. It will have an opening at every floor with auto shutoff stainless steel intake hopper door of 90min fire rating and UL approved with all accessories with strict compliance to NBC 2016. The Openings shall have 120⁰ C fire sprinklers, with 10LPM Discharge installed in it to control any fire break out, it shall also have special de-odorizing cum disinfectant to curb the bad smell / fumes and germs in the chute. At the receiving end of chute, a proper collecting hopper shall be provided which can sustain / absorb the impact of garbage and can gently dispose off to the collecting trolley. A cleaning system should also be provided for chutes.

Height and service opening: Refuse chutes shall extend from the refuse collection room to a height of at least six feet above the roof. A spark arrester shall be provided at the top of the chute above the roof.

Refuse collection rooms: A refuse collection room shall be provided at the bottom of all chutes at the cellar or lowest story level to receive the refuse. Such rooms shall be enclosed with walls and roofs constructed of material having a minimum fire resistive rating of three hours, except that gypsum masonry may not be used for such enclosure walls. Openings to such rooms shall be provided with fireproof, self-

closing doors having a minimum fire resistive rating of one and one-half hours. It shall be unlawful to keep such doors open. Refuse chutes shall extend to the underside of the roof of the refuse room or lower. Roofs shall be at least six inches away from combustible floor or wall construction. Refuse rooms shall be used only for receipt of refuse and for refuse compacting equipment. Refuse rooms shall be provided with sufficient sprinklers to sprinkle all parts of the room, with at least two sprinkler heads provided and with sprinklers so separated as to sprinkle a maximum area of the room when one of the sprinklers is blocked or not operating. A hose connection shall be provided within the refuse room.

The chute should come with fabricated customized trolley of minimum 660 Ltr. capacity with trolley wheels.

The work has to be carried out as per approved design and drawing complete in all respect. (Before installation the shop drawings have to be got approved from JDA.)

22. SIGNAGE (Internal & External)

SITC of following signages shall be in the scope of the agency, fabricated from the materials specified and as shown in the architectural drawings no. SNP/A/DT-101:

Sign.	Signage	Size	Location	Material	Approx. No.
S-1.	Unit Signage	150 x 300	Above entry door of every unit	SS	44
S-2.	Floor Signage	300 x 450	At every floor level	Glass lit	20
S-3.	Service area signage	600 x 200	At every floor level	Glass lit	20
S-4.	Basement & Ground Directional signage	450 x 150	At all Entry & Exit locations including Ramps	Glass lit	100
S-5.	Fire Signage	500 x 150	As per NBC	Glass Lit	60
S-6.	External signage with RCC foundation	500 x 300	As per JDA Specifications	RCC with Stone	10
S-7.	Column No. Signage in Basement		As per JDA Specifications	Reflective film with metal base	--
S-8	Main Building Block Signage	As per Design & Drawing	Ground Floor/Terrace	LED complete as per design drawing approved by JDA.	4

Note: Sign S-1 in SS plates, S-2 & S-3 shall be glass lit signage.

- a) Scope of the work includes preparation of the shop drawings (based on the architectural drawings), fabrication, supply, installation and protection of the Signage, till completion and handing over of the work.
- b) The item of work for the respective signages shall be conforming to Specifications and shall cover all operations, fabrications and their installations and materials required for finished product.
- c) The signage work shall be got executed through specialized fabricator having experience of similar works. The Contractor shall submit the credentials of such fabricator for the approval of the JDA.
- d) The Contractor shall submit the Design, Size and installation procedure along with samples to JDA for approval. Approved samples will be kept at site till the whole work is completed. JDA has right to modify the design of the approved samples and contractor is bound to follow these written instruction/changes in design/size etc. from JDA.

e) The Contractor shall submit shop drawings, for approval of the JDA, for fabricating signage with detailing of frame work, if any, along with the fixing details. The details of the signage including location, etc. shall be shown in the shop drawings.

The Contractor shall procure and submit to the JDA, samples of various materials for the signage work, for approval. After approval of samples of materials, the Contractor shall prepare sample(s) for approval of JDA. The material shall be procured and the mass work taken up only after the approval of the mock up by the JDA. The mock-up shall be dismantled and removed by the contractor as per the direction of the JDA.

Sec VI

Conditions & Specifications of Civil Works

Additional conditions of civil works

The work in general shall be carried out in accordance with the specifications mentioned with this tender document.

The order of preference in case of any discrepancy shall be as following:

Scope of work, if any services required to make the Hospital building habitable and completely functional is not covered in the scope of work, interior and services same shall either be pointed out in pre-bid meeting else, it shall be presumed that the same shall be provided within the quoted cost and nothing extra shall be paid on this account.

Specifications and Conditions, Additional Conditions mentioned in this document.

JDA Specifications for civil and electrical as applicable.

Indian Standard Specifications of BIS including modifications / amendments Relevant Sections of National Building Code 2016 with up-to-date amendments Sound engineering practice as per directions of the JDA.

Agency(s) shall provide permanent benchmarks, flag tops and other reference points for the proper execution of work and these shall be preserved till the end of the work. All such reference points shall be in relation to the levels and locations, given in the Architectural and plumbing drawings. On completion of work, the Agency(s) shall submit six prints of -as built drawings to the Engineer-in-Charge (Hard & soft copy both)

The Agency (s) should engage approved, licensed plumbers for the work and get the materials (fixtures/fittings) tested, by the municipal Body/Corporation authorities wherever required at his own cost. The Agency(s) shall submit for the approval of the JDA, the name of the plumbing Agency proposed to be engaged by him.

The agency shall give performance test of the entire installation(s) as per the specifications in the presence of the JDA or his authorized representative before the work is finally accepted and nothing extra what-so-ever shall be payable to the agency for the test.

The work shall be carried out in accordance with the Architectural drawings and structural drawings, interior and finishing drawings approved by the JDA.

Before commencement of any item of work the agency shall correlate all the relevant architectural and structural drawings, and specification etc. and satisfy himself that the information available is complete and unambiguous. The agency alone shall be responsible for any loss or damage occurring by the commencement of work based on any erroneous and/or incomplete information and no claim whatsoever shall be entertained on this account.

The work of services will be executed simultaneously. The agency shall minimize the scope of making recesses, holes, opening etc. as the same shall be planned and necessary grooves/niches shall be provided in shuttering of RCC.

The agency shall conduct his work, so as not to interfere with or hinder the progress or completion of the work being performed by other agency(s) or by the JDA and shall as far as possible arrange his work and shall place

and dispose of the materials being used or removed, so as not to interfere with the operation of other agency simultaneously working or he shall arrange his work with that of the others in an acceptable and coordinated manner and shall perform it in proper sequence to the complete satisfaction of others.

If the work is carried out in more than one shift or during night, no claim on this account shall be entertained. The agency must take permission from the police authorities etc. if required for work during night hours, no claim/hindrance on this account shall be considered if work is not allowed during nighttime.

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

Sample of building materials, fittings and other articles required for execution of work shall be got approved from the JDA before use in the work. The quality of samples brought by the agency shall be judged by standards laid down in the relevant JDA/BIS specifications. All materials and articles brought by the agency to the site for use shall conform to the samples approved by the JDA which shall be preserved till the completion of the work.

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

The agency shall procure the required materials in advance so that there is sufficient time to testing of the materials and clearance of the same before use in the work. The agency shall provide at his own cost suitable weighing and measuring arrangements at site for checking the weight / dimensions as may be necessary for execution of work.

Regarding testing of civil & electrical materials, the testing of materials shall be conducted in Govt. Laboratory / Govt. colleges / IITs / NITs or from the laboratory approved by JDA. The charges of testing of materials in approved laboratory shall be borne by the agency.

Agency shall submit minimum - Quality Assurance plan within 45 days after award of work which shall be consisting of:

Lot size, number of required tests and frequency of testing. While deciding these criteria JDA Specifications & Provisions of BIS Code and Standard Practices may be referred. Volume of work, Practical Difficulties and Site Conditions etc. may also be kept in view. The lot size, number of tests and frequencies of testing can be altered or modified by the JDA from the prescribed limits.

It should clearly indicate the Machinery and other Tool & Plants required to be deployed at site by the agency. Entire Machinery and T&P may not be required at the start of work, therefore, a proper time schedule by which each Machinery & T&P to be brought at site should also be indicated.

Receipt of Material, testing of the same & Maintenance of Register of Tests.

All the registers of tests carried out at Construction Site or in outside laboratories shall be maintained by the agency. Which may be inspected by JDA or his/her designee at any point of time.

The Agency shall allow access to Third Party Quality Assurance Agency (TPQAA) engaged by JDA to have a control on quality and methodology of execution. At least 25% of Samples of materials including Cement Concrete Cubes shall be taken jointly by Agency and TPQAA / JDA / quality control wing of JDA or his authorized representative. All arrangements for transporting and getting the tested shall be made by the Agency.

All the test in field lab setup at Construction Site shall be carried out by the Quality control team to be engaged by the Agency which can be witnessed by JDA or his/her designee. A daily report of Tests to be conducted on a day shall be submitted to JDA or his/her designee.

All the entries in the registers will be made by the designated Engineering Staff of the Agency.

Agency shall be responsible for safe custody of all the test registers.

Submission of copy of all test registers, Material at Site Register and hindrance register along with each

alternate Running Account Bill and Final Bill shall be mandatory.

All material received at site shall be entered in MAS Register and copy of Supply order, MTC & Bill-invoice shall be maintained in order. The MAS Registers including Cement and Steel Registers shall be maintained by a qualified staff of Agency which may be inspected by JDA or his/her designee at any time. The daily report of receipt of material shall be sent to JDA or his/her designee.

The agency shall submit a 'Methods statement' for each important activity for the approval of the JDA soon after the award of work to him. The 'Methods statement' is a statement by which the construction procedures for any activity of construction are formulated and stated in chronological order. The 'Methods statement' should have a description of the item with elaborate procedures in steps to implement the same, the specifications of the materials involved, their testing and acceptance criteria, equipment to be used, Precautions to be taken, steps of measurement etc.

As and when any important item is taken up for execution, the Agency shall submit the specifications and develop a checklist and Pour card. This sample checklist should be got approved from the JDA and should be used at site. This check list should be shown to the JDA or his/her designee during inspection. This procedure is to be followed for all hidden items, CC/RCC work, Steel-reinforcement, shuttering, cast-in-situ mosaic flooring, doors & windows, plumbing, including water supply pipelines, roof treatment, earth filling etc.

The agency shall render all help and assistance in documenting the total sequence of this project by way of photography, slides, audio-video recording etc. nothing extra shall be payable to the agency on this account.

TECHNICAL SPECIFICATIONS

NOTE: Normally all the required specifications are given below but if any how some specifications is/are left out or in case of any discrepancy, then guidelines of PWD Specification./ ISI / or other relevant specifications of the product shall be followed as per direction and satisfaction of JDA.

1. CIVIL WORKS

A. EXCAVATION AND FILLING IN FOUNDATION AND PLINTH

1.0 SETTING OUT

- 1.1 It shall be the responsibility of the contractor to install substantial reference marks, bench marks etc. and maintain them as long as required by the JDA. The contractor will assume full responsibility for proper setting out, alignment, excavation and dimensions on each and all parts of the work.

2.0 EXCAVATION AND PREPARATION OF FOUNDATION FOR CONCRETING

- 2.1 The Foundation shall be dug to the dimensions as shown on the drawings or as directed by the JDA. The excavated material shall be stacked at a sufficient distance away from the edge of the excavated pit so as not to endanger the stability of the sides.
- 2.2 If excavation is carried out to greater depth than specified, extra depth shall be made up by filling in lean concrete. Cost of such extra filling required therein as specified above shall be borne in full by the contractor.
- 2.3 If required to protect the sides of pits and trenches, timber shoring and strutting shall be erected. The timbering shall be closed or open depending on the nature of the soil and work and the arrangement of timbering including sizes and spacing of members used shall be as approved by the JDA. No extra charges shall be admissible on this account.
- 2.4 The bottom of all excavation shall be leveled in accordance with the drawings/directions of the JDA.
- 2.5 The contractor shall report to the JDA when the excavations are ready to receive concrete. No concrete shall be placed in foundations until the contractor has obtained the approval of JDA.
- 2.6 After the excavation is passed by the JDA (and before laying concrete) the contractor shall get the dimensions of the excavation and levels recorded jointly with the Engineer of the JDA.

3.0 BACKFILLING

- 3.1 Back filling in sides of foundation shall be done with soil approved by the JDA taken from excavation or from outside the site. The backfilling shall commence only after the approval of the JDA.
- 3.2 Fill shall be of well compactable, well graded earth or sand and shall be free from tree stumps, organic matter, seed, peat etc. Where earth or sand from source other than excavation at site is used, the quality of such earth or sand shall be the same as that obtained from excavation at site, or superior to it.

4.0 DEWATERING

4.1 Rate for excavation shall include bailing or pumping out water which may accumulate in the excavation during the progress of work either from seepage, springs, rain, curing or any other cause and diverting surface flow if any by bunds or other means.

4.2 The excavation shall be kept free from water

- a) During inspection and measurement.
- b) When concrete and/or masonry are in progress and till they come above the natural water level and,
- c) Till the JDA considers that the concrete/mortar is sufficiently set.

5.0 DISPOSAL OF EXCAVATED MATERIALS

The excavated material certified as surplus and not useful shall be removed by the contractor from the site in an approved manner. However, this is to be noted that any finds of archaeological interest such as relics of antiquity, coins, fossils or other articles of any other material of value shall be delivered to the Raj. Housing Board. The decision of the JDA as to the nature of find shall be final and binding. The contractor shall have to dispose off the excavated materials as per the local bylaws of the relevant authority and in conformity with the instructions/rules of the local bodies/government in this regard to a site/location of his choice. Any permission/approval of the Competent Authority in this regard is the responsibility of the contractor and nothing extra shall be paid to him on this account. The earth/rock will be removed, carted and disposed off by the contractor at his own cost and under his own arrangement and nothing extra shall be paid to him on this account.

6.0 RATE TO INCLUDE

Apart from other factors mentioned elsewhere in this contract, item of excavation shall also include for the following:

- a) Cleaning of the site
- b) Setting out works as required and setting up bench marks and other reference marks.
- c) Providing shoring and strutting and subsequently removing the same.
- d) Bailing and pumping out water as required and directed.
- e) Excavation at all depths and removal of all materials
- f) Backfilling the trenches along side masonry or concrete up to the natural ground level including water and ramming.
- g) Necessary protection including labour, materials and equipment to ensure safety and protection against risk or accident.

7.0 PLANKING AND STRUTTING

In case of deep trenches where the soil is soft and not capable of being retained without the help of support, planking and strutting as required shall be carried out. It shall be the responsibility of the contractor to take steps to prevent slide / collapse. Method of planking / strutting will be largely influenced by the type of soil encountered and as approved by the JDA.

8.0 MEASUREMENTS AND EXCAVATION

- a) Measurements of earthwork in excavations shall be done as per the dimension of foundations shown in the drawings.
- b) The total quantity of earthwork in excavation shall be determined by taking the existing ground levels at various places and the final excavated levels.

B ANTITERMIT TREATMENT

I. Indian Standards

Indian Standards to be followed are

1]	IS 6313(Part I):	Code of practice for Anti-termite measures in buildings constructional measures.
2]	IS 6313(Part II)	Code of practice for anti-termite measures in Building (pre constructional chemical treatment)].

II Materials

One of the following chemicals in water emulsions shall be used.

Chemical	IS No.	:	concentration by weight, percent.
8944	:	1%	Chloropyrifos IS
Lindane	IS 632	:	1%

III. Workmanship

- a. Barriers shall be complete and continuous under the whole of the structure to be protected. All foundation shall be fully surrounded by and in close contact with the barrier of treated soil. Each part of the area treated shall receive the prescribed dosage of chemical.

Time of application.

- b. Soil treatment should start when basement/foundation trenches and pits are ready to take mass concrete in foundations. Laying of mass concrete should start when the chemical emulsion has been absorbed by the soil and the surface is quite dry. Treatment should not be carried out when it is raining or when the soil is wet with rain or sub-soil water. The foregoing applied also in the case of treatment to the filled earth surface within the plinth area before laying the sub-grade for the floor.

- c. Disturbance

Once formed, treated soil barriers shall not be disturbed. If by chance, treated soil barriers are disturbed, immediate steps shall be taken to restore the continuity and completeness of the barriers-system.

- d Termite mound treatment

if termite mounds are found within the plinth area, these shall be destroyed by pouring into the mounds at several places, after breaking open the earthen structure and making holes with crow-bars, at the rate of approximately 4 litres of emulsion per cubic meter of mound.

e Soiltreatment

Treatmentofcolumnpitsfoundation,trenchesandbasementexcavations:

The bottom surface and the sides (upto a height of 300 mm above concrete foundationlevel) of the excavations made for column pits, wall trenches and basements shall be treated with the chemical at the rate of 5 litre per sqm of surface area. After the columnfoundation and retaining walls of the basement come up, the back fill in immediatecontact with the foundation structure shall be treated at the rate of 15 litres per sqm ofthe vertical surface of the substructure for each side. If water is used for ramming theearth fill the chemical treatment shall be carried out after ramming operation is done byrodding the earth at 150 mm centers close to wall surface and spraying the chemicalwith the above dose. As earth filled in layers the treatment shall be carried out in similarstages. The chemical emulsion shall be directed towards the concrete or masonrysurfaces is well treated with the chemicals. In the case of RCC framed structure withcolumnsandplinthbeamsandRCCbasements,thetreatmentshallstartatthedepthof 500 mm below ground level. From the depth the back fill around the columns beamsand RCC basement wall shall be treated at the rate of 15 litres per sqm of verticalsurface.Theotherdetailsoftreatmentshallbeas described below:

a. Treatmenttotopsurfaceofplinthfilling:

After the earth filling is completed in the plinth area and before the rubble packing orsubgrade is laid, the entire surface of the filled earth shall be treated with the chemical emulsion at the rate of 5 litres per sqm. Light rodding may be carried out in the soilsurface to facilitate absorptionsaturationofthesoilwith chemical emulsion.

For buildings, where construction has advanced already for facility of construction, thetreatment could also be done effectively, over the base concrete (lean mix) under thefloor taking care that the emulsion, at the rate of 5 litres per sqm soak fully into theconcrete.

Theaboveapplicationeffectivelypreventsentryoftermitesthroughthefloorstructure.

b. Treatmentof soilalong externalperimeter

Finally the earth around the external perimeter of the building upto a depth of 30 cm.shall be treated at the rate of 5 litres per running metre of the external wall. To facilitate this treatment solid MS rods should be driven into the soil as close possible to the plinthwall at intervals of 15 cm and upto a depth of 30 cm. and the rods moved backwardsand forwards in a direction parallel to the wall to break up the earth so that the emulsionmixesintimatelywith thesoil.

c. Treatmentof soilsurrounding pipes,wastesandconduits

When pipes, wastes and conduits enter the soil inside the area of the foundation, thesoil surrounding the points of entry shall be loosened around each such pipe, waste orconduits for a distance of 15 cm and upto a depth of 7.5 cm before the treatment iscommenced.Whentheyeenterthesoilexternaltothefoundations,theyshallbesimilarlytreated unless theystand clear of the wallsof the building by about 7.5cm for a distance over 30cm.

d. Treatmentforexpansionjoints:

Expansionjointsatgroundfloorlevelareoneofthebiggesthazardsfortermiteinfestation.The soilbeneaththesejointsshouldreceivespecialattention.This treatment should be supplemented by treating through the expansion joint after the sub-grade has been laid at the rate of 2 litres per linear meter.

e. Spraying equipment:

A pressure pump shall be used to carry out spraying operations to facilitate

uniform spraying and penetration of chemical into the earth. The chemicals, concentration and dosage for horizontal and vertical surfaces are based on the IS code of practice for Anti-termite measures in Buildings. IS 6313 (Part II).

Measurements:

Measurement, if required in case of preconstruction treatment as detailed above shall be for actual area covered by building at ground level in plan in sqm.

Free service guarantee:

The contractor shall not that termite proofing work, is subject to a free service guarantee from the date of completion of the treatment. The contractor shall give an undertaking in writing to the effect that during the guarantee period any infestation of subterranean termites will be eradicated and necessary treatment carried out to prevent re-infestation, free of cost to the employer. The guarantee shall allow a minimum period of 10 (ten) years for pre-construction treatment.

Tenderers must ensure that the work will be done through the professional Pest Control operator. They should be members of Indian Pest Control Association or any other recognized professional body. They should furnish a list of termite control jobs carried out by them successfully for Government Department, Statutory bodies or large private organizations to prove that they are capable of handling anti-termite work.

C MORTARS:

Mortars shall be prepared by mixing graded fine aggregate with cement, in proportions specified for respective items of work as detailed in specifications or drawings. Mixing of mortars shall be done by mechanical mixers only. Hand mixing may be permitted in specified cases on written permission from the engineer.

Mortars shall be classified by proportion only. They shall not be specified by strength. Volumetric mixing shall be based on dry volumes of each ingredient. For convenience, measurement shall correspond to volume of one cement bag i.e. 0.035 cum boxes shall be made of size 40x35x25 cm. These shall be marked as mortar mixing boxes by red paint and shall be used throughout the contract. Hand mixing or mechanical mixing proportioning shall be done with use of these boxes.

Cement mortar shall be prepared by mixing cement and sand in specified proportions. Proportioning shall be carried out as detailed above. Sand shall be added suitably to allow for bulkage. Bulkage shall be determined as specified in I.S. cement and sand added to the mixer shall be thoroughly mixed and water shall be added to it gradually. Mixer after addition of water shall run for minimum 3 minutes. Mortar mixed shall be consumed within 30 minutes of mixing.

D. CONCRETE MIX AND MORTAR:

Whenever not specified in the specifications or on the drawings, use following mixes: a] plain concrete under foundations and floors etc.

Cement concrete 1:4:8 [1 cement: 4 coarse sand: 8 stone aggregate 40 mm size].

- b] Plain concrete for bed block, concrete blocks to anchor door and windows hold fasts, gate posts, grill blocks coping and anchor foundations of over head water tank decking etc.

Cement mix M-15

- c] Reinforced concrete Concrete mix M-20 Concrete mix M-25

- d] Precast concrete member concrete mix M-15

- e] Mortar for blockwork, stone masonry:

i] Cement mortar 1:6 [1 cement: 6 coarse sand] for 200 mm or thicker sections.

ii] Cement mortar 1:4 [1 cement: 4 coarse sand] for section thinner than 200 mm.

- f] Mortar for plastering:

Cement mortar 1:3 [1 cement: 3 sand]. For members in contact with soil or

plinth filling. Cement mortar 1:6 [1 cement: 6 sand] for internal plaster.

Cement mortar 1:4 [1 cement: 4 sand] for external plaster

E. CAST IN PLACE REINFORCED CEMENT CONCRETE

1.0 GENERAL

1.1 DESCRIPTION

This section covers the requirements for furnishing of cement concrete including materials, proportioning, batching, mixing, testing, placing, compacting, finishing, joining, curing and all other work as required for reinforced cement concrete. Cement concrete shall be composed of cement, fine aggregate, coarse aggregate, and water with or without admixture as approved, proportioned and mixed as specified herein.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- a) Steel reinforcement
b) Formwork

1.3 APPLICABLE CODES AND STANDARDS

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

IS: 269 Ordinary and low heat Portland Cement.

IS: 383 Coarse and fine aggregates from natural sources for concrete. IS: 455 Portland slag cement.

IS:456 Code of Practice for plain and reinforced concrete. IS:516 Methods of test for strength of concrete.

IS: 1119 Methods of sampling and analysis of concrete IS:1489 Portland Pozzolana cement.

IS:1838 Performed fillers for expansion joints in concrete non extruding and resilient type.

IS:1946 Code of practice for use of fixing devices in walls, ceiling and floors of solid construction.

IS: 2386 Methods of test for aggregates for concrete. (PART I TO III)

IS: 2645 Integral cement waterproofing compound.

IS: 3414 Code of practice for design and installation of joints in building. IS:3535 Methods of sampling hydraulic cement

IS: 3558 Code of Practice for use of immersion vibrators for consolidating concrete. IS:4031 Methods of physical test for hydraulic cement

IS:4032 Methods of chemical analysis of hydraulic cement

IS: 4082 Recommendations on stacking and storage of construction materials at site.

IS:6925 Methods of test for determination of water-soluble chlorides in concrete admixtures.

2.0 SUBMITTALS:

2.1 MATERIALS REPORT

2.1.1 Prior to start of delivery of materials required for cement concrete, the following shall be submitted by the Contractor to the JDA for approval:

- a) Recommended supplier and/or sources of all ingredients for making concrete including cement, fine and coarse aggregate, water and additives.
- b) Quality inspection plan to ensure continuing quality control of ingredients by periodic sampling, testing and reporting to the JDA on the quality of materials being supplied.

2.2 MIX DESIGN

2.2.1 The contractor shall design mixes for each class of concrete indicating that the concrete ingredients and proportions will result in concrete mix meeting requirements specified.

2.2.2 Prior to commencement of concreting work the Contractor shall submit the mix design as a report for the approval of JDA. This report shall compare the proposed mix design with specified requirements and shall be summarized on a form similarly to that shown in Appendix-I.

2.3 PLANT AND EQUIPMENT

2.3.1 The Contractor shall submit the following to the JDA well in advance:

- a) The proposed programme, methods and details of plant and equipment to be used in testing ingredients, mix design and concrete samples.
- b) The proposed programme, methods and details of plant and equipment to be used for batching and mixing of concrete.

2.4. CERTIFICATES

2.4.1 With each mix design, the Contractor shall submit laboratory test reports, and manufacturer's certificates test reports and manufacturer's certificates attesting that ingredients are conforming to specifications.

2.4.2 In case the source, brand or characteristic properties of the ingredients need to be varied during the term of the contract, a revised laboratory mix report shall be submitted.

2.5 REPORT FOR INSPECTION AND TESTING

During concreting operations, the Contractor shall conduct inspection and testing, and all reports thereon shall be submitted in summary form to the JDA.

2.6 SCHEDULES

During construction, the Contractor shall prepare working schedules for dates and rate of placing of concrete for each item of work and submit the same to the JDA when requested.

3.0 MATERIALS:

3.1 Before bringing to the site, all materials for cement concrete shall be approved by the JDA. All approved samples shall be deposited in the office of the JDA before placing orders for the materials with suppliers. The materials brought on to the work shall conform in every respect to their approved samples.

3.2 Fresh samples shall be deposited with the JDA whenever type or source of any material changes. The Contractor shall check each fresh consignment of materials as it is brought on to the work to ensure that they conform to the specifications and/or approved samples.

3.3 The JDA shall have the option to have any of the material tested to find whether they are in accordance with specifications at the Contractor's expense. All bills, vouchers and test certificates, which in the opinion of the JDA, are necessary to convince him as to the quality of materials of their suitability shall be produced for his inspection when required.

3.4 Any materials which have not been found to conform to the specifications and not approved by the JDA shall be rejected and shall be removed from the site by the Contractor at his own cost within the time stipulated by the JDA. The JDA shall have the power to cause the Contractor to purchase and use materials from any particular source, as may in his opinion be necessary for the proper execution of work.

3.5 AGGREGATES

3.5.1 Aggregates from natural sources shall be in accordance with IS:383. The Contractor shall submit to the JDA certificates of grading and compliance from the suppliers for all consignments of aggregate. In addition, from time to time, the Contractor shall test the aggregates at site in accordance with IS: 2386, part I, II and III. The Contractor shall allow for and provide all necessary apparatus for carrying out such tests and for supplying test records to

the JDA.

3.5.2 For fair faced concrete, the Contractor shall ensure that aggregates are free from iron particles and impurities, which may cause discoloration.

3.5.3 FINE AGGREGATE

3.5.3.1 The fine aggregate shall be pit sandstone dust or other approved sand. It shall be free from clay, loan, earth or vegetable matter and from salt or other harmful chemical impurities. It shall be clean, sharp, strong, angular and composed of hard siliceous materials.

3.5.3.2 The grading of sand as determined by the methods prescribed in IS:2386 Part I shall be within the limits of Grading Zone II given in table 1. When the grading falls outside their percentage limits given for sieves other than 600 micron, 300 micron and 150-micron (I.S) sieves but not more than 5 percent, it shall be regarded as falling within this zone. The 5% it shall be regarded as falling within this zone. The 5% can be excess summation on one or more sieves.

TABLE-FINE AGGREGATE

I.S Sieve DESIGNATION	PERCENTAGE PASSING FOR GRADING		
	ZONE-I	ZONE-II	ZONE-III
10 mm	100	10 0	1 0 0
4.75mm	90-100	90-100	90- 100
2.36mm	60-95	75-100	85- 100
1.18mm	30-70	55-90	75- 100
600 micron	15-34	35-59	35- 60
300 micron	5-20	8-30	8- 30
150 micron	0-10	0-10	0- 10

3.5.3.3 The maximum quantity of silt as determined by the method prescribed in IS:2386 Part I shall not exceed 8 percent.

3.5.3.4 Stone dust shall be obtained by crushing hard stone and the grading as determined by the method prescribed in IS: 2386 part I shall be within the limits of Grading falls outside the percentage limits given for the sieves other than 600 micron and 300 micron (I.S) sieves by not more than 5% and on 150 micron sieve by not more than 20% can be excess summation on one or more sieves.

3.5.4 COARSE AGGREGATE

3.5.4.1 The Coarse aggregates shall be crushed stone, river shingle or approved pit gravel.

3.5.4.2. Coarse aggregate obtained from crushed or broken stone shall be angular, hard, strong, dense, durable, clean and free from soft, friable, thin, flat, elongated or flaky pieces.

3.5.4.3. River shingle or pit gravel shall be rounded, sound, hard, clean, non-porous, suitably graded in size with or without broken fragments and free from flat particles of shale, clay, silt, loam and other impurities.

3.5.4.4. Except where it can be shown to the satisfaction of the JDA that a supply of properly graded aggregate of uniform quality can be maintained over the period of works, the grading of aggregates shall be controlled by obtaining the coarse aggregate in different sizes and blending them in correct proportions as and when required.

3.5.4.5. The maximum size of coarse aggregate shall be such that the concrete can be placed without difficulty so as to surround all reinforcement thoroughly and fill the corners of formwork.

3.6 WATER

3.6.1 Water used in the works shall be potable water and free from deleterious materials. Water used for mixing and curing concrete as well as for cooling and/or washing aggregate shall be fresh and clean, free from injurious amounts of oil, salts, acids, alkali, other chemicals and organic matter.

3.6.2 Water shall be from the source approved by the JDA and shall be in accordance with clause 4.3 of IS:456.

3.6.3 Before starting any concreting work and wherever the source of water changes, the water shall be tested for its chemical and other impurities to ascertain its suitability for use in concrete for approval of the JDA. No water shall be used until tested and found satisfactory. Cost of all such tests shall be borne by the Contractor.

3.7 ADMIXTURES AND ADDITIVES

3.7.1 Chemical admixtures are not to be used until permitted by the JDA. In case their use is permitted, the type, amount and methods of use of any admixture proposed by the Contractor shall be submitted to the JDA for approval.

3.7.2 The Contractor shall further provide the following information concerning each admixture to the JDA.

- a) Normal dosage and detrimental effects if any of under dosage and over dosage.
- b) The chemical names of the main ingredients in the admixture.
- c) The chloride ion content if any expressed as a percentage by weight of admixture.
- d) Whether or not the admixture leads to the entrapment of air when used in the manufacturer's recommended dosage.
- e) Where two or more admixtures are proposed to be used in any one mix, the manufacturer's written confirmation of their compatibility.

3.7.3 In reinforced concrete, the chloride ion of any admixture used shall not exceed 2 percent by weight of the admixture as determined in accordance with IS:6925 and the total chloride in all admixtures used in concrete mix shall not exceed 0.30 percent by weight of cement.

3.7.4 The admixtures when used shall conform to IS:9103. Trial mixes shall verify the suitability of all admixtures.

3.7.5 The addition of calcium chloride to concrete containing embedded metal will not be permitted under any circumstances.

3.7.6 Retarding admixtures when used shall be based on lignosulphonates with due consideration to clause 5.2 and 5.3 of IS:7861.

3.7.7 Waterproofing admixtures shall comply with IS:2645.

4.0 PLANT:

- 4.1 The Contractor shall obtain the approval of the JDA for all plant items she propose to use for the manufacture and placing of concrete.
- 4.2 The arrangement and siting of plant for the manufacture of concrete shall be agreed with the JDA.
- 4.3 The Contractor shall maintain all items of plant at all times in a clean and efficient working condition.

5.0 STORAGE:

All goods and products covered by these specifications shall be produced well in advance and stored as specified below:

5.1 CEMENT

- 5.1.1 Cement shall be stored on a raised floor in dry weatherproof and drought free but well ventilated shed.
- 5.1.2 Cement bags shall be stacked close together away from external walls and in stacks not more than ten bags to avoid lumping under pressure.
- 5.1.3 Cement stored during monsoons or cement expected to be in store for more than eight weeks shall be completely enclosed in 700 gauge polythene sheet so arranged that the flap closes on the top stack. The Contractor shall ensure that protective polythene sheet is not damaged at any time during use.
- 5.1.4 Cement of different types shall be stored in separate sheds or separate compartment of shed. If different types of cement are mixed, the JDA will have the discretion to condemn all the cement concerned.
- 5.1.5 Consignments of cement shall be used in order of delivery. A record shall be kept of the batch numbers of cement deliveries in such a form that the part of the works in which the cement is used can be readily identified.
- 5.1.6 The Contractor shall be responsible for the storage of cement at the site and no claim will be entertained in the event of any damage occurring to cement due to faulty storage by the Contractor or on account of his negligence.
- 5.1.7 Cement stored on site for a period longer than eight weeks shall be tested to the satisfaction of the JDA before it is used in the works.
- 5.1.8 Cement which has so deteriorated in quality that it no longer conforms in all respects to the requirements of this specification will be condemned by the JDA and shall not be used in the works. The Contractor shall immediately remove from the site all cement that has been so condemned.

5.2 AGGREGATES

- 5.2.1 Aggregates shall be stored on a suitable well-drained raft of concrete, timber, metal or other approved material. The storage of aggregate on the ground will not be permitted.
- 5.2.2 Each size of aggregate shall be stored separately in such a manner as to prevent spillage and mixing of one aggregate with an adjacent aggregate. The dividing walls of any bin shall be of sufficient height and the aggregate shall be so deposited that a distance of 300 mm shall be left between the top of the division wall and any part of the aggregate slack.
- 5.2.3 When slack piling, the aggregates shall not form pyramids resulting in segregation of different size particles the slacks shall be regular and of a height not exceeding two meters.

6.0 CONCRETE MIX PROPORTIONS:

Cement concrete used in the works shall be either of the two categories given below:

6.1 ORDINARY CONCRETE

All cement concrete not designated by strength shall be treated as ordinary concrete of nominal mix as specified. The aggregates and cement shall be as specified. The aggregates and cement shall be measured by volume. Mixing water shall be measured in graduated litre cans.

6.2 CONTROLLED CONCRETE

- 6.2.1 All cement concrete designated by strength shall be treated as controlled concrete. The controlled concrete shall conform to one of the grades specified here in or on the drawings. The aggregates and cement shall be measured by weight in approved weight batching equipment. Mixing water shall be measured in graduated liter cans. One or more complete bags of cement shall be used for each batch of concrete.
- 6.2.2 The controlled concrete shall meet with the strength requirement laid down in table 2. The aggregate cement ratio and water cement ratio to be used for obtaining the specified cube strengths given in Table 2 shall be determined in accordance with the design of determined in accordance with the design of the mix.
- 6.2.3 The Contractor shall be responsible for designing mixes of the specified performance to suit the design of workability and characteristic strength, required for the various parts of the works.
- 6.2.4 Alternative mixes may be designed by the Contractor for use in both thin and narrow sections and thick sections. Special mixes using finer aggregates may be designed by him for infilling pockets and narrow spaces and for regions of congested reinforcement.
- 6.2.5 The minimum cement content for controlled concrete shall not be less than the amount given in Table 2 for the particular grade of concrete.

TABLE -2		
Group	Grade Designation	Specified Characteristic Strength of 150mm Cube at 28 days in N/mm ² .
Ordinary concrete	M10	10
	M15	15
	M20	20
Standard Concrete	M25	25
	M30	30
	M35	35
	M40	40
	M45	45
	M50	50
	M55	55
High Strength Concrete	M60	60
	M65	65
	M70	70
	M75	75
	M80	80

7.0 WATER CEMENT RATIO

- 7.1 The quantity of water added to the cement and aggregates during mixing shall be such as to produce concrete having sufficient workability to enable it to be properly compacted to be worked into the corners of the shuttering and around reinforcement.
- 7.2 Due account shall be taken of the variation of moisture content within any consignment of aggregate and any variations due to watering, exposure to rain or drying weather. The content tests in accordance with IS:2386 Part III on stacked aggregates as directed by the JDA and results submitted to him.
- 7.3 In case of ordinary concrete the maximum value of water cement ratio shall be 0.50 and in the case of controlled concrete the water cement ratio is determined

by the mix design.

- 7.4 The Contractor shall exercise particularly tight control on the water content for fair faced concrete the colour of which is sensitive to small variation of water in mix.
- 7.5 When a suitable water cement ratio has been determined and agreed with the JDA, it shall be maintained throughout the corresponding part of works. Approved tests shall be undertaken periodically by the Contractor to satisfy the JDA if the Contractor is able to demonstrate that such a reduction is consistent with producing concrete of the required workability and characteristic strength.
- 7.6 The Contractor shall frequently test the concrete for slump-cone test. The slump at the point of placing as measured in accordance with the methods laid down in IS: 1199 shall not be more than 75 mm and not less than 20 mm except for concrete containing a retarder or plasticizer admixture when the initial slump shall be 100 mm to 125 mm.

8.0 REQUIREMENT OF CONTROLLED MIXES

- 8.1 The measure of quality control exercised by the Contractor in the manufacture of the Concrete mix shall be the standard deviation derived from the analysis of cube results tested in accordance with IS: 516.
- 8.2 The contractor shall design each concrete mix to have mean strength greater than the required characteristic strength by at least the current margin defined as 1.64 times the standard deviation. In the first instance the Contractor shall assume a Standard Deviation of 5.5 N/mm.
- 8.3 Should the analysis of the first 30 cube test results of concrete of nominally similar proportions of similar materials and produced over a period exceeding 5 days but not exceeding 6 months by the same plant under similar supervision show the standard deviation to be less than 4.5 N/sq.mm the mix may be re-designed assuming a standard deviation of 4.25 N/sq.mm in which case the Contractor shall submit details of the proposed new mix proportions to JDA for his consideration.
- 8.4 Should the further analysis of the next 100 cube test results of concrete of nominally similar proportions of similar materials and produced over a period not exceeding 12 months by the same plant under same supervision show the standard deviation to be less than 3.75 N/sq.mm the Contractor may redesign the mix assuming a standard deviation of 3.5 N/sq.mm and shall submit the details of the proposed new mix proportions to the JDA for his consideration.
- 8.5 If at any time the statistical minimum strength of the concrete defined as the mean strength minus 1.64 times the actual standard deviation as determined from cube test results falls below the characteristic strength, the mix shall be redesigned by the Contractor. Details of the new mix proportions shall be submitted to the JDA for his comments and the Contractor's supervision and degree of control over mix proportions shall be required.

9.0 APPROVAL OF DESIGNED MIXES

- 9.1 The Contractor shall submit to the JDA for comments sufficient evidence based on trial mixes that for each grade of concrete the intended workability, the proposed mix proportions and the method of manufacture will produce concrete of the required quality.
- 9.2 The Contractor shall obtain from the JDA his written approval on the mix design for each grade of concrete before any concrete of that grade is placed in the works.
- 9.3 For each grade of concrete, three separate batches of concrete shall be made by the Contractor using material typical of the proposed supply and under full-scale site condition.

- 9.4 The workability of each of the trial batches shall be determined and 6 specimen preliminary test cubes shall be produced from each trial batch. Three cubes of each set shall be tested at 7 days and the remaining 3 cubes of each set shall be tested at 28 days.
- 9.5 The trial mix proportions for each grade of concrete shall be considered satisfactory if the mean strength of the 9 cubes tested at 28 days exceeds the specified characteristic strength by between 0.6 and 1.2 times the current margin and the least cube strength is greater than the specified characteristic strength and the concrete contains the correct amount of cement and the free water/cement ratio is below the maximum specified value.
- 9.6 Following agreement with the JDA on the trial mix proportions should the Contractor wish to make substantial changes in the materials or in the proportions of the materials to be used in a mix, the JDA will require further trial mixes to be made and their results submitted for the comments prior to such materials or proportions being adopted by the Contractor, except that no such trial mixes will be required under subclause 8.3 and 8.4 of this specification.

10.0 CONCRETE TESTING

10.1 TEST CUBES

- 10.1.1 The strength of concrete either in assessing the suitability of the trial mixes or when placed in the works shall be determined from 150mm cubes made, cured, stored, transported and tested in accordance with IS:516.
- 10.1.2 Test cubes shall be made as, where and when the JDA may require.
- 10.1.3 Test cubes shall be made under the direct supervision of the competent person appointed by the Contractor to supervise all stages of the preparation and placing of concrete. They shall be made by the Contractor in the presence of the JDA generally from concrete taken at the point of discharge from the mixer and the Contractor shall provide suitable facilities in the form of a hut or other covered protection as agreed with or directed by the JDA for the storing and curing of the test cubes during the first 24 hours after making them and until they are dispatched to the testing laboratory.
- 10.1.4 Test cubes shall be marked and dated in such a manner that the grade and the part of the works in which the concrete they represent has been placed can be readily identified.
- 10.1.5 Testing shall be done at an approved laboratory at the site itself and the results shall be submitted promptly by the Contractor to the JDA.

10.2 WORK TEST

- 10.2.1 When concrete of a particular grade is first used in the works, 2 cubes shall be taken from 3 separate batches during each of the first 7 days of using that grade. Of these 6 cubes 9 each cube representing concrete made of a different batch shall be tested at 7 days and the remaining 3 cubes shall be tested at 28 days.
- 10.2.2 For every subsequent 20 cum of concrete or for every days concreting be the less in column, 6 cubes shall be made for each grade of concrete and tested at 7 and 28 days as for sub-clause 10.2.1
- 10.2.3 If the mean concrete strength determined from such 28 day cube tests does not reach the characteristic strength for that grade, the materials and/or their proportions for that grade shall be modified by the Contractor to the satisfaction of the JDA.
- 10.2.4 Regarding testing, measurement and rates and any other item not specifically mentioned under this specification, the provision of PWD (Raj.) specifications 1998 with up to date corrections slip shall apply.

10.2.5 In addition the Contractor at his own expense takes such action as the JDA may consider necessary on the concrete placed in that part of the works represented by these test cubes so found to be below the characteristic strength.

11.0 WEIGHT BATCHING

- 11.1 Unless otherwise agreed with the JDA all concrete ingredients except water for controlled concrete shall be weight batched using a platform (similar to one used for weighing luggage at railway station) weighing up to 200 kg to the nearest 100 gm or any other approved type of weight batcher.
- 11.2 Batching shall be of an accuracy of not less than 1/2 kg and the weighing batching equipment shall have an accuracy of + 3 percent. The weighing batches shall be tested for accuracy of calibration before commencement of work and at least once a fortnight thereafter, or more frequently, if so required by the JDA.

12.0 CONCRETE MIXING

- 12.1 All concrete whether ordinary or controlled, shall be mixed in an approved mixer for the minimum time necessary to ensure adequate quality and uniform distribution of the materials. The cement and aggregates shall normally be first mixed dry until all particles of aggregate are coated with cement after which the water shall be added.
- 12.2 Allowance shall be made for the moisture content of the aggregates when calculating the amount of water to be added for each mix.
- 12.3 The temperature of the aggregate, water and cement when added to the mixer shall be such that the temperature of the concrete at the time of placement is less than 40°C.
- 12.4 Materials for concrete shall be deposited into the drum while it is in rotation. Mixers shall not be loaded beyond their rated capacity and each batch shall be completely discharged from the drum before recharging takes place.
- 12.5 Facilities shall be provided to spray the mixer drum with cool water between batches and on the completion of concreting the drum shall be washed down. The surface of the mixer drum shall be maintained in a clean condition at all times.
- 12.6 Retempering and/or mixing of concrete which has partially HARDENED and set will not be permitted under any circumstances.

13.0 TRANSPORTING

- 13.1 The period between mixing the concrete and placing it in the final position shall be kept to a minimum and the delivery of concrete shall be co-ordinated with the rate of placement to avoid delays in delivery and placement.
- 13.2 Concrete shall be handled from the place of mixing to the place of final deposit by methods that prevent segregation, loss of ingredients and contamination and maintain the required workability.
- 13.3 Should any segregation have occurred in any batches arriving at the place of deposition, such batches shall be deposited and thoroughly turned over by hand before placing in the works.
- 13.4 Where concrete is conveyed by chutes, the chute shall be made of metal or fitted with metal linings. The approval of the JDA shall be obtained for the use of chutes in excess of 3 metres long and in such cases the concrete shall be remixed if so required by the JDA.
- 13.5 All plant and equipment used in the transportation of concrete shall be thoroughly cleaned before and after each working period and at all changes of concrete mixes. Water used for

this purpose shall be discharged will clear of formwork or the concrete already in place.

14.0 PREPARATION BEFORE CONCRETING

- 14.1 The inside surface of the forms against which concrete is to be placed shall be clean and free from dried or hardened spattering or coatings of concrete. The forms shall be well wetted before placing concrete.
- 14.2 When the work has to be resumed on a surface, which has hardened, such surfaces shall be roughened. It shall then be swept clean, thoroughly wetted and covered with 12mm layer of freshly mixed mortar composed of cement and sand (in the same ratio as the cement and sand in the concrete mix) immediately before placing of concrete.

15.0 PLACING

- 15.1 Concreting of any portion of the work shall be done only in presence of the representatives of the JDA.
- 15.2 Concrete shall be carried out continuously between construction, contraction or expansion joints, shown on the drawings or agreed with JDA. The Contractor shall closely follow the sequence of concreting where such is specified on the drawings. If concreting is interrupted before reaching the predetermined joint an approved construction joint shall be provided.
- 15.3 Immediately before placing of concrete for columns and walls, the reinforcement within and the old concrete at the bottom of the formwork shall be given a coating of cement sand mortar of the identical materials and proportions to be used in the subsequent concrete, to prevent the loss of fine material from the initial concrete pour.
- 15.4 Concrete shall be deposited as nearly as is practicable to its final position and shall not be dumped in a large quantity at any point to be run or worked along the formwork manually or with vibrators. Concrete shall not be deposited at a faster rate than it can be placed and compacted.
- 15.5 Concrete shall be thoroughly worked into the forms so that they are entirely filled, reinforcing bars so that they are entirely filled, reinforcing bars adequately and tightly surrounded and entrained air released from the mass of concrete. Placing shall be carried out by hand prodding as well as vibrators in a manner directed by the JDA.
- 15.6 The concrete shall be placed in layers not greater than 300-mm thickness and thoroughly compacted before succeeding layers are placed. Concrete shall be placed in single operation to the full thickness of slabs, beams and similar members. No concrete shall be placed on concrete which has set sufficiently to cause the formation of planes of weakness and where this is likely to occur due to unforeseen circumstance the procedure to be followed shall be as for clause 14.2 of this specification.

16.0 COMPACTION

- 16.1 Each layer of concrete whilst being deposited shall be compacted by approved methods to form dense material with all surface free from honeycombing, air holes or other blemishes. The Contractor shall use mechanical vibration for all concrete and shall take care that internal vibrator shall not be brought into contact with the reinforcement or the formwork. Where external vibration of the forms is not adopted for fair faced surfaces, the concrete shall be manually vibrated adjacent to such surface in addition to internal vibrating.
- 16.2 An adequate number of vibrations shall be used to ensure that compaction of concrete is achieved within 10 minutes of placing. Particular attention shall be given to the compaction of the concrete around the water bars to ensure that no voids or porous areas are left.
- 16.3 Compacting shall cease as soon as excess water appears on the face of concrete.

Any water accumulating on the surface of newly placed concrete shall be removed by approved methods and no further concrete shall be placed there on until such water has been removed.

- 16.4 Notwithstanding the requirements regarding mix design, should it be found that the proportion of water in the mix is such that laitance forms before compaction (i.e. completion of expulsion of air) is complete, the quantity of water in the mix shall be reduced. No water shall be added to concrete after mixing has been completed, but where the proportion of water in the mix is such that it is impossible to achieve complete compaction, the quantities of cement and water. Whenever either of the aforesaid procedures is to be adopted, an additional set of 6 cubes for testing at 7 or 28 days shall be made from the adjusted mix.
- 16.5 The time elapsing between the discharge of the concrete from the mixer and the completion of compaction shall not exceed 30 minutes.
- 16.6 A sufficient number of spare vibrators shall be kept readily accessible to the place of deposition of concrete to assure adequate vibration in case of breakdown of those in use.

17.0 FINISHES

- 17.1 All concrete surfaces shall have a good, dense finish. Except for slabs the exposed faces of concrete for which formwork is not provided shall be smoothed with a steel or woodentowel to provide a finish equal to that face where formwork is provided.
- 17.2 The top surfaces of all floor and roof slabs specified as smooth shall be leveled and trowelled before the concrete begins to set to a smooth finish at the levels or falls shown on the drawings. The troweling shall be done at such a time and in such a manner that an excess of mortar is not brought to the surface of concrete nor the aggregate displaced. The top surfaces of concrete slabs specified to receive an integral finish shall be uniformly roughened by deep hacking before the finish is laid.
- 17.3 Immediately after striking the formwork and removing any superficial water, honeycombed areas in normal unfinished concrete shall be inspected by the JDA and, where directed, the Contractor shall immediately make good at his own expenses such honeycombing whilst the concrete is still green to the satisfaction of the JDA. All air holes shall be similarly filled in.
- 17.4 The Contractor shall be responsible for providing an adequate key in concrete where plastering or rendering is specified to be applied. Hacking of the concrete surface immediately after striking the formwork will be permitted.
- 17.5 The faces of all fair faced concrete shall be of even colour throughout, free from air bubbles, cracks, honeycombing or other blemishes and will be inspected by the JDA immediately after the formwork has been struck. Such faces shall not be rubbed down after striking the formwork to remove fins, excrescences or any similar imperfections without the prior permission of the JDA.
- 17.6 Concrete surface finishes shall accord to the requirements and all instructions by the JDA with regard to the method of achieving such finishes shall be implemented.

18.0 CURING AND PROTECTING

- 18.1 Walling on concrete shall not be permitted for at least 24 hours after it has been placed in position or for such additional length of time as the JDA.
- 18.2 Immediately after compaction and completion of any surface finishes, the concrete shall be protected from the evaporation of moisture by means of polythene sheeting, wet hessian or other similar material kept soaked by spraying. As soon as the concrete has attained a degree of hardening sufficient to withstand surface damage moist curing shall be implemented and maintained for a period of at least 15 days after casting.
- 18.3 Method of curing and their durations shall be such that the concrete will have satisfactory durability and strength and members will suffer efflorescence and will not cause by its shrinkage undue

cracking in the works.

- 18.4 The top surfaces of slabs and other horizontal surfaces shall be cured by impounding water in cement mortar bunds. Steeply sloping and vertical formed surfaces shall be kept completely and continuously moist prior to and during the striking of formwork by applying water to the top surfaces and allowing it to pass down between the formwork and the concrete.
- 18.5 The Contractor shall give careful consideration to the curing methods and conditions for fair faced concrete. Components, which are specified to have exposed concrete finish, shall receive the same curing treatment. Moreover water used for curing shall be clean so as not to discolour the concrete.
- 18.6 All fair-faced concrete shall be protected from damage from the time of striking the formwork. All edges and surfaces of such concrete shall be protected from chipping using notched timber corner pieces or other suitable covers, which shall be maintained in place until the completion of the work.
- 18.7 The Contractor shall be responsible for ensuring all fair faced concrete free of stains from concrete materials and shall clean all such staining as may occur at his own cost as soon as possible to the satisfaction of the JDA.

Vacuum Dewatering

C.C. pavement of minimum mix M-35 with ready mixed concrete from batching plant. The ready mixed concrete shall be laid and finished with screed board vibrator, vacuum dewatering process and finally finished by floating, brooming with wire brush etc. complete as per specifications and directions of Engineer-in-charge.

Material

All materials of construction like cement, aggregate, sand, water etc.

Cement is particularly suitable as binding agent. Cement content shall be at the lowest limit. The total filler content consisting of cement and fine particle, shall be limited to a minimum. This factor is of foremost importance both for the vacuum and for the reduction of shrinkage.

Grade of Concrete

Minimum grade of concrete used shall be M-25 conforming to IS-456. Only Design Mix Concrete shall be used. For other details like proportioning, batching, mixing, placing, curing etc.

Special Requirement

All works covered by this specification shall be carried out by an experienced agency having expertise in vacuum dewatering concrete system after getting the same approved. Only skilled and experienced operators shall be employed for the purpose. Prior approval of the agency shall be obtained from the JDA before starting the work. All the equipment shall be of approved and proven types and suitable for the work involved.

Concrete laying pattern shall be decided in consultation with the JDA and with his approval. The maximum width of a slab strip shall not generally exceed 4 meters and minimum number of construction joints shall be used. Alternate slab strips shall be sequentially laid. Any damage to the already finished top surface shall be avoided. At construction joints no overflow of mortar or slurry on the already hardened surface shall be allowed while concreting the intermediate slab strip. Such construction joints shall be marked with a thread in a straight line while the concrete is still green. Continuity of reinforcement shall be maintained while laying concrete in slab strips. Edges at expansion joints shall be protected and proper arrangement of shear-transfers shall be provided as standards.

For concrete compaction after placing concrete in position, it shall be vibrated thoroughly using

oker/needle vibrators and thereafter leveled with surface vibrators to produce a homogeneous and smooth concrete surface. In order to achieve a smooth surface to the satisfaction of the Engineering-in-Charge, surface vibrators shall be very carefully used by skilled operators. Over vibration resulting in excess mortar near the surface shall be avoided.

Dewatering

Suction mats shall be spread over the leveled fresh concrete surface and shall be connected by suction hose to the vacuum pumps for De-watering of surplus water in the concrete. During De-watering it shall be ensured that no cement/cement slurry is pumped out.

Floating and Troweling

This shall be done after De-watering by using skim floater (power floater). After this, surface shall be troweled with minimum two passes of power trowel to achieve a wear-resistant surface to the satisfaction of the JDA.

Curing

However, all care shall be taken to avoid any stain or permanent stain on the surface. Any stain or permanent marking on the top surface shall be removed by approved means.

Approach Working Platform & Formwork

The Agency shall arrange all approaches, scaffolding, working platform, etc. for carrying out the entire operations safely and in a work-man-like manner. The working area shall be nearly maintained and all the facilities required by the JDA for proper supervision of the work shall be provided.

The specification and method statement shall be submitted by the agency well in advance before the start of execution. The execution shall be allowed only after due approval of JDA.

19.0 CONSTRUCTION JOINTS

- 19.1 Construction joints shall be made only where shown on the drawings. Where the Contractor wishes to form joints in concrete other than those shown on the drawings, he shall submit his proposals giving the position, form and treatment of such joints to the JDA for his approval.
- 19.2 Vertical construction joints shall be formed against a stop board and horizontal construction joints shall be level.
- 19.3 Except where shown otherwise on the drawing, reinforcement shall continue through construction joints.
- 19.4 As soon as possible after the formwork has been struck for vertical joints or after the concrete has set in horizontal joints, the surface laitance of the hardened concrete on the face of the joint shall be removed to expose the coarse aggregate in such a manner that the loosened particles of aggregate and damaged concrete are not left on the surface. The exposed face shall be swept clean of foreign matter and laitance. Feathered construction joints will not be permitted. Immediately before placing the new concrete, neat cement grout shall be poured over the old concrete followed for horizontal joints by a 12mm thickness of sand cement mortar of the same materials and proportions to be used in the new concrete.

20.0 CONTRACTION JOINTS

20.1 Contraction joints required will be as shown on the drawings.

20.2 Construction joints shall not be hacked, wetted or mortared before concrete is placed against them.

21.0 EXPANSION JOINTS

Floor Joint of 50mm Gap (modular) Expansion joint system shall be related with floor location as per drawings and wherever directed by Engineer-In-Charge. The joint system will be of extruded aluminum base members, self-aligning /self centering arrangement and support plates etc. as per ASTM B221-02. The system shall be such that it provides floor to floor /floor to wall expansion control system for various vertical locations in load application areas that accommodates multi directional seismic movement without stress to its components. System shall consist of metal profiles with a universal aluminum base member designed to accommodate various project conditions and finish floor treatments. The cover plates shall be designed of width and thickness required to satisfy projects movement and loading requirements and secured to base members by utilizing manufacturer's pre-engineered self-centering arrangement that freely rotates/ moves in all directions. The Self-centering arrangement shall exhibit circular sphere ends that lock and slide inside the corresponding aluminum extrusion cavity to allow freedom of movement and flexure in all directions including vertical displacement. Provision of Moisture Barrier Membrane in the Joint System to have a water tight joint is a mandatory requirement all as per the manufacturer's design and as approved by JDA. (Material shall conform to ASTM 6063).

Roof Joint of 50mm gap

Expansion joint system of approved make and manufacture for various roof locations shall be provided as per approved drawings and wherever directed by JDA. The joints shall be of extruded aluminum base members with, self-aligning and self-centering arrangements support plates as per ASTM B221-02. The system shall be such that it provides water tight roof to roof / roof to corner joint cover expansion control system that is capable of accommodating multi directional seismic movement without stress to its components. System shall consist of metal profile that incorporates a universal aluminum base member designed to accommodate various project conditions and roof treatments. The cover plate shall be designed of width and thickness required to satisfy movement and loading requirements and secured to base members by utilizing manufacturer's pre-engineered self-centering arrangement that freely rotates/ moves in all directions. The Self-centering arrangement shall exhibit circular sphere ends that lock and slide inside the corresponding aluminum extrusion cavity to allow freedom of movement and flexure in all directions including vertical displacement. The Joint System shall resist damage or deterioration from the impact of falling ice, exposure to UV, airborne contaminants and occasional foot traffic from maintenance personnel. Provision of Moisture Barrier membrane in the Joint System to have a water tight joint is a mandatory requirement. (Material shall conform to ASTM 6063.)

Application Procedure Expansion joint shall be provided as shown in the approved drawing and as per direction of JDA. All joints shall be cleaned and free from loose aggregates, the edges shall be in proper line. The joint shall be of the appropriate width as per the drawings. Provide continuous frame on each side of the joint, designed to support gasket and centre plate where required. After installing the frames at both sides, place the centre plate in between the two frames and finally flush the gasket on the top of the frames. Fixing of the joint after proper assembly of the components shall be through the proper stainless-steel counter sunk screws, which shall be drilled to the base concrete slab beams with a bonding agent.

The specification and method statement shall be submitted by the agency well in advance before the start of execution. The execution shall be allowed only after due approval of JDA.

Armour Board for Expansion

S. No	Parameters	Units	Test Result	Tested as per

1	Water Absorption	Kg/Sq.Mtr	0.45 Max	AST M-1575
2	Density	Kg/Cu.Mtr	28 Min	Do
3	Compression Strength (25% Deflection)	Kg/CmSq	0.21 Min.	Do
4	Compression Set	%	25% Max	Do
5	Tensile Strength	Kg/Sq.Cm	1.8 Min.	Do
6	Elongation	%	60 In	Do

Joint Providing armour Board of approved colour shall be provided between expansion joints, thickness built up using 10mm specifically extruded high performance sheet minimum density 28kg per cum and compression strength 0.21 Kg./Sq.m when tested as per ASTM D-3575 including using double sided adhesive tape of 25x25x2 mm at four places per Sq.m to the casted surface to form the expansion joint and will become one side of the shuttering while the expansion joint is being created, including cost of all materials, Transportation, cutting and placing to the required size, labour charges, sundries, wastage etc. at all levels complete as per drawings and as per direction of JDA.

(50 mm thick) Technical Specification of Armour Board Laying Procedure

While creating expansion joint the armour board will become one side of shuttering. To hold two free sides of shuttering a MS bolt of 12mm dia with both sides threaded will be used at every 1 Mtr interval with matching nut with concrete sleeve 50mm x 50 mm. This bolt shall be taken out & hole of sleeve be grouted afterwards with cement mortar.

When forming expansion joint with armour board in in-situ concrete, joint-sealing slot shall be formed in the following manner.

The armour board is to become one side of shuttering. Cut off a strip of armour board equal to D. Further, cut the strip along the joint length into two.

The depth of top strip shall be = $(1.25 W \text{ or } W + 5\text{mm whichever is less}) + (W/2 \text{ or } 15\text{mm whichever is less})$ and the bottom strip = $(D - \text{top strip})$, where D = slot depth in MM & W = slot width in MM

Pin the top strip back on to the bottom strip using nails at two-inch intervals. Ensure that the slot is clean and dry. Install a strip of filler material on top of armour board flush with finished surface using either a separation Tape/synthetic rubber-based adhesive.

Just prior to sealing pull off the top strip to create an uncontaminated sealing slot ready for preparation & sealing.

21.4 OPEN JOINT FILLERS

21.4.1 Where shown on the drawings open joints in the structure shall be filled with one of the following of expansion joint fillers:-

- In internal areas a material conforming to IS:1838 containing bitumen emulsion fibres or coc k granules bound together with natural resin.

- b) In external areas a material comprising closed cell rubber or containing cork granules bound together with natural resin.

21.4.2 The joint fillers shall be easily and uniformly compressible to its original thickness, stoppable, easily cut or sawn, robust, durable, resistant to decay due to termite or weathering, unaffected by water and free of any constituent which will bleed into or stain the concrete.

21.4.3 The joint filler shall be of same thickness of the joint width, it shall extend through the full thickness of the concrete unless otherwise specified and shall be sufficiently rigid during handling and placing to permit the formation of straight joints.

21.5 JOINT SEALING COMPOUNDS

21.5.1 Joint sealing compounds shall seal joints in concrete against the passage of water, prevent the ingress of grit or other foreign material and protect the joint filler. The compound (Silicone sealant Nitoseal 125 or equivalent) surfaces shall be resistant to flow and weathering.

22.0 INSERTS

22.1 The Contractor shall fix all necessary inserts such as steel plates, pipe sleeves, bolts etc. and make provision of holes, pockets, dowels etc. in the formwork to enable subsequent fixing of supports, brackets, ceilings, precast members etc. As indicated on the drawings, or as required by the JDA.

22.2 In-situ concrete inserts shall be as per IS:1946 and of a type approved by the JDA unless otherwise specified elsewhere.

22.3 Nothing extra over and above the provision as per the priced schedule of quantities shall be paid to the Contractor on this account.

22.4 With the prior agreement of the JDA, expansion type fasteners may be used by the Contractor in hardened concrete.

23.0 CRACKS

23.1 If any cracks develop in the reinforced cement concrete construction which in the opinion of the JDA may be detrimental to the strength of the construction, the Contractor at his own expense shall test the structural element in question. If under the set test load the cracks shall develop further the Contractor at his own expense shall dismantle the construction, cart away the debris, replace the construction and carry out all consequential work thereto at no extra cost.

23.2 If the cracks are not detrimental to the stability of the construction in the opinion of the JDA, the Contractor at his own expense shall grout the cracks with pneumatically applied mortar or epoxy grout. At his own expense and risk he shall also make good all other building works such as plaster, mouldings, surface finish of floors, roofs, ceilings etc. which in the opinion of the JDA have suffered damage either in appearance or stability owing to such cracks.

23.3 The repair work shall be carried out to the satisfaction of the JDA. The decision of the JDA as to the extent of the liability of the contractor in the above matters shall be final and binding on the Contractor.

24.0 LOAD TESTING ON COMPLETED STRUCTURES

24.1 During the period of construction or within the defect liability period the JDA may at its discretion order the load testing of any completed structure or any part thereof if it has reasonable doubts about the adequacy of the strength of such structure for

any of the following reasons:

- a) Results of compressive strength on concrete test cubes falling below the specified strength.
- b) Premature removal of formwork.
- c) Inadequate curing of concrete.
- d) Overloading during the construction of the structure or part thereof.
- e) Carrying out concreting of any portion without prior approval of the JDA.
- f) Honeycombed or damaged concrete, which in the opinion of the JDA is particularly weak and will affect the stability of the structure to carry the design load, more so in important or critical areas of the structure.
- g) Any other circumstances attributable to alleged negligence of the Contractor, which in the opinion of the JDA, may result in the structure or any part thereof being of less than the expected strength.

24.2 All the loading tests shall be carried out by the Contractor strictly in accordance with the instructions of the JDA. Such tests should be carried out only after expiry of minimum 28 days or such longer period as directed by the JDA.

24.3 The structure should be subjected to a superimposed load equal to 1.25 times the specified superimposed load assumed in the design. This load shall be maintained for a period of 24 hours before removal. During the test, test strong enough to take the whole load shall be placed in position leaving a gap under the members as directed.

24.4 The deflection due to the superimposed load shall be recorded by sufficient number of approved deflectometers capable of reading up to 1/500 of Δ and located suitably under the structure as directed by the JDA. If within 24 hours of the removal of the superimposed load the structure does not recover at least 75% of the deflection under the superimposed load, the test loading shall be repeated after a lapse of 72 hours. If the recovery after the second test is less than 80% of the maximum deflection shown during the second test, the structure shall be considered to have failed to pass the test and shall be deemed to be unacceptable.

24.5 In such cases the part of the work concerned shall be taken down or cut out and reconstructed to comply with the specifications. Other remedial measures may be taken to make the structure secure at the discretion of the JDA. However, such remedial measures shall be carried out to the complete satisfaction of the JDA.

24.6 All costs involved in carrying out the tests and other incidental expenses thereto shall be borne by the Contractor regardless of the result of the tests. The Contractor shall take down or cut out and reconstruct the defective works or shall make the remedial measures as instructed at his own cost.

24.7 In addition to the above load test, non-destructive test methods such as core test and ultrasonic pulse velocity test shall be carried out by the Contractor at his own expense if so desired by the JDA. Such tests shall be carried out by an agency approved by the JDA and shall be done under expert guidance using only recommended testing equipment. The acceptance criteria for these tests shall be mutually agreed between the JDA and the Contractor.

25.0 SUPERVISION

25.1 All concreting work shall be done under strict supervision of the qualified and experienced Engineer of the Contractor as well as those of the JDA. The Contractor's Engineer and supervisor who are in-charge of concreting work shall be skilled in this class of work and shall personally superintend all the concreting operations.

25.2 Special attention shall be paid to the following:

- a) Proportioning, mixing and quality testing of the materials with particular control on the water-cement ratio.
- b) Laying of material in place and thorough compaction of the concrete to ensure solidity and freedom from voids and honeycombing.
- c) Proper curing for the requisite period.
- d) Reinforcement positions are not disturbed during concreting and consolidation by vibration.

26.0 QUALITY CONTROL

26.1 The JDA reserves the right to make changes in the mix proportions including the increased cement content or/and a change in the Contractor's control procedure, should the quality control during progress of the works prove to be inadequate in his opinion.

26.2 All the concrete work shall be true to level, plumb and square within the acceptable tolerance. The corners, edges and arrises in all cases shall be unbroken and finished properly and carefully.

27.0 TOLERANCES

- 27.1 The acceptable tolerances for formed concrete surfaces shall be as given below:
- a) Variation from plumb for
 - i) Columns and walls to be rendered -6mm in 3 metres
 - ii) Exposed columns and walls -3mm in 3 metres
 - b) Variation in cross-sectional dimensions of column and beams and in the thickness of slabs and walls -6mm +12mm.

28.0 TESTING ROOM

28.1 A testing room of not less than 10 sq.m equipped with the following apparatus and qualified concrete technician, labour and materials required for carrying out tests therein shall be provided by the Contractor at his own cost:

- 1) Sieve set (For aggregate 20mm down) 40mm dia 45 cms

20mm	dia 45 cms	
16mm	dia 45 cms	
12.5mm	dia 45 cms	
10mm	dia 45 cms	
4.75mm	dia 45 cms	600 micron dia 20 cms
300 micron	dia 20 cms	
150 micron	dia 20 cms	
75 micron	dia 20 cms	
- 2) Weighting
 - a) Physical balance cap. 200gms with weight box (accuracy 0.5gms)
 - b) Counter scale cap. 20kg
 - c) Weights

5kg.....1no.	500gms 1no.
2kg.....2 nos.	200gms 2nos.
1kg.....1no.	100gms 1no.

- 3) Slumpcones.....12nos.
 - 4) 15 cms moulds. 18nos.
 - 5) Electrickeroseneheater
 - 6) Pansetc.asdirectedbyJDA
 - 7) VicatApparatuswithneedles,testtubes, beakersthickglassplateetc.
 - 8) Measuringcylinders. 1000ml,500ml,100ml,10ml.
 - 9) Washbottles..Cap.500ml..2nos.
 - 10) Sink
 - 11) Workbenches,shelves,desksandanyotherfurnitureandlightingasrequiredbytheJDA.
 - 12) Springbalance dial typecap.100kg
 - 13) Litremeasures
- a) 10lit.....1no.
 - b) 5lit.....1no.
 - c) 2lit.....2 nos.
 - d) 1lit.....1no.
 - e) 1/2 lit.....1no.

29.0 RATE

TheContractorrateshallincludethecostofmaterialsandlabourrequiredforalltheoperations described aboveatall depthsandheights.

APPENDIX - I

STANDARD CONCRETE MIX DESIGN PRESENTATION

Grade of Concrete	:				
Cement Content & Type	:				
Water-Cement Ratio	:				
Free Water	:				
Specified strength @ 28 days	: Current Mean Strength	:			
Current standard deviation	:				
Admixture type	:				
Admixture dosage	: Slump @ 30 minutes / Slump @	:			
: 60 minutes (in laboratory)	:				
Air Content	:				
Chlorides (as NaCl)*	:				
Sulphates (as SO ₃)*	: Combined Aggregate grading	:			
	Sieve 75	38.119	9.54.75	2.361.18	0.600.300.15 75
	mmmmmmmmmm		mmmm		mm mmmmmmicron
% Passing					

*Total in mix, expressed as a percentage by weight of cement.

E. FORMWORK

1.0 GENERAL

1.1 DESCRIPTION

This section covers the requirements for providing, fabricating and erecting of formwork including propping, bracing, shoring, strutting, tying, bolting, wedging and all other temporary supports to the concrete during the process of setting subsequent removal of forms.

1.2 RELATED WORKS SPECIFIED ELSEWHERE

- a) Cast-in-place reinforced concrete
- b) Pre-cast concrete

1.3 APPLICABLE CODES AND STANDARDS

The codes and standards generally applicable to the work of this section are listed hereinafter.
IS:456 Code of Practice for plain and reinforced concrete
IS:4990 Plywood for concrete shuttering work.

2.0 SUBMITTALS

2.1 TYPE OF FORMWORK

Prior to start of delivery of material for formwork, the contractor shall prepare samples of different types of about 10 sq.m. and obtain approval of the JDA.

2.2 DESIGN OF FORMS

Before fabricating of forms, the contractor shall submit shop drawings and design calculations for proposed formwork to the JDA for his approval. However, the approval of the formwork design in no way will relieve the contractor of his responsibility for adequately constructing and maintaining the forms so that they will function properly.

3.0 MATERIALS

- 3.1 Formwork shall be of timber, plywood, steel or any other material capable of resisting damage to the contact faces under normal conditions of erecting forms, fixing steel and placing concrete. The selection of materials suitable for formwork shall be made by the contractor based on the maximum quality consistent with the specified finish and safety.

3.2 TIMBER

Timber used for formwork shall be easily workable with nails without splitting. It shall be stable and not liable to warp when exposed to sun and rain or wetted during concreting.

3.3 PLYWOOD

Plywood used for formwork shall be 12mm thick phenol-bonded shuttering, quality plywood complying with IS:4990 and of make approved by the JDA.

3.4 STEEL

Steel formwork shall be made of 4mm thick black sheets stiffened with angle iron frame made out of M.S. angles 40 mm x 40 mm x 6mm.

3.5 VERTICAL PROPS

Vertical props used for formwork shall be of steel pipes adequately braced. These shall be strong enough to bear the load during concreting operations without buckling.

4.0 DESIGN CRITERIA

- 4.1 Formwork shall be designed for the loads and lateral pressures due to dead weight of concrete, superimposed live load of workmen, materials and plants and for other loads as indicated on the drawings.
- 4.2 Forms shall be designed to have sufficient strength to carry the hydrostatic head of concrete as a liquid without deflection tolerances exceeding the acceptable limits.
- 4.3 Where necessary to maintain the tolerances indicated on the drawings, the formwork shall be cambered to compensate for anticipated deflections due to the weight and pressure of the fresh concrete, and also due to any other construction loads. Unless otherwise shown or specified, the cambers shall be provided as below:

Types of member	Compression steel as % of tensile steel	Camber coefficient
Simple span	0%	0.066
50%		0.037
Continuous	0%	0.032
Restrained span	50%	0.020
Cantilever	0%	0.086
50%		0.046

$$\text{Camber in cms} = K \times L \times 2.54 / D$$

Where K = Camber coefficient

L = Length of member in meter D = Depth of member in meter

5.0 ERECTION OF FORMWORK

- 5.1 Form shall be used wherever necessary to confine concrete during vibration and to shape it to the required lines. The formwork shall conform to shapes, lines, levels and dimensions of the concrete shown on the drawings.
- 5.2 Form shall have sufficient strength to withstand the pressure resulting from placement and vibration of concrete and shall be maintained rigidly in position. Formwork shall be adequately supported by adequate number and size of struts, braces, ties and props to ensure rigidity of forms during concreting. Where props rest on natural or filled up ground, to avoid any settlement, the soil shall be thoroughly compacted and based on props shall be of sufficient size so as to restrict the bearing pressure on the ground to 5T/sqm.

- 5.3 Form shall be tight enough to prevent loss of mortar from the concrete and to produce dense, homogeneous and uniformly coloured concrete completely free from honeycombing or surface roughness. Joints in formwork shall be designed to prevent leakage, not only between individual elements forming the panels but also from the horizontal and vertical junction between the panels themselves.
- 5.4 If formwork is held together by bolts, or wires, those shall be so fixed that no iron shall be exposed on surface against which concrete is to be laid. The JDA may at his discretion allow the contractor to use tie bolts running through the concrete at his own cost. Holes left in the concrete by these tie bolts shall be filled as specified by JDA at the contractor's expense.
- 5.5 Formwork shall be constructed so as to facilitate loosening and permit removal without jarring the concrete. Wedges, clamps and bolts shall be used wherever practicable instead of nails.
- 5.6 All formwork erected shall be approved by the JDA before concreting is started.

6.0 CLEANING AND OILING OFF FORMS

- 6.1 At the time concrete is placed in the forms, the surface of the forms in contact with the concrete shall be free from encrustation of mortar, grout or other foreign material. Temporary openings shall be left at the bottom of formwork to enable sawdust, shavings, wire cutting and other foreign material to be worked out from the interior of the forms before the concrete is placed.
- 6.2 The surface of the forms to be in contact with the concrete shall be coated with an approved coating that will effectively prevent staining and will not stain the concrete surface. After each use the surfaces of forms in contact with concrete shall be cleaned, well wetted and treated with form oil approved by the JDA. Lubricating (machine) oil shall not be used.
- 6.3 Immediately before concreting is commenced the formwork shall be carefully examined to see that all dirt, shavings, sawdust and other refuse have been removed and the formwork shall be wetted thoroughly to prevent absorption of water from concrete. The formwork shall be kept wet during concreting and for the whole time that it is in place.

7.0 REMOVAL OF FORMWORK

- 7.1 Formwork shall be removed carefully so as to prevent damage to the concrete. Wooden wedges only shall be used between the concrete surface and the form where force is necessary to separate the form from the concrete. Metal wedges, bars or tools shall not be used for this purpose. Any concrete damaged in the process of removing the forms shall be repaired in accordance with the provision of concrete specifications.
- 7.2 All non-supporting formwork shall be loosened and removed during regular working hours, and as soon as the concrete has hardened sufficiently to prevent damage from the removal of the forms. All falsework and forms supporting concrete beams and slabs, or other members subject to direct bending stress, shall not be removed or released until concreting operations are complete. The contractor shall conduct inspection and testing, and all reports thereon shall be submitted in summary form to the JDA.

- 7.3 Unless otherwise permitted in writing by the JDA, the form shall not be stripped in less than the minimum period specified in IS:456. However, the JDA may increase the above if he considers it necessary for structural stability.
- 7.4 No construction loads exceeding the combination of superimposed dead loads plus specified live load shall be supported on any unshared portion of the structure under construction, unless analysis indicates adequate strength to support such additional loads.
- 7.5 Formwork shall be removed in such a manner so as to impair safety and serviceability of the structure. It shall be removed gradually to prevent sudden application of loads to the concrete. All concrete to be exposed by form removal shall have sufficient strength so as not to be damaged thereby.

STRIPPING TIME:

Forms shall not be struck until the concrete has reached a strength at least twice the stress to which the concrete may be subjected at the time of removal of formwork. The strength referred to shall be that of concrete using the same cement and aggregates, with the same proportions and cured under conditions of temperature and moisture similar to those existing on the work. Where possible, the formwork shall be left longer as it would assist the curing.

In normal circumstances and where ordinary Portland cement is used, forms may generally be removed after the expiry of the following periods:

A]	Walls, columns and vertical faces of all structural members	24 to 48 hours as may be decided by the JDA.
B]	Slabs (props left under)	3 days.
C]	Beams of fits	7 days
D]	Removal of props under slabs: 1. spanning up to 4.5M 2. spanning over 4.5M	7 days 14 days
E]	Removal of props under beam and arches: 1. spanning up to 6m 2. spanning over 6m	14 days 21 days
F]	For cantilever slabs and beams	28 days

For other cements, the stripping time recommended for ordinary Portland cement may be suitably modified.

The number of props left under, their sizes and disposition shall be such as to be able to safely carry the full dead load of the slab, beam or arch as the case may be together with any live load likely to occur during curing or further construction.

8.0 REUSE OF FORMS

- 8.1 Immediately after the forms are removed, they shall be cleaned with a jet of water and a soft brush before they are reused.
- 8.2 The contractor shall not be permitted to reuse any forms which, in the opinion of the JDA, has worn out and has become unfit for formwork. The JDA may, in his absolute discretion, order rejection of any forms he considers unfit for use in the works, and order their removal from the site.

9.0 RATES

- 9.1 Rates quoted by the contractor shall apply to work at all floor levels/depths.
- 9.2 Regarding modes of measurement, rates and any other items not specifically covered under these specifications, nomenclature of items and other conditions for this tender, the provisions of latest PWD (Raj) Specification BSR, JDA BSR shall apply.

F. STEEL REINFORCEMENT

1.0 GENERAL

- 1.1 This section covers the requirement for providing fabricating, delivering and placing in position and securing at locations by binding or welding, of reinforcements for in-situ and precast non-prestressed reinforced concrete work.
- 1.2 Reinforcements for concrete may be from any of the "Grades" of steel indicated below, conforming to the relevant Indian Standards mentioned against each item:

GRADE	DESCRIPTION	CONFORMING TO
Fe 250	Mild Steel	IS:432(Part I)
Fe 490	Hard drawn steel wire	IS:432(Part II)
Fe 415	High strength deformed/ Ribbed Steel	IS: 1786
Fe 500	High strength deformed/ Ribbed Steel	IS: 1786
Fe 550	High strength deformed/ Ribbed Steel	IS: 1786

- 1.3 Reinforcing steel may be any of the following types: Type-I : Plain round bars (PR)
 Type-II : Welded wire fabrics (WWF)
 Type-III : Cold twisted deformed bars (CTD)
 Type-IV : Thermo Mechanically treated ribbed bars (TMT)
 Type-V : Thermo Mechanically treated ribbed corrosion resistant bars (Copper Bearing) (TMT-CR)
- 1.4 Unless specifically shown in drawings or instructions issued in writing by JDA, steel of any grade or type other than those specified in Clauses 1.2 and 1.3 stated above, shall NOT be used for the purpose of concrete reinforcement.
- 1.5 Type and grade of steel to be used in the work shall be verified by the JDA and relevant contract documents before procuring such steel.
- 1.6 All steel shall be procured only from original producers. Re-rolled steel shall not be procured for the purpose of using these as reinforcement in concrete work.
- 1.7 Every consignment of steel brought to the site of work for use in reinforced concrete work, shall be accompanied by a certificate from the manufacturer giving the following details:
- Process of manufacture.
 - Grade and type of steel.
 - Chemical composition of steel.
 - Identification mark on steel.
 - Results of tests giving yield strength, ultimate tensile strength, elongation percentage on gauge length of 5 times the diameter of the bar, bend and re-bend on minimum mandrel

diameter, bond strength values, corrosion test results and fatigue test results. All such certificates should be deposited with the JDA for his record and reference.

1.8 Steels of Grade Fe 415, Fe 500 and Fe 550 may be Type- III (CTD bars), or Type - IV (TMT bars), or Type-V (TMT-CR bars), depending on the process employed by the manufacturer. Depending on the process, the chemical composition of steel may vary from manufacturer to manufacturer. However, the manufacturer shall give a guarantee that when combinations of different grades and different types of steel are used in conjunction and are placed in contact, there is no bimetallic action causing enhancement of the process of corrosion.

1.9 Some tests to re-confirm the mechanical properties of steel will have to be conducted on every consignment of steel received on site. Frequency of such tests shall be as follows:

For every consignment of steel up to 100 tonnes or part thereof:

TESTS TO BE CONDUCTED		NO. OF TESTS
i)	Tensile strength test	1 no. for each size with a minimum of 2 tests.
ii)	Bend Test for:	
	Bars smaller than and including	1 no. for each size with minimum 20 mm dia a minimum of 3 tests.
	Bars larger than 20 mm dia	1 no. for each size with a minimum of 5 tests.
iii)	Elongation Tests	Minimum 2 nos. choosing one no. from any two different sizes, if applicable.
iv)	Mass Tolerance Tests	Minimum 3 tests with one number from different sizes, if applicable.

All such field tests shall be conducted at a NABL accredited laboratory to be decided by the JDA. Contractor shall be obliged to conduct all such tests and the cost of these tests will have to be borne by him.

1.10 Steel brought to site shall be free from mill scales, rust, grease, oil, paint or any other coatings, which have deleterious effect on the performance. Bars and wires shall be clean, rolled and shall be free from all surface defects detrimental to its use. However, rust, seams, mill scales or minor surface irregularities shall not be the cause for rejection. Such bars shall be properly cleaned and re-tested as directed by the JDA. Tests shall be conducted in accordance with the relevant Indian Standard Specifications.

1.11 Based on test results of field tests, specified in Clauses 1.9 and 1.10 above, the JDA will be the sole authority to accept or reject the consignment of steel and such decision shall not be influenced by the results of tests as per manufacturer's certificate mentioned in Clause 1.7 above.

1.12 Steels of all grades and all types shall have maximum carbon content of less than 0.25% by mass for guaranteed weld ability.

1.13 Steel of Type-V shall have a maximum copper content of 0.30% by mass.

1.14 Steel of Type -II shall be manufactured in conformity with provisions of IS: 1566 and shall be certified by the manufacturer as such.

1.15 For acceptability of steel, test results shall comply with the values given below:

STEEL GRADE (Clause 1.2)	Fe250	Fe490	Fe415	Fe500	Fe550
Yield Strength/ 0.2% Proof stress (Min)	250	490	415	500	550
Ultimate Tensile Strength (Min)	410	580	485	550	585
Elongation on gauge length 5 dia (Min)	23%	10%	14.5%	14%	12%
Mandrel dia for bend test (Max)					
a) For bars upto & incl. 20mm	2 dia	2 dia	3 dia	4 dia	5 dia
b) For bars above 20mm	3 dia	2 dia	4 dia	5 dia	6 dia
Mandrel dia for re-bend test (Max)					
a) For bars upto & incl. 20mm	(Not applicable)	5 dia		5 dia	7 dia
b) For bars above 20mm	(Not applicable)	7 dia		7 dia	8 dia
Tolerance on nominal mass of 7.85g/cc.	+2%	+2%	+2%	+2%	+2%
	-	-	-	-	-

dia-denotes diameter

2.0 BINDING WIRES

2.1 Binding wire for steels of all grades and types shall normally be black annealed steel wire conforming to IS: 280.

2.2 When reinforcing bars are galvanised for corrosion protection, the binding wires to be used in conjunction with such steel shall also be galvanised as wires to be used in conjunction with such steel shall also be galvanised as per relevant specifications given elsewhere.

2.3 Binding wires that are to be used in conjunction with fusion bonded epoxy coated reinforcing bars shall be plastic coated as per specifications given elsewhere.

2.4 Nominal size of binding wire shall be as under:

- a) For bars of size less than and including 20mm: 20 gauge
- b) for bars of size over 20mm : 18 gauge

3.0 COVER BLOCKS

3.1 Cover blocks for reinforcement shall be made out of cement mortar. Crushing strength of such cover blocks shall be one grade richer than the concrete in the member where such cover blocks are to be used.

3.2 Cover for reinforcement may also be provided with reinforcing bars forming "Chairs" for seating of bars. Such chairs shall be fabricated out of scrap steel of lengths, which cannot be efficiently used as reinforcements. Unless specifically indicated in drawings or permitted by JDA, Type - V bars or bars treated for corrosion resistance shall not be used for fabricating such "Chairs".

3.3 Cover blocks made out of Neoprene or high strength plastic may be used subject to written approval being obtained from the JDA.

4.0 STORAGE OF STEEL

4.1 Reinforcing steel shall be handled and stored in a manner such that bending and distortion of the bars is avoided.

4.2 All reinforcing steel shall be stored horizontally above ground level on platforms or other approved support, clear of any running and/or standing water. Contact with soil shall not be permitted.

4.3 Bars of different grades, types and sizes shall be stored separately.

4.4 Reinforcing bars treated with a corrosion resistant protective coating of any kind shall be handled and stored with utmost care so as not to cause any damage to the protective coating. Such bars shall be stored separately from others.

4.5 Every stack of reinforcement stored shall be provided with a distinctively displayed identification board carrying the following information:

- a) Grade of Steel as per Clause 1.2.
- b) Type of steel as per Clause 1.3.
- c) Nominal size of steel.
- d) Type of corrosion treatment to steel, if provided.
- e) Delivery batch number and date.

5.0 FABRICATION

5.1 Contractor shall prepare "Bar Bending Schedules" for all structural components based on drawings issued for construction. Such schedules shall be submitted to the JDA for his approval. Fabrication of reinforcements shall commence only on receiving approval of "Bar Bending Schedule" from the JDA.

5.2 Reinforcement steel shall be carefully cut/bent and formed to the dimensions and configurations shown in the drawings and Bar Bending Schedule.

5.3 All cutting, bending, fixing, binding, etc. shall be done generally in accordance with IS: 2502 unless otherwise specified herein.

5.4 Bending dimension tolerances shall be as specified in IS: 2502. However, cutting tolerances for all sizes of bars and for all lengths shall be limited to plus-minus 10mm.

- 5.5 All bars shall be bent cold using appropriate mandrel sizes. Dimensions of bends and hook shall be as indicated in the schedules.
- 5.6 It shall be ensured that bars are not bent or straightened in any manner that will injure the material. Any incorrectly bent bar shall be used only when the bends are set right, provided that during straightening and re-bending the bar, the bar is not damaged in any way including formation of twisted necks.
- 5.7 No bar shall be bent or straightened when in position on the works without approval of the JDA, whether or not such bars are partially embedded in hardened concrete.
- 5.8 Reinforcing steel having a reduced section, visible cracks, peels or any other defects shall not be used for the purpose of reinforcing the concrete.

6.0 PLACEMENT

- 6.1 All reinforcement shall be placed accurately and secured in position as indicated in drawings.
- 6.2 Tolerances on placing of reinforcement shall be as under:
- | | | | |
|-----|--|------------------------------|-------------------|
| i) | Overall Thickness of member | tolerance in spacing of bars | |
| a) | Members of thickness | + 5mm | 300mm or less - |
| b) | Members of thickness | + 10mm | more than 300mm - |
| c) | Beam and column elements | + 2mm | - |
| ii) | Tolerance to clear concrete cover dimensions shall be plus-minus one-third the specified cover or 5mm whichever is less. | | |
- 6.3 Contractor shall provide approved type of supports to reinforcing bars for maintaining the bars in position and to ensure required spacing and correct cover as called for in the drawings. Precast cement mortar cover blocks, chairs and spacer bars shall be used as appropriate for this purpose. For fair faced concrete work, temporary spacers shall only be used and these shall be removed or withdrawn as compaction of concrete proceeds. Spacers shall not be permitted to be left in fair faces of concrete.
- 6.4 All intersections of reinforcement shall be securely tied with stands of binding wire as required, and twisted tight to make the skeleton or network of steel a rigid frame so that the bars do not get displaced during transportation, placement or vibration of concrete. Tack welding of reinforcements in place of binding with wire may be permitted by the JDA after ensuring the weldability of steel.
- 6.5 Contractor shall take all necessary precautions to ensure that during handling and erecting of steel, no damage is done to the finished concrete.
- 6.6 Temporary walkways and galleries shall be placed across reinforcements laid in position for purpose of movement of men and material. Such walkways and galleries shall be independent of the reinforcement. No movement of men and material shall be permitted on reinforcements laid in and secured in position.
- 6.7 Without relieving the contractor of the responsibilities for the correctness of placing of reinforcements in accordance with drawings, the reinforcements as placed and secured in position shall be got inspected and approval obtained from the JDA in writing before any concrete is placed in the form. Contractor shall allow for sufficient time to get the reinforcement work inspected and any subsequent remedial measures to be carried out.

7.0 COVER TO REINFORCEMENTS

- 7.1 Unless shown on drawings or otherwise specified or instructed by the JDA, minimum clear concrete cover to reinforcements shall be maintained as per IS: 456 for normal structures, and as per IS: 3370 for water retaining structures.

- 7.2 Care shall be taken to maintain the cover to tolerance limits specified earlier in Clause 6.2 above.

8.0 SPLICING

- 8.1 As far as practicable, bars of maximum available lengths shall be used. All bars shall preferably be in single lengths. Where such arrangements are not possible, bars shall be spliced together.
- 8.2 Splices may be lapped splices or welded splices unless specifically shown on drawings or conveyed in writing by the JDA, welded splices shall not be provided.
- 8.3 Where welded splices are indicated in drawings or instructed by the JDA, such welding shall be provided as specified in approved drawings.
- 8.4 Where details and specific locations of splicings are not shown in drawings, lap splices shall be so provided that:
- 8.4.1 At any section not more than 50% of total number of bars are spliced together at any face of the member.
- 8.4.2 From the end of one splice to the beginning of the next splice in two continuous bars, there is a clear distance of 300 mm or 12 times the diameter of the bar whichever is greater.
- 8.5 Lengths of such lap splices shall be as given in Table 6.5.1

TABLE 6.5.1

STEEL GRADE	STEEL TYPE	SPLICE LENGTHS FOR GRADES OF CONCRETE IN MULTIPLES OF NOMINAL BAR DIAMETER			
		M-25	M-30	M-35	M-40
Fe 250	I	40	36	32	30
Fe 490	II	76	71	63	56
Fe 415	III/IV/V	40	38	33	30
Fe 500	III/IV/V	50	45	40	36
Fe 550	III/IV/V	53	50	44	40

- 8.6 Splice lengths given in Table 6.5.1 are for steel that do not have any coating on the surface affecting its bond strength.
- 8.7 Irrespective of values obtained from Table 6.5.1, minimum splice length shall be 300 mm.
- 8.8 When bars of two different diameters are spliced, the splice length shall be based on the smaller of the two diameters, unless otherwise shown in drawings.

READY MIX CONCRETE

Batching of Concrete ingredients: For all structural concreting, only Ready Mixed Concrete (RMC) manufactured with weigh batching plant or obtained from approved R.M.C. supplying agencies or produced at site using mechanical mixers and weigh batchers as per item description,

will be used. The R.M.C. supplying agency will supply mix design details in advance before start of delivery. Transporting, placing, compacting, finishing and curing of concrete shall be in accordance with IS:456-2000.

For all RMC concreting, the concrete after discharge from batching plant will be loaded in transit mixers and kept continuously agitated while mix is in transit. At destination the mix will be unloaded into the hoppers of concrete pump. For site made concrete suitable prescribed methods shall be adopted.

The concrete produced in RMC plant/batching plant, when discharged from transit mixer in pump hopper shall be kept continuously agitated and pumped to destination placing point. Site made concrete shall be placed by approved method of placing. The height of any single lift of concrete shall not exceed 1.5 m for walls and 2.0 m for columns. For columns where the height of pour is more than 2.0 m, suitable arrangement in formwork should be made so that the vertical drop of concrete is restricted to less than 2.0 m. Any such arrangement should be approved from the engineer in advance before execution.

High velocity discharge of concrete causing segregation of mix shall be avoided. The concrete shall be placed in the forms gently and not dropped from the height exceeding 1.5 m except in columns where the maximum allowed will be 2.0 m. Each batch of concrete will be placed in layer. Each layer of concrete shall be compacted fully before the succeeding layer is placed and separate batches shall be placed and fully compacted before the layer immediately below has taken initial set. The layers should be sufficiently shallow, to permit stitching of two layers together by vibration.

Concreting of any portion or section of the work shall be carried out in one continuous operation and no interruption of concreting work will be allowed without approval of the Engineer.

Plain concrete in foundations shall be placed, in direct contact, with the bottom of excavation, the concrete being deposited in such a manner, as not to get mixed with the earth. The concrete placed below the ground level shall be protected from falling earth during and after placing. Concrete placed in ground containing deleterious substances, shall be kept free from contact, with such ground and with water draining there from during placing and for a period of 7 days or otherwise instructed there after. Approved means shall be taken to protect immature concrete from damage by debris, excessive loading, abrasion, vibrations, deleterious ground water, mixing with earth and other materials and other influences, that may impair strength and durability of concrete.

Before starting of work contractor will get the concrete pouring programme and its sequence approved by Engineer to avoid cold joints.

Proper planning of concrete supply, pump locations, line layout, placing sequence and the entire pumping operations shall be made. The concrete production, transportation and placing shall be planned in such a manner that duration between arrival of water during mixing and placing of concrete in desired location is well within time limits prescribed by the RMC manufacturer, however, this is subjected to fulfillment of slump and other properties of concrete as specified in tender. On failure to adhere to the time schedule by the supplier the Engineer may reject the concrete.

The pump wherever used should be as near the placing area as practicable, and the entire surrounding area shall have adequate bearing strength to support concrete delivery pipes. Lines from pump to the placing area should be laid out with a minimum of bends. For large placing areas alternate lines should be installed for rapid connection when required. Standby power and pumping equipment should be provided to replace initial equipment, should breakdown occur. The placing rate should be estimated so that concrete can be ordered at an appropriate delivery rate.

As a final check, the pump should be started and operated without concrete to be certain that all moving parts are operating properly. A grout mortar should be pumped into the lines to provide lubrication for the concrete, but this mortar shall not be used in the placement.

When the form is nearly full and there is enough concrete in the line to complete the placement, the pump shall be stopped and a go-devil inserted and shall be forced through the line by water under pressure to clean it out. The go-devil should be stopped at a safe distance from the end of the line so that the water in the line will not spill into the placement area. At the end of placing operation, the line shall be cleaned in the reverse direction.

1.0 STONEMASONRY:

1.1 Jaipur is surrounded by a belt of Aravali hills having good quality of building stone.

Stones available from quarries called SAIWAD, located in Tehsil Amer, at a distance of about 20 Km from the site, has good quality of stones available in different colours.

GENERAL SPECIFICATION OF STONEMASONRY:

Normally, stones used should be small and uniform to be lifted and placed by hand. The length of the stones should not exceed three times the height and the breadth of bases should be greater than $\frac{3}{4}$ of the thickness of the wall, not less than 150 mm.

The height of the stones may be up to 300 mm. Stones with round surface should not be used. All stones should be wet before use. Percentage of water absorption shall not be more than 5%. Minimum crushing strength of building stones shall be 200 Kg/sq. cm.

1.2 RANDOM RUBBLE MASONRY BUILT IN COURSES:

The stones are hammer-dressed on bed and top surface unless natural cleavage of the stone gives parallel faces. No face of stones to be narrower or shorter than its height and no such stones shall, tail into the wall less than its height and at least $\frac{1}{3}$ of the face stone shall tail into the wall twice their height.

Random Rubble stone masonry for foundation and plinth should be in Cement Sand Mortar 1:6 (1 Cement: 6 Sand) for above 300 mm thick wall.

Hammer dressed exposed Random Rubble masonry to be built in courses with stone of approved quarry for superstructure above ground level in cement sand mortar 1:6 (1 cement: 6 Sand) including filling the joints in white cement marble powder (1:2) with an admixture of pigment matching the stone shade for 30 cm. thick wall.

1.2.1 BED & JOINTS:

Not to exceed 12 mm thick. The stones shall break joints on the faces for at least half the height with those of courses above and below.

1.2.2 HEIGHT OF COURSES:

Not less than 150 mm in height and brought up to level beds and shall be laid at right angle. Refer JDA's detailed drawings in this respect.

1.2.3 BONDS OR THROUGH STONES:

In the interior thickness of the wall bond stones of at least 450 mm long shall be given so as to approximately provide through-bond of long stones at every 1500 mm distance.

1.2.4 QUOINS OR CORNER STONES

Faces bed to be squared back carefully at least 100 mm and joints 65 mm.

1.2.5 HEARTING

Stones to be not less than 150 mm in any direction, carefully laid, hammered down with wooden mallet into place and solidly bedded with mortar, chips and spalls being wedged into void thick beds of joints and mortar.

2.0 BRICK MASONRY

- 2.1 Brick should be soaked in water for at least one hour before use for works in cement mortars. The bricks should be sufficiently soaked before use but not excessively so. The absence of bubbling when the soaked brick is immersed in water is the test for thorough soaking.
- 2.2 Brickwork shall be laid in English Bond using first class bricks designation 75. Half cut bricks shall not be used except where necessary to complete the bond. All courses shall be laid truly horizontal and all vertical joints shall be truly vertical. The thickness of mortar shall be kept uniform, keeping the bricks frog upwards.

3.0 HALF BRICK MASONRY:

Half brickwork – plain or reinforced.

115 mm thick brick work shall be called as half brick work. It shall be built by laying bricks in stretcher bond. Mortar shall be as specified in the Schedule of Rates.

These walls may be used for forming cavities or partition walls inside buildings. Brickwork shall be reinforced with either of the following methods:

- 1] with 6 mm dia. Bars, 2 bars at every third layer.
- 2] GI metal lath/GI hoop iron 25 mm x 1.6 mm shall be used at every third layer as detailed by layer as detailed by the manufacturer.
- 3] Patti Beams of 115 x 150 mm high in M 20 grade concrete shall be casted. Beam shall be reinforced with 2 nos. 8 mm dia Tor bars and 6 mm dia. MS links at 300 mm C/C. Patti beam shall be at every 1000 mm interval in height.

Embedding of reinforcement shall be done very carefully. All precautions shall be taken so that edges are not exposed, lapping of bars and lath shall be proper and staggered.

Measurements shall be in square meters. Reinforcement and shuttering shall not be measured separately.

RATE:

The following operations shall be included in the brick work :-

- A] Raking out joints for plastering or for pointing done as a separate process or for finishing joints flush as work proceeds.
- B] Preparing tops and sides of existing walls and the like for raising.
- C] Rough cutting and waste for forming gables, cores of arches, splays at caves and the like and all rough cutting in the body of brickwork, unless otherwise stated.
- D] Plumbing to angles and battered surfaces.
- E] Forming reveals to jambs where fair cutting on exposed faces is not involved. F] Leaving holes for pipes etc.
- G] Building-in hold fasts, air bricks, fixing bricks etc.
- H] Building-in ends of beams, joists, slabs, lintels, sills, trusses etc. I] Forming opening and flues for which no deduction is made.
- J] Bedding wall plates, lintels, sills, roof tiles, corrugated sheets, etc. in or on walls, if not covered in their respective trade.

K] Leaving chases of section not exceeding 50cm in girth.

4.0 WOODWORK

4.1 PLY/BLOCKBOARD

All ply or block board shall be of best quality of DURO/NATIONAL/ GREENLAM make or equivalent. All exposed block board edges shall have lipping of timber as directed and nothing extra is payable for the same.

When decorative ply/block board is used for funnelling or ceiling etc. the same shall be of matching grains.

4.2 SCREWS

All screws shall be of best quality chromium plated. Brass or steel screws of Nettle fold made or equivalent.

4.3 LAMINATE

Laminate where specified shall be of matt finish of 1.5mm thickness of approved make.

4.4 PAINTS

The paints used shall be of approved shade of make - Berger/Dulux/ICI/Asian or equivalent.

4.5 TIMBER:

4.5.1. TEAKWOOD:

Superior class Teak Wood, such as Balar Shah Malabar or Dandeli. It shall be of best quality available in market and well seasoned. It shall be free from dead knots, warps, cracks, shakes and sap wood. Wherever the word "teak wood" is specified in the schedule and/or drawings shall mean superior class teak wood as specified herein above.

4.5.2. IST CLASS DEODARWOOD:

Timber shall be of good quality and well seasoned. It shall have fairly uniform colour, reasonable uniform grains and shall be free from dead knot, cracks, shakes and sap wood.

4.5.3. KAILWOOD:

It shall be well seasoned out of sleepers devoid of any knots and should be of uniform grains.

4.5.4. TITOCHAPWOOD:

It shall be well seasoned. It shall have fairly uniform colour, grains and shall be free from dead knot, cracks, shakes and sap wood.

i. GENERAL:

- a. All blockboards and plywood shall be National/Duro make. In case due to non-availability or otherwise any other make is to be used, JDAs prior approval should be obtained.
- b. All the exposed internal and external commercial face shall be painted with two coats of synthetic enamel paint, over a coat of wood primer.
- c. All the wooden surfaces touching the wall, floor and ceiling shall be treated with anti-termite treatment as per ISI/PWD specifications.

ii. PROCEDURE OF WORK:

- a. The contractor shall arrange his operations such that they are convenient and agreed to by the JDA.
- b. He shall adhere to the time schedule presented by him and shall complete to

all satisfaction of the JDA.

iii. BUILT-IN-JOINERY:

Where joinery work is specified to be built in, it shall be the responsibility of the contractor to ensure that the joinery works are set in plumb and true in line and shall not be damaged or displaced by subsequent operations.

iv. PROTECTION OF WORK

The Contractor shall be responsible for the temporary doors and closing in of openings necessary for the protection of the work during progress. He shall also provide and maintain any other temporary covering required for the protection of finished/unfinished woodwork that may be damaged during the progress of the work if left unprotected.

v. MAKE GOOD DEFECTIVE WORK:

The contractor shall be responsible for any shrinkages or warping or any other defects which may appear in any joinery work.

All defective or damaged work shall be taken down and renewed or repaired to the satisfaction of the JDA/Interior Designers without any extra charges.

vi. ANTI-TERMIT TREATMENT:

All the surfaces shall be treated with anti-termit treatment as per ISI specifications.

5.0

STEEL WORK IN DOORS/WINDOWS/VENTILATORS/BALUSTRADES, STILLS, GATE, PARTITIONS AND GLAZING ETC.

Steel doors

Material

Steel used in the manufacture of rolled steel section shall conform to IS 1977. Dimension and weight of rolled sections shall be as per IS 1038/IS 7452. Rolled steel sections shall be free from rolling defects and shall be suitable for punching and welding. Cord-eyes, pulleys, brackets and catch plates for spring catches may be of malleable iron or mild steel. Pivots and spring catches shall be of non-ferrous metal.

Couplings for building sections shall be as detailed in IS 1038. They may be manufactured from M.S. plate 1.6 mm thick and conforming to dimensions of IS 1038. Also tubular sections as detailed in IS 1081 may be used for coupling at varying angles.

Machine screws used for buildings shall conform to relevant ISI codes. Wood screws used shall conform to IS 451.

All bolts, nuts, screws, washers, fixing lugs etc. shall be suitably anti-corrosion treated. All peg stays, handles and other fittings shall be brass oxidized or as specified.

Frames shall be fabricated from sections approved sections cut to length and joints mitred. Framed shall be square and flat. Flash butt welding shall be adopted. The glazing section stennoned and riveted into frames. Intersections with vertical shall be broached and intersection closed by hydraulic pressure.

Welds shall be continuous and throughout the joint. No tack weld permitted. Welds shall be ground properly. Welds shall be without any cavities, cracks, cut sets etc.

Composite units shall be coupled with coupling sections. These joints shall be sealed with mastic sealant to make water and airtight.

Glazing shall be fixed from outside of frame with glazing clips in slots already provided. Glass shall be held in position by using putty conforming to IS 419. Putty shall be well worked behind and above glass to secure glass suitably. Putty shall be cut neatly.

Door shall be securely fixed in position to correct line, level and plumb. Position of unit shall be as approved by EIC. Normally frames shall be 12 mm less all round than opening provided. They shall be fixed within masonry and concrete by grouting hold fasts screw/welded to frames.

Frames fabricated, checked, cleaned and primed at shop. On fixing in position and completion of civil wet work, fixing of glazing and due cleaning they shall be painted with one coat of primer, two undercoats and one finished coat of enamel paint system.

STEEL WORK FOR GRILLS, BALUS TRADES ETC. STEEL

All finished steel shall be well and clearly rolled to the dimensions and weight specified by ISI subject to permissible tolerance as per IS 1852-1973. The finished materials shall be free from cracks, surface flaws, laminations, rough and imperfect edges and all other defects. Steel sections shall be well protected.

The decision of Engineer regarding rejecting any steel section on account of any of the above defects shall be final and binding on contractors. Structural steel work shall conform to relevant I.S. Specifications.

FABRICATION

The steel sections as specified and as required, shall be straightened and cut, square and correct lengths and measured with a steel tape. The cut ends exposed to view shall be finished smooth. No two pieces shall be welded or otherwise jointed to make up the required length of a member. All straightening and shaping to forms, shall be done by pressure. Bending or cutting shall be carried out in such a manner as not to impair strength of the metal.

WELDING AND FIXING:

Wrought iron or mild steel work shall be forged clean from the anvil and neatly, soundly and perfectly finished to the dimensions specified. All welds, turns or sets shall be sound. Screwed work shall have full internal and external threads. Holes shall be punched clean and burrs cleaned off. All counter sinks shall be concentric. Edges shall be filled square and smooth. All welds shall be cleaned of slag and other deposits after completion including grinding to square neat joints.

GLAZING:

The glazing work shall be applicable to the wood / steel work. The contractor shall provide all labour, materials and equipments required to complete the installation of all glass glazing and related items. The glass shall be of the type and quality as specified and directed by the Engineer and as per the relevant I.S. Specifications. The contractor shall cut the glass to the sizes as per approved drawings. Cracks, chipped or disfigured glasses shall not be accepted. The contractor shall have to replace all the broken glasses if any at the time of completion of the work without any extra cost. If not specified 4mm thick glass panes shall be provided.

PUTTY:

Special metal sash putty of approved make conforming to IS:420-1953 shall be used for fixing for glass panes. Putty shall be applied between glass panes and glazing bar. Putty shall then be applied over the glass panel, which shall stop 2 to 3 mm from the sight line of the back rebate to enable the painting to be done up to the sight line, to seal the edge of the putty to the glass. The oozed out back putty shall be cleaned and from putty cut to straight line. Putty shall be painted within 2 to 3 weeks, after glazing is fixed to avoid its cracking.

GLAZING CLIPS:

Four glazing clips shall be provided per glass pane for a size larger than 30 cm x 60 cm for all types where the glass panes, size exceed 80 cm x 200 cm. 6 glazing clips shall be used. In case of doors, windows and ventilators without horizontal glazing bars, the glazing clips may be spaced according to the slots, in the vertical members provided the spacing does not exceed 30 cm, otherwise the spacing shall be 30 cms.

Wherever glass panel are to be provided in wooden members, the same shall be fixed with teak wood beading including necessary screws and putty etc. as per drawings.

6.0 ALUMINIUM WORK: Material:

Aluminium alloy standard extruded sections manufactured in the country by major manufacturers and are used for fabrication of Aluminium doors, windows, ventilators and partition. Tee/angle sections are used for framework of false ceiling. The chemical composition and mechanical properties of these extruded sections should comply with the requirement of IS 733, IS 1285, IS 737. Aluminium corrosion resistance, it is inert to sulphur.

Aluminium alloy extruded sections in different forms used in the manufacture of frames and shutters of doors and windows and supports for hand rails, wall facings, partitions and similar other applications, where surface finish is important and medium strength would suffice shall conform to IS: 733 and IS 1285.

Anodising:

In India, standard aluminium extrusion products are manufactured by a very few large companies and the product mix includes a wide range of solid and hollow profiles with different functional shapes for architectural, transport, structural glazing, curtain walling, textile, electrical industries, micro light, air craft etc. and also the products used in irrigation industry as tubes for sprinkler system and for transporting water etc.

The extrusions are anodised up to 30 micron in different colours like silver, champagne, bronze and black. A foil proof scaling system ensures durable finish for long lasting applications.

Aluminium work for Doors, windows, ventilators and Composite Units:

The aluminium doors, windows and ventilators shall be fabricated by reputed local workshops using the aluminium extrusions manufactured by the renowned manufacturers., Mysore or similar concerns. Fabrication of doors, windows etc. on site by local labour employed by the contractor shall not be permitted. The fabricated materials in ready to fix position are subject to inspection by the JDA, who may call for necessary documents to confirm that only materials from reputed manufacturers have been used for the fabrication.

Doors:

Aluminium Alloy Extruded Sections:

Dimensions and weight per metre run of extruded sections shall be used for manufacturing aluminium doors, windows, ventilators etc. as recommended in IS: 1948-1961.

General Specification and Tolerances for Aluminium Extrusions manufactured by renowned manufacturers:

Circumscribing Circle Diameter (CCD)

[I] the product range can be broadly categorised as follows:

a] for solids up to 190 mm. b] for hollows up to 135 mm.

[II] Sections with higher CCD can also be produced as per special inquiry.

Manufacturing tolerances:

Dimensional extrusions are normally manufactured as per Indian Standard/British Standard Specifications. Special tolerances shall be mutually agreed upon:

Tolerance on cut length:

[I] The standard cut length is 3.66M. the tolerance on cut length shall be as follows:

Length	upto 6 metres	over 6 metres
Tolerance	+ 5.00mm	+7.00MM

[II] Section can also be supplied in random lengths between 1500mm to 5000mm.

Tolerance in weight:

Actual weight of sections depend upon the functions like tolerances and alloy. Generally a section will be supplied $\pm 10\%$ weight tolerances.

Glazing:

Sheet Glass, Frosted Sheet Glass:

Sheet glass shall be flat, transparent and clear as judged by unaided eye. It may, however possess slight tint when viewed edge wise. Sheet glass shall be of selected quality [SQ] or ordinary quality [OQ] as per IS:2835. glass shall be free from cracks. Unless otherwise specified ordinary quality sheet glass shall be used.

Dimensions:

Normal thickness and range of thickness of sheet glass shall be as per standard norms. Tolerance on cut size [length and width] shall be ± 2 mm.

Thickness and weight of sheet glass

Normal thickness [mm]	Range of thickness [mm]	Weight [kg/sqm]
3.0	2.8 to 3.2	7.5
4.0	3.8 to 4.2	10.00
4.8	4.6 to 5.1	11.9
5.5	5.2 to 5.8	13.5
6.3	6.0 to 6.6	15.5

Sheet glass of 4 mm nominal thickness weighing not less than 10 kg/sqm shall be used for glass panel of area up to 0.5 sqm. for panel exceeding 0.5 sqm in area, the nominal thickness of glass to be used shall be as specified.

Glass panes shall weigh at least 7.5 kg/sqm and shall be free from flaws, specks or bubbles. All panes shall have property squared corners and straight edges. The glass panes shall be so cut that it fits slightly loose in the frames. In doors, windows and clerestory windows of bath, WC and lavatories frosted glass panes shall be used which shall weigh not less than 10 kg/sqm.

Glazing shall be provided on the outside of the frames unless otherwise specified.

Fixing of glass panes shall be done with aluminium beading. Fabricator shall drill appropriate holes for screws. Normally the beadings are fixed with screws spaced not more than 10 cm from each corner and intermediate not more than 20 cm apart. When the glass panes are fixed with aluminium beading having mitred joints, epoxy resin or silicon sealant shall be applied between glass panes and sash bars and also between glass panes and the beading.

Panelling:

Different types of panelling such as ply wood, block board, veneered particle board, fibre board panelling can be used for aluminium doors, windows and ventilators.

Measurement:**Framework:**

Only after ascertaining that the aluminium doors, windows and ventilators fixed on site are manufactured by reducing the width by 2.5 cm and height by 1.25 cm than the specified size of doors in the drawings issued for construction, the length of each extruded section used for fabrication of the door shall be measured correct to 1 mm. In case the sizes of doors that are manufactured, happen to be the sizes specified in the drawings, only the theoretical dimensions arrived by reducing the overall sizes should be considered.

The weight of material used shall be calculated on the basis of actual weight of extruded sections used for fabrication and shall be compared with the weights given in the manufacturer's catalogue. Subject to the condition that the variation in actual weight should not exceed $\pm 10\%$ than the weights specified in the manufacturer's catalogue. Payment shall be made for the actual weight of the extruded section. The final weights shall be calculated in kgs. Upto two places of decimal.

Glazing:

Length and width of opening for glazing insert shall be measured correct to 1 cm.

7.0 FLOORING**CEMENT CONCRETE:**

Cement concrete of specified mix shall be used

and it shall generally conform to the specification for concrete.

BASE:

Proper base to required slopes shall be prepared for laying the flooring. In case of flooring under layer shall be of hard core and or cement concrete. If the cement concrete flooring is to be laid directly on RCC slab, the surface of the RCC slab shall be roughened with brushes while the concrete is green. Before laying the concrete the laitance shall be removed, the surface shall be hacked and a coat of cement slurry at 2.75 kg/sqm on the floor area shall be applied to get a good bond between concrete and slab.

The hard core shall consist of broken stones / stone blast of 50 mm and under size. These shall be spread and laid on the prepared base and initially compacted manually. The surface shall then be checked for proper grade. The hard core shall be then compacted by mechanical compactors.

LAYING:

The specified thickness of cement concrete shall be laid in the pattern as approved by the Engineer and ISI Specification. Wherever not specified minimum thickness of 40 mm be provided.

The flooring shall be laid to the level except where slopes are called for in the drawings in which case the slope shall be uniform and arranged to drain off in the indicated outlets. Particular care shall be taken to ensure that all flooring Skirting / dado to perfectly match for colour / texture / finish.

CURING:

Curing for cement / metal hardened flooring shall be done for a period of 10 days after the top layer has hardened. Curing shall be done by flooding with water.

POLISH HED KOTA FLOORING:

STONE SLAB:

The slabs shall be of selected quality, hard, sound and homogeneous in texture, free from cracks, decay, weathering and flaws. They shall be hand or machine cut to the required thickness (25mm, if specified), size and shape as specified.

They shall be of even colour and free from soft spots, cracks and broken flaws on top.

DRESSING:

Every slab shall be cut to the required size and shape and fine chisel dressed on the side to the full depth so that a straight edge laid along the side of the stone shall be in full contact with it. The side (edges) shall be table rubbed with coarse sand or machine rubbed before paving. All angles and edges of the slab shall be true, square and free from chippings and the surfaces shall be true and plane.

PREPARATION OF SURFACE AND LAYING:

The bed mortar should be of cement mortar 1:4 (1 cement; 4 coarse sand) of 20 mm thick average thickness having a minimum of 12 mm thickness and not more than 28 mm thickness anywhere. This should be laid on the sub-base of floor, after cleaning the same and thoroughly wetting. Neat cement grout of honey like consistency shall be spread on the mortar bed on as much area as could be covered with the flooring slabs within half an hour.

The edges of the slabs to be fit jointed as required and the joints shall be buttered with grey cement, with admixture of pigment to match the shade of the slab. The flooring shall be laid without variation in colour and the stones to be graded to achieve desired uniformity.

POLISHING & FINISHING:

- A] First grinding with coarse grade carborundum stone shall be done.
- B] Second grinding shall be done with carborundum stone 120.
- C] Final cutting with fine stone of 220-350 grade.

GRANITE/MARBLE STONE:

Granite / marble stone shall be hard, sound, homogeneous in texture with crystalline texture and shall be uniform in colour and free from cracks, stains and weathering. The quality shall be as specified and approved by the Engineer. The slab shall be cut to the required shape and size, fine dressed on all sides to the full depth. Front edge of the stone to be rounded. The surfaces shall be machine cut or table rubbed and all edges and angles shall be true, square and free from chippings. The laying, curing, polishing and finishing shall be as per specifications duly approved by the JDA. The mortar bedding thickness shall be 20mm.

GLAZED CERAMIC TILES

Glazed ceramic tiles shall be laid on structural concrete slab or floor concrete slab. These will be as per specification.

Tiles do not require any special bedding as per terrazzo and stone floor tiles. But to achieve required slope it is advisable to provide, average 20mm thick bedding cement layer. Over this, tiles shall be laid on neat cement slurry. Tiles for skirting and dados shall be laid on cement mortar 1:3 backing plaster of 12mm thickness.

8.0 PLASTERING

All plaster work shall be executed in a workmanlike manner and shall be of the best workmanship. All plastering shall be finished to true plane, without imperfections and square with adjoining work and shall form proper foundations for finishing materials such as paint etc. Grooves in plaster as

specified in the drawings shall be provided.

Masonry and concrete surface to which plaster is to be applied shall be clean, free from efflorescence and damp and sufficiently rough and keyed to ensure proper bond.

MORTAR

The mortar shall be used as specified in the nomenclature / drawings. In the absence of any specific mention it should be cement mortar 1:6 for internal and 1:4 for external walls and 1:3 for ceiling plaster.

At all joints between concrete frames and masonry wire netting of required width shall be installed as required by the Engineer before plastering. Groove shall be provided between the ceiling and wall plaster, if so desired by the

Engineer. Edges of all plastered surfaces shall be protected. The contractor shall prepare samples of each type of plaster work for approval by the Engineer before the commencement of plaster work.

All plasters shall be commenced from the top and worked towards the ground and no patch work shall be permitted.

Mortar shall be applied to the surface in uniform layers slightly more than the specified thickness.

FINISHING:

The surface shall be made even and finishing shall be completed with plaster's trowels as soon as possible. In any case, it shall not take more than half an hour after water has been added to dry mortar. The finished thickness shall be 12 mm on smooth faces of internal walls and 15 mm average on the rough faces of walls and external walls. Thickness of ceiling plaster to be minimum 6 mm and may be increased to get even and level surface.

All corners, angles and junctions shall be truly vertical or horizontal as the case may be carefully and neatly finished.

Rounding of corners and junctions where required shall be done without any extra payment.

No portion of the surface shall be left out initially to be patched up later on, work shall be continuously taken up. The work includes provision of all grooves, between various surfaces.

WORKMANSHIP:

Preparation of mortar mix:

The material used in preparation of plastering mix shall be measured by volume using gauge-boxes or by weight.

When cement is measured by weight, 1440 kg. of material shall be taken equivalent to one cubic meter.

Mixing:

Mixing shall be done mechanically. Each mortar batch shall be used within half an hour. Hand mixing if permitted as special case shall be carried out on a clean watertight platform. The mixing operation shall be continued with addition of necessary quantity of water until a uniform appearance and consistency of mortar is obtained.

Cement and sand shall be mixed dry in required proportion to obtain a uniform colour and water shall then be added to get the required consistency of the plaster.

Method of plastering:

Surfaces to be plastered must be clean and free from dust, loose material, oil, grease, mortar droppings, sticking of foreign matter, traces of algae etc. It is very important to ensure that there should not be any chance of the plaster getting abandoned due to presence of

materials harmful for bonding.

Raking out of joints is expected to be carried out along with masonry but it should be checked thoroughly so as to receive good key.

Walls should be sufficiently damp prior to plastering. Water from plastering mortar must not be observed by masonry under any condition.

Any unavoidable projections in masonry and concrete surfaces shall be chiseled back. Care shall be taken that surrounding surfaces are not damaged and reinforcement is not exposed.

Thickness of one coat should not be more than 15 mm and less than 8 mm for single coat finished plaster.

In case of multi coat plaster, sufficient time shall be allowed for the undercoat to harden (cured, dried and shrunk properly) before subsequent coats are applied.

Undercoat shall be scratched or roughened before they are fully hardened to form a mechanical key.

The method of application is also important and hence it is recommended that the mix be thrown on the surface rather than stuck with trowel. This increases the adhesion.

Scaffolding should be rigid allowing free and safe movement on the platform and it should be at sufficient distance or height from the working area. Scaffolding with railing gives more confidence to workers and improves the quality of work.

Actual plastering shall be undertaken only on the approval of the JDA. Plaster work should only follow the steps mentioned below:

- A] Surface must be thoroughly cleaned.
- B] Plaster area must be provided with level dabs or spots allowing working and checking with 2-3 m straight edge. Depth of plaster must not be less than 8 mm at any point.
- C] Required concealing services must be completed and tested. D] No further cutting of masonry must be required.
- E] Repairs carried out to masonry or concealing work must be cured and dry. F] Surface must be sufficiently damp.
- G] Plaster dabs are checked for plumb and level by the EIC or his representative.
- H] Joints, concealing and repairing areas must be covered with 20 gauge GI chicken mesh as per the JDA's instructions.

Corners, external or internal shall be finished along with final coat. It is advisable to have rounded corners.

Plaster shall be cured for 14 days by wet curing except in interior finish plaster. During this period plaster shall be protected from exposure to extremes of temperature and weather.

Plaster shall be leveled and lined by aluminium hollow section, 2-3 m long (this will give even and leveled surface). There shall not be more than 2 mm difference in level when checked with 3 m straight edge. It is important that enough pressing and beating is done to achieve compact filling of joints and that the area is fully compacted.

Finishing of plaster may be carried out with wooden float (randhas) or trowelled smooth with sheet metal trowels as specified. Care shall be taken to avoid excessive trowelling and overworking of the wooden float.

All corners, internal or external, shall be truly vertical and horizontal. These shall be finished with a proper template to achieve best workmanship for rounding and chamfering as specified or directed.

Plaster shall be cut to correct horizontal or vertical line at the end of the day or if work requires to be suspended for any reason.

It is advisable to limit the area of plaster to 15 sqm to avoid cracks due to thermal movements of dissimilar material in contact, it is advisable to provide joints treated with groove or any

other details as suggested by the Architect / Engineer. These joints if not specified shall be treated with 150 mm wide reinforcing chicken mesh (approved by the JDA) fixed over joints by G nails and they are plastered.

MEASUREMENT:

Thickness of plaster shall be the average depth of plaster as specified. But if extra thickness occurs due to bad quality of bricks, stones or blocks or due to bad workmanship, then the repairs required to be carried out shall be at the cost of the contractor.

- A] Grooves, patts in continuation of large areas or plaster areas shall be considered as part of the plaster and not measured separately.
- B] Isolated areas and width below 300 mm shall be specified and detailed separately in the Schedule of rates and measured in running meter.
- C] Ceiling plaster, including ribbed beam slab shall be measured in square meters.
- D] Beams and columns in continuation of masonry shall be measured in square meter.

Jambs, sills, coves, cornices etc. shall be a part of plaster and not separate payments shall be made towards these items.

Deductions:

- A] Deductions for an opening in plaster shall not be for area less than 0.5 sq.m.
- B] In case the opening area is 0.5 sq.m. to 3.0 sq.m., only 50% area shall be deducted from each side.
- C] In case the width of door or window frames are equal to masonry, full area of openings shall be deducted.
- D] In case of opening of area above 3 sq.m. each deduction shall be made for opening on each face and jambs, soffits, sills shall be measured.

RATE: (If applicable)

Description of item, includes wherever necessary, conveyance and delivery handling, unloading, storing, fabricating, hoisting, all labour for finishing to required shape and size, setting, fitting and fixing in position, straight cutting and waste, return of packings and other incidental charges.

Levels and heights shall be as indicated in the Schedule. Preparation of

surfaces shall be as approved by the JDA.

Trimming off the projections on masonry shall be included in the

price. Scaffolding and working platforms shall be included in the price.

Materials as detailed and as required to complete item as specified shall be included in the price.

Curing of plasters shall be included in the price.

Cleaning of adjacent areas, windows, door frames etc. including masonry surface in exposed masonry work, shall be included in the price.

Forming grooves for joints between beams / columns and masonry etc. shall be included in the price. Any special treatment if detailed shall be measured separately and billed in Schedule of Rates.

Providing and fixing chicken mesh at junction of RCC, brickwork, edges, corners, chiseled and repaired

brick work prior to plaster over concealed conduit etc. shall be as directed by the JDA. It shall be considered as per of item and no separate charge will be payable.

CURING:

Curing shall be started as soon as the plaster has hardened sufficiently. The plaster shall be kept wet for a period of a minimum of seven days or as directed. The finished surfaces shall be suitably protected from sun, rain and other damages.

SCAFFOLDINGS:

For all plaster and pointing work double scaffolding having two sets of vertical supports shall be provided. The supports shall be sound and strong tied together with horizontal pieces over which scaffolding planks shall be fixed.

Any cracks which appear in the surface and all portions which should be hollow or are found to be soft or otherwise defective shall be cut and redone as directed by the Engineer to match with the surrounding surfaces.

NEERU PLASTER FINISH:

Neeru plaster is done to have better finished plaster surface. The mortar for punning shall consist of one lime patti and one fine sand unless otherwise specified. The lime patti shall be made using fat lime. The mortar shall be grinded in a mechanical mortar mill. The surface of the undercoat on which the Neeru plaster is to be done shall be left rough. The finishing shall be applied when the under coat is still green. The mortar for finishing shall be applied in a uniform layer slightly more than 3 mm thick between gauged pads, with which to ensure an even and uniformly thick surface by frequent checking with a wooden straight edge. It shall be finished to an even and smooth surface with trowels.

All corner, angles and junctions shall be truly vertical and horizontal as the case may be and shall be carefully and neatly finished. Rounding or chamfering corners, arises, junctions etc. where required shall be made without any extra payment.

No portion of the surface shall be left out initially to be patched up later on. The thickness of the finished mortar shall not be less than 3 mm thick.

9.0 PAINTING:

The following specifications cover the painting and finishing of all surface throughout the interior and exterior of the building. Refer to schedule of finishes, for type of interior finish, exterior finish to surface etc. Contractor shall supply all labour, materials, tools, ladders, scaffolding and other equipment necessary for the completion and protection.

All colour, tints as approved in the colour schedule shall be approved by the Engineer. The contractor shall use pre-mixed manufacturer's colours and shall prepare painted samples of the colours selected and submit the same for approval by the Engineer. No work is to proceed until the Engineer has given his approval of the colour samples. For mixing of various shades and colour no extra shall be payable.

All materials used in the work shall be specified in brand and quality, as approved by the Engineer. Paints shall be ready mixed and all paints, varnishes, enamels, lacquers, stains, paste, fillers and similar materials must be delivered to the job site in the original containers, with the seal unbroken & label intact. Each container shall give the manufacturer's name, type of paint, colour or paint and instruction for reducing. Thinning shall be done only in accordance with manufacturer's directions.

All surfaces to be painted and floors in the rooms being painted shall be cleaned free of all loose dirt and dust before painting is started. All work where a coat of material has been applied must be inspected and approved before application of the succeeding specified coat.

Each under coat shall be a distinct shade of the approved colour. All interior and exterior trim, door frames, door windows, ventilators, shelving, cabinet work shall be thoroughly and carefully

painted on all surfaces and edges which will be concealed when installed. Such surfaces shall be clean, dry sanded and properly prepared to receive the paint, tops, bottoms and edges of doors shall be finished same as the rest of the door.

Where walls are specified to be painted, all columns, arches, groove, rough surfaces, reveals, soffits, returns etc. shall be included and no extra shall be payable.

WOOD:

Sand paper to a smooth even surface and then dust off and wipe clean. Touch up all knots and pitch pockets with shellac on interior wood and outside with sealer or exterior work. After priming coat has been applied thoroughly fill all nail holes, irregularities and cracks. Use plaster wood filler for stained or natural finish and putty for painted work.

PLASTERWORK:

Fill all holes, cracks and abrasions with plaster of paris, properly and applied cut smoothed off to match adjoining surfaces. Do not use sand paper on plaster surface. Plaster shall be allowed to dry for at least 3 weeks.

STEEL & IRON:

All surfaces shall be washed with mineral spirits to remove any dirt or grease before applying paint. Where rust or scale is present, it shall be wire brushed and emery prepared clean. Shop coats of paint that have become marred shall be cleaned off, wire brushed, and spot primed over the effected areas.

Brick tile / brick work / concrete shall be allowed to dry for at least 30 days, then shall be prepared for paint by thoroughly removing all dirt, dust, oil lacquer, efflorescence and other deteriorious materials. Cracks, faulty joints and cavities in concrete shall be filled by applying cement and sand grout and cement to produce a uniform even surface.

No exterior painting shall be done in damp foggy or rainy weather, surface to be painted shall be clean, dry smooth and adequately protected from dampness. Each coat shall be applied in sufficient quantity to obtain complete coverage, shall be well brushed and evenly worked out over the entire surface and into all corners, angles, and crevices, allowed to thoroughly dry. Second coat shall exactly match final coats is started. Allow for at least 48 hours drying time between coats for interior and 7 days for exterior work and if in the judgement of the Engineer more time is required it shall be allowed.

Finished work shall be uniform, of approved colour, smooth and free from runs, sags, defective brushes and clogging. Make edges of paint adjoining other materials or colour sharp and clean, without overlapping plaster wood filler when it shall be wiped across the grain of the wood and then with the grain to secure a clean surface.

All under coats of paint shall be tinted to the same or approximately the same shade as of the final coat.

All interior plastered surfaces shall be washed down with solution consisting of 3 pound of zinc sulphate per gallon of water.

Enamel or varnish finish / oil finish applied to wood or metal shall be sanded between coats with fine sand paper to produce a smooth even finish. Varnished surfaces must be protected from dampness and dust until completely dry.

WHITE WASHING & COLOUR WASHING:

PREPARATION OF SURFACES:

The surfaces shall be prepared thoroughly cleaned of mortar drops and foreign matter.

LIME WASH:

The wash shall be prepared from fresh stone white lime or manual or equivalent quality. The lime shall be thoroughly slaked on the spot, mixed and stirred with sufficient water to make a thin cream. The cream shall be screened through a clean course cloth and of the nature of gum dissolved in hot water added for each of the cream. Water shall be added at the rate of about one gallon per kg. of lime to produce a milk solution. In case of colour wash pigment of approved quality and shade be added with the lime wash.

Wherever white washing with whitening is to be applied, same shall be as per I.S. code.

WHITE WASHING/COLOUR WASHING:

The wash shall be applied with a brush. The coats being laid on vertically and horizontally alternatively, each coat being allowed to dry before next coat is applied. When dry, the wash should show no sign of cracking.

No portion in the surface shall be left out initially to be patched up later on.

For new work, 3 or more coats shall be applied till the surface present a smooth and uniform finish, the last coat being applied vertically.

DRY DISTEMPERING:

Dry distemper of the approved brand and manufacturer shall be used. The shade shall be got approved from the Engineer before application. The dry distemper shall be prepared and mixed as per approved manufacturer's specifications and instructions.

The surface shall be thoroughly brushed free from mortar dropping or other foreign matter and sand prepared smooth. New plaster surface shall be allowed to dry before applying as per direction and satisfaction of Engineer. Filling in plaster shall be made good with plaster of Paris mixed with dry distemper of the colour to be used. The surface shall be rubbed down again with fine grade sand paper and a coat of distemper shall be applied over the patch.

A priming coat of whitening shall be over the prepared surface in case of new work, if so stipulated in the description for the item. No white washing coat with lime shall be used as a priming coat. The treated surface shall be allowed to dry before the distemper coat is given.

The treatment shall consist of a priming coat of white washing followed by the application of two or more coats or distemper till the surface shows an even colour. The application of each coat shall be as follows:

The entire surface shall be coated with mixture uniformly with proper distemper brushes in horizontal strokes followed immediately by vertical one which together shall constitute one coat. The subsequent coats shall be applied after the previous coat has dried. The finished surface shall be even and uniform and shall show no brush marks and wavy surfaces. Enough distemper shall be mixed to finish one room at a time and application of a coat in each room shall be finished in one operation. After each day's work the brushes shall be washed in hot water and hung down to dry.

WATERPROOFING CEMENT PAINT:

Water proofing cement paint of approved brand and manufacture shall be used. The paint shall be brought in sealed bags and the shade etc. shall be got approved from the Engineer. The surface shall be prepared thoroughly cleaned of foreign drops & foreign matter. All loose particles shall be dusted off after rubbing. One coat of water proofing cement paint properly diluted with rubbing thinner (water or other liquid) as stipulated in horizontal stroke followed immediately by vertical one, which together constitute one coat. Subsequent coat shall be applied in the same way after a time interval of at least 24 hours between consecutive coats until an even shade is obtained. The surface shall be cured by keeping it wet by sprinkling water for at least 7 days.

TEXTURE FINISH:

High quality acrylic based texture spray applied in approved pattern applied as intermediate finish in desired pattern to form film thickness 1-1.2mm after scrapping and proper cleaning the surface to

remove loose particles from the plaster/RCC surface over a priming coat of exterior primer applied at 0.8 litres

/10 sqm, followed by minimum two top coats with premium acrylic smooth exterior paint with 100% acrylic content UV resistant properties, anti-algae additives and dirt pick-up resistance of required shade complete as per manufacturer's specification. All layers should be of single manufacturer approved brand.

The agency shall supply all materials, labour, tools, ladders, scaffolding and other equipment necessary for the completion and protection of all texture work as herein specified shall be applied to all surfaces requiring texturing throughout the exterior of the building as given in the schedule of finishes or elsewhere. The texturing shall be carried out by a specialist sub-contractor, approved by the JDA. Care is to be taken that all surfaces to be textured are thoroughly cleaned and dry.

Storage of materials to be used on the job shall be only in a single place approved by the JDA. Such storage place, shall not be located within any of the buildings included in the contract.

The paint shall be continuously stirred in the container so that its consistency is kept uniform throughout.

The painted surfaces shall present uniform appearance and semi-gloss finish free from streaks, blisters etc.

For new work, the surface shall be thoroughly cleaned off all mortar dropping, dirt dust, algae, fungus or moth, grease and other foreign matter of brushing and washing, pitting in plaster shall be made good, surface imperfections such as cracks, holes etc. shall be repaired using white cement. The prepared surface shall have received the approval of the Engineer-in-charge after inspection before painting is commenced.

Before pouring into smaller containers for use, the texture shall be stirred thoroughly in its container, when applying also the texture shall be continuously stirred in the smaller containers so that its consistency is kept uniform.

The specification and method statement shall be submitted by the agency well in advance before the start of execution. The execution shall be allowed only after due approval of JDA.

PAINTING WITH SYNTHETIC ENAMEL/READY MIXED/EXTERIOR PAINT:

Synthetic enamel paint (conforming to IS :1932-1964) / ready mixed paint / exterior paint shall be of approved brand and manufacture and of the required colour shall be used for the top coat and an under coat of shade to match the top coat as recommended by the manufacturer shall be used.

Preparation of surfaces shall be as specified for painting earlier:

Application: the number of coats including the undercoat shall be as under:

- a) Under coat: One coat of the specified paint of shade suited to the shade of the top coat shall be applied and allowed to dry overnight. It shall be rubbed next day with the finest grade of wet abrasive paper to ensure a smooth and even surface, free from brush marks and all loose particles dusted off.
- b) Top coat: top coats of specified paint of the desired shade shall be applied after the undercoat is thoroughly dry. Additional finishing coats shall be applied if found necessary to ensure proper uniform gloss surface.

10.0 WATER PROOFING: INDIAN STANDARDS

Indian standards to be followed are:

1.	IS 3384	Specification for Bitumen primer for use in water proofing and damp proofing.
2.	IS 269	Specification for 33 grade ordinary and low heat Portland cement.

3.	IS 383	Specifications for coarse and fine aggregates from natural sources.
4.	IS 2645	Specification for integral cement water proofing compound.
5.	IS 3495	Method of Test for burnt clay building bricks.
6.	IS 8112	Specification for 43 grade ordinary Portland cement.
7.	IS 12118	Specification for two part polysulphide based.

Part I General Requirements.

PROPRIETARY TREATMENTS:

Terrace water proofing (brick bat)

Various experienced water proofing specialists shall carry out the following or similar types of water proofing treatments. Terraces and roof slabs shall be treated with integral cement based water proofing consisting of brick bat concrete laid to slope. The treatment shall be taken over vertical surfaces as required / specified. Final finished surfaces may be laid with paving tiles, stones as finished smooth in cement and marked with false chequered marking. Points given below are just for guidelines. The actual steps and details shall be submitted by the contractor for approval of the Engineer. Work shall be carried out as per approved method by the Engineer.

The surface to be treated shall be cleaned and well-defined cracks grouted by making 'V' notches with the cement slurry.

Average 110 mm thick brick bat with cement concrete treatment shall be installed. Surfaces shall be cleaned, grouted and cured brick bat of required sizes shall be laid on grouted areas to slopes as shown in drawing. Further joints shall be grouted with cement sand mortar of mix 1:6 and then finished with cement sand mortar mixed with water proofing compound. Surfaces shall be finished smooth and false marking of 300x300 mm tile pattern made. If other finishes are to be installed surfaces shall be prepared to receive the same.

Rainwater inlets, pipes and other obstructions protruding shall be properly treated to ensure that leakage/seepage does not take place.

Additional points to be noted are:

- A] Required slopes are created and maintained for easy draining of water.
- B] Draining points shall be treated thoroughly and carried out right into the rainwater pipes.
- C] Edges and corners are rounded or chamfered to a minimum of 75 mm radius.
- D] The top edges shall be finished in a neat horizontal line and tucked in a groove in the wall/parapet, about 300 mm above the finished surface.

The treatment shall also be carried out over parapet walls about minimum 300 mm in height or sill all around as a case may be.

The surface shall be finished neatly with cement mortar in a ratio of 1:4 and marked with false marking. It may be covered with paving precast cement tiles or others specified tiles or stones in specified sizes. These shall be bedded in 12 mm thick cement sand mortar. Joints shall be pointed with CM in a ratio of 1:3, mixed with 5% water proofing compound by weight.

Testing:

Treatment shall be tested by ponding water about 250 mm high for 72 hours. Surfaces shall be examined for leakage, seepage, dampness, sweating etc.

Measurements shall be in square metre for finished surface area. Rates shall include all items right from cleaning of surface to completion and required guarantee against defects such as leakage, seepage, dampness, sweating etc. for a period of 10 years.

Sunken Portions:

All the sunken portions and vertical faces shall be treated in the following process:

1. Surface shall be cleaned and first coat of cement slurry applied @ 4.4 kg./sq.m. mixed with waterproofing compound 'Impermo' of Snowcem or equivalent conforming to IS 2645 in recommended portions.
2. then the 2nd coat of barrier consisting of 20 mm cement plaster 1:3 cement mortar mixed with waterproofing compound 'Impermo' of Snowcem or equivalent conforming to IS 2645 in recommended portions.
3. After proper curing for 3 days and proper drying the surface, the 3rd and final course of bitumen shall be applied hot at 1.7 kg. per sqm of area and PVC sheet of 400 micron thick (Overlaps at joints of PVC sheet should be 100 mm wide and pasted to each other with bitumen @ 1.7 kg/sqm) shall be applied.

Proper slope without let, plastering etc. as detailed in the sketch to be provided by the civil contractor.

Waterproofing with Fully Bonded HDPE Membrane

Fully Bonded HDPE Membrane type waterproofing is to be carried out in raft

/in foundation work (only if found necessary as per direction of engineer-in-charge)..

1.2 mm thick Fully bonded HDPE membrane (Smooth Type) shall provide an intimate bond to the underneath of the poured concrete used as base/raft slab to resist water migration. Membrane shall be supplied with original manufacturer's Material Test Certificate (MTC) & membranes shall be installed in strict accordance with original manufacturer's instructions. Agency shall prepare the method statement.

The fully bonded HDPE sheet membrane shall consist of a multi-layer composite film which consists of highly resilient HDPE film, self-adhesive polymer layer and a trafficable weather resistant layer.

Fully bonded HDPE sheet membrane shall be chemically resistant in all types of soil or water and is unaffected by ground settlement beneath slabs. The fully bonded HDPE sheet waterproofing membranes shall have the following typical properties:

Peel Adhesion to concrete > 800 N/M (as per ASTM D903) Elongation > 400%

Tensile strength: > 27 Mpa

Thickness: 1.2 mm with HDPE thickness, HDPE – 0.8 mm min

Thickness Puncture Resistance - 1000 N

Pre-applied fully bonded HDPE membrane shall be installed with self-edge laps, and end laps executed with supplier instructions. Pre-applied fully bonded HDPE membrane shall be laid over the entire area and returned on to the diaphragm/retaining wall & terminated as per manufacturer instruction till the level of raft slab.

Purpose of this technical specification is to establish, monitor and control all activities to execute the waterproofing of basement raft and Reinforced concrete retaining walls including, sampling, inspections & execution without any safety hazard. This procedure is exercised in order to meet the requirements specified in drawings, project specifications and up to the satisfaction level of JDA & consultant.

Scope of this work covers installing minimum 1.2 mm thick with minimum 0.8 mm HDPE, pre-applied, fully bonded HDPE Waterproofing membrane on uniform and regular PCC surface for basement base slab and 1.5 mm thick with minimum 0.35 mm HDPE lamination.

Controlling Specifications shall be of Original Manufacturer Shop Drawings (Private Label Supplier Shop Drawings not acceptable) and Original Manufacturer Method Statement (Private Label Supplier Method Statement not acceptable) after due approval of JDA.

Waterproofing with Styrene Butadiene Styrene-HDPE membrane

Waterproofing of all retaining walls/Basement Walls shall be done with Styrene Butadiene Styrene-HDPE membrane.

Supply & Installation

The Self-Adhesive SBS-HDPE membrane shall be 1.5mm thick self-adhesive, cold applied, flexible waterproofing membrane comprising of a self-adhesive rubberized asphalt with minimum 0.2mm HDPE lamination. Membrane shall be supplied with original manufacturer's Material Test Certificate (MTC) & membranes shall be installed in strict accordance with original manufacturer's instructions (private label supplier is not allowed) and agency shall produce method statement from original product manufacturer. The self-adhesive membrane shall have following minimum properties:

- a) Lap Adhesion: >650 N/M
Thickness: 1.5mm, HDPE min. Thickness-0.20mm
- b) HDPE lamination: 0.2mm minimum
- c) Elongation (to ultimate failure of rubberised asphalt): >210%
- d) Puncture Resistance: 250N Laying of membrane

The protective release paper shall be peeled back and the adhesive surface of the self-adhesive membrane unrolled onto the prepared surface as described. The membrane shall be brushed onto the surface to ensure that air is excluded from under the membrane. Adjacent rolls of self-adhesive

membrane shall be provided with minimum 75mm overlap at the edges and 50mm at ends to ensure complete continuity. Pressure shall be applied at the laps with a roller to ensure complete adhesion between both layers. All joints to be well rolled until complete waterproofing is obtained. Where membrane is expected to be left exposed at the top of a wall for any length of time the top edge is to be batten fixed to secure the edge and prevent slumping. The perimeter of membrane placed in any given day's operation shall have the free edges sealed by rolling down tightly to prevent entry of moisture and cleaned before continuing with the following day application.

Top of retaining wall

Where the self-adhesive membrane is terminated at the top of a wall, a chase shall be provided of dimensions 20 x 20mm. The self-adhesive membrane shall be dressed into the chase and pointed prior to backfilling.

Inspection and protection

Immediately prior to covering the membrane careful inspection shall be made for accidental damage, any damaged areas shall be cleaned and patched with membrane extending 100 mm beyond the damaged area. On vertical applications where abrasive backfill is to be used the membranes shall be protected with other approved protection boards.

Controlling Specifications shall be of Original Manufacturer Shop Drawings (Private Label Supplier Shop Drawings not acceptable) and Original Manufacturer Method Statement (Private Label Supplier Method Statement not acceptable) after due approval of JDA.

Solvent Based PU Waterproofing

Water proofing treatment to Basement Deck Slab (Terrace of basement) shall be done with Solvent Based PU.

Surface area shall be cleaned up to visible of hair cracks / aggregate texture. Cleaning of RCC member shall be done by hacking tool, wire brush & air blower etc. Open cracks & construction joints shall be sealed with cement mortar. All clean & treated area shall be tested for water tightness by flooding water. All wet spots & water leakage area shall mark for treatment.

Providing and applying high performance, low odour, fast curing, high solids, cold applied polyurethane elastomer waterproof membrane over uniform surface of slab to achieve the required minimum DFT of 1.2mm. PU shall be solvent based pure polyurethane elastomer & shall not contain bitumen or tar and will not bleed or stain. Solvent based PU shall

have following minimum properties:

- a) Solid % Vol: 88
- b) Tensile Strength > 2 Mpa
- c) Elongation > 440%
- d) Chemical Resistance- Excellent shall be applied as per manufacturer specification.

Providing & laying rolled matrix soil filter cum drainage system of minimum 8mm thickness having a compressive strength of 180 KN/sqm of 8mm height with geotextile on top, as per manufacturer's specification, complete as directed.

Component Polyurethane shall be installed as per original manufacturer's instructions (private label supplier is not acceptable). Membrane system is designed to be mindful of the environment, having very low VOC.

PU waterproofing membrane is well suited for use in most areas of application in industrial, commercial and civil design. It has been formulated using the latest moisture curing polyurethane technology and offers the particular benefits of, low tensile modulus, high tear and adhesive strengths, plus high elongation and puncture resistance.

PU waterproofing membrane shall not be exposed to direct sunlight for extended periods of time – to protect the membrane from UV exposure within 2 to 3 days. In addition, the membrane shall be covered by tiles, toppings or membrane protection to prevent damage by other trades.

Controlling Specifications shall be of Original Manufacturer Shop Drawings (Private Label Supplier Shop Drawings not acceptable) and Original Manufacturer Method Statement (Pvt Label Supplier Method Statement not acceptable) after due approval of Engineer-in-charge.

Crystalline Waterproofing:

Water proofing of all water retaining structures such as Underground Tanks / Sumps, STP sumps, Overhead Tanks etc. shall be done by using crystalline chemical by mixing it in concrete.

Waterproofing of all water bodies / Water fall etc. shall also be done by using crystalline waterproofing chemical by mixing it in concrete.

Crystalline chemical shall be mixed in manufacturer's dosage at the time of production of concrete in plant.

Controlling Specifications shall be of Original Manufacturer Shop Drawings (Private Label Supplier Shop Drawings not acceptable) and Original Manufacturer Method Statement (Pvt Label Supplier Method Statement not acceptable) after due approval of JDA.

GUARANTEE

The contractor shall propose the system, giving full descriptions for approval from JDA.

The system shall be guaranteed for 10 years against all defects and liabilities thereof from the date of completion of project. The guarantee shall be on Stamp paper of Rs. 100/- in proforma to be approved by the Employer / JDA. [the contractor shall submit proforma to JDA for approval of Employer / JDA before being written on stamp paper]. The cost of stamp paper shall be to the contractor's account.

Work shall be carried through approved specialist agency as per method of working approved in writing by the JDA.

11. FALSE CEILING

The false ceilings shall be provided as per schedule of finishes and scale of amenities.

12. Floor Tiles/Wall Tiles/Engineered marble, Quartz, Granite etc.

The Engineered marble, Quartz, Granite in flooring is to be provided shall be as per relevant IS code/ JDA BSR specifications and scale of amenities given in this document.

13. MS Fire Check door of 120 Minutes fire rating.

This specification covers the design, supply of materials manufactured and installation of factory made single leaf/double leaf metal fire doors and frames of approved make, design, finish tested and ISO 9001-2000 Certified Company and the manufacturer must be approved manufacturer of supply and fixing of CE/UL certified metal steel fire doors at all levels with all accessories and including supply and installation of hardware. The fire check door shall be complete in all respect as per specifications and direction of Engineer-In-Charge.

Door frame shall be Single rebate Grooved profile of size 125 x 60 mm made out of 1.60mm (16 gauge) minimum thick galvanized steel sheet confirming to IS 2260 & 4351 with grooved seal. Frames shall be Mitered and field assembled with self-tabs. All provisions shall be mortised, drilled and tapped for receiving appropriate hardware. Rubber door silencers shall be provided on the striking jamb. Frame shall be provided with back plate bracket and anchor fasteners for installation on a finished plastered masonry wall opening. Once frame installed shall be grouted with cement & sand slurry necessary for fire doors on the clear masonry opening.

Door leaf shall be 46mm thick fully flush double skin door with or without vision lite. Door leaf shall be manufactured from 1.2mm (18 gauge) minimum thick galvanized steel sheet. The internal construction of the door shall be rigid reinforcement pads for receiving appropriate hardware. The infill material shall be resin bonded honeycomb core with fire rated proprietary insulation filler bonded to both faces of sheet with lock seam joints at style edges. All doors shall be factory prepped for receiving appropriate hardware and provided with necessary reinforcement for hinges, locks, and door closers. The edges shall be interlocked with a bending radius of 1.4mm. For pair of doors astragals has to be provided on the meeting stile for both active and inactive leaf. Vision lite wherever applicable shall be provided as per manufacturer's recommendation with a beading and screws from inside.

The door frames and door shutters shall be primed with 'H' primer and finished with PU/Powder coated. The shutter would be mounted with SS Ball Bearing Hinges of size 100mm x 75mm x 3.0mm of Becker Fire Solutions (4 Nos per leaf), appropriate openings for vision panel glass. Prototype Test certificate for test carried out earlier at CBRI Roorkee for fire rating of doors, shall be attached along with manufacturer's test certificate.

All door shall be factory made and rate to include installation, Fire rated hardware like hinges, panic bar, door closer, Vision Panel 300x 200, Glass, lock, handles, coordinator etc. as desired with necessary reinforcement and direction of Engineer in charge.

Door closer confirming to CE & EN 1154 and B.S. – 476, Part-22, two hours' fire door.

Panic Exit Device – Single / Double leaf confirming to CE & EN 1154 and B.S.–476, Part-22, two hours' fire rated.

Mortice Lock with lever handle confirming to CE & EN 122090 / DIN 18251 and B.S.-476, Part-22, two hours' fire rated.

Stainless steel ball bearing hinges 4 nos. on each side of shutters size 100 mm x 100 mm x 3 mm with screw set etc. complete.

Vision panel: 6 mm thick borosilicate toughened glass 120 min fire rated glass on each leaf of size

300 x200mm.

All doors shall be factory made and deemed to include installation, all hardware like hinges, panic bar, door closer, Vision Panel 300x200, Glass, lock, handles, coordinator etc. as required with necessary reinforcement and direction of JDA.

Applicable codes and standards shall be all the latest editions of standards, specifications, acts, and codes of practice referred to herein including all applicable official amendments and revisions. However, the applicable standards and codes shall be as per but not limited to the list given below: IS: 277 Galvanized steel sheets (plain and corrugated) of GPL Grade with Z 120 Coating. IS: 3614 Metallic and non-metallic fire check doors—Resistance test and Part-2 performance criteria.

The following information shall be submitted by the agency for obtaining approval of the JDA before start of work

Product Data : Manufacturer's data sheets on each product to be used, including preparation instructions and recommendations. Storage and handling requirements and recommendations. Details of construction and fabrication. Installation methods.

Shop Drawings : Detailed plans and elevations, details of framing members, anchoring methods, clearances, hardware, and accessories clearly shown.

Manufacturer's Certificates: Certifying that products meet or exceed specified requirements.

Operation and Maintenance Data: Submit lubrication requirements and frequency, and periodic adjustments required.

Name of installer: Approved by the manufacturer, specializing in performing work of this section with minimum three years' experience.

Delivery, Storage and Handling Fire rated door set shall be delivered and stored in manufacturer's unopened packaging until ready for installation. It shall be protected from exposure to moisture and shall be stored in a dry, warm, ventilated weather-tight location

The Agency shall furnish all materials, labour, operations, equipment, tools & plant, scaffolding and incidentals necessary and required for the completion of all metalwork in connection with steel doors, as called for in the drawings, specifications which cover the major requirements only. Anything called for in the tender documents shall be considered as applicable to the items of work concerned. The supply and installation of additional fastenings, accessory features and other items not specifically mentioned, but which are necessary to make a complete functioning installation shall form a part of this contract.

The Agency shall submit the details of manufacturers from the list of approved makes from which he intends to procure the doors. The agency shall procure the doors only after the approval of the manufacturer from the JDA.

All metalwork shall be free from defects, impairing strength, durability and appearance and shall be of the best quality for purposes specified. It shall be made with structural properties to withstand safety strains, stresses to which they shall normally be subjected to. All fittings shall be of high quality and as specified and as per approval. The Agency shall strictly follow, at all stages of work, the stipulations contained in the Indian Standard Safety Code or its Equivalent British Standard and the provisions of the safety code and the provision of the safety rules as specified in the General Conditions of the Contract for ensuring safety of men and materials. Any approval, instructions, permission, checking, review, etc. by JDA, shall not relieve the Agency of his responsibility and obligation regarding adequacy, correctness, completeness, safety, strength, quality, workmanship.

Testing: The fire doors shall be tested by CBRI or any Test Lab approved by the competent authority. Galvanized steel to be used conforming to IS: 277.

Mock-up: Before proceeding for mass production of all units, the agency shall fix typical mock-up units of each type to verify selections made under sample submittals and to demonstrate aesthetic effect and set quality standards for materials and execution. The agency shall proceed for mass production only after approval of Mock-ups by JDA or his authorized representative.

The specification and method statement shall be submitted by the agency well in advance before the start of execution. The execution shall be allowed only after due approval of JDA.

14. Wooden chowkhat and Shutter

The wooden chowkhats, shutters, magic eye in front door etc. are to be provided shall be as per relevant IS code/ JDA BSR specifications and scale of amenities given in this document.

15. Hardware for Door & Windows

The stainless-steel fittings and fixtures shall be in SS Grade 316, machine made and free of fabrication marks, residual effects of welding/riveting etc.

The fittings shall be finished in a Satin finish (brushed finish - satin's commercial purpose) except where specified otherwise. The brushed effect shall be uniform and without any variations.

Irrespective of the stipulations contained above, the agency shall produce samples for all the fittings in advance and a written approval for the chosen sample shall be obtained from the JDA. The decision of the JDA in respect of the specification, quality and make of fittings to be used at site shall be final and binding on the agency. Nothing extra shall be payable on this account.

All the fittings shall provide with all such accessories as are required to complete the item in working condition whether specifically mentioned or not in the Bill of Quantities, specification & elsewhere in this tender document. The quoted rates shall be deemed to be all inclusive for a complete item fit for use including all

material. Labour, T & P, Specials, fixing arrangements, nuts, bolts, screws, bushes, all required connection pieces etc. as well as making good the surface wherever required.

All the accessories including brackets, nuts, bolts, screws, bushes etc. shall be of the quality and make specified by the manufacturer of the fitting.

All the fitting shall be got fixed through the authorized Fixing Agency on the approved list of manufacturers of fitting. The said Fixing Agency shall be got approved before start of fixing at site.

All the fitting including accessories shall be accompanied with certificate of origin and representative test certificate of conformance with relevant code form the manufacturer with each lot supply. The test certificate shall clearly indicate the lot numbers of the supplied fittings.

The specification and method statement shall be submitted by the agency well in advance before the start of execution. The execution shall be allowed only after due approval of JDA.

SS Railing

All SS railings shall be of grade 304 which shall be provided as per scope of work / relevant drawings, scale of amenities mentioned elsewhere in the tender document.

Sanitary fittings

The sanitary fittings such as W.C., wash basin, tap etc. are to be provided shall be as per relevant IS code / JDAB SR specifications according to scale of amenities and drawings attached.

UPVC windows (Double glazed)

COMPOSITION : Un-plasticized PVC (Polyvinyl Chloride) meeting the requirement of ASTM D 1748 / BS 7413 / EN 12608 shall be used. No reworked material is to be used in any profile; whether used internally or externally.

PROFILE MARKING: The main frame profiles shall be permanently marked at approximately 1 meter intervals with an identifying mark which enables the name of the profile Systems supplier, date of manufacture and extruder to be identified without extraction of the window.

DURABILITY : The Systems shall be resistant to chemicals, and be fungal and vermin proof. The profiles must be color fast, being able to withstand weather and light resistance test of 4000 hours on xenon and weathering apparatus.

COLOUR : The Systems color should be uniform and consistent as approved by JDA. **FIRE RESISTANCE:** The UPVC should be classed as self-extinguishing to prevent support or enhancement of accidental fires.

QUALITY CONTROL: The extrusion process must be quality controlled and the appropriate standards relating to impact strength, technical performance and consistency.

PROFILE CONSTRUCTION : The profile depth should be minimum of 58mm with a nominal wall thickness, internally and externally of 2.8mm. The profile shall have a minimum of two sealed chambers for transoms and mullions and 3 sealed chambers for frames and sashes.

INTERNAL PROFILE DRAINAGE: The internal drainages shall be isolated from chambers into which reinforcements can be placed or through which frame fixing pass. Drainage shall be either through the base or alternatively to the face, concealed by face drainage caps.

PRESSURE EQUALIZATION : Pressure equalization for glazing rebates and for frame rebates shall be carried out in accordance with the recommendation of the profile Systems supplier to ensure efficient drainage in adverse conditions.

WINDOW PERFORMANCE: Windows must meet the requirements with respect to air permeability, watertightness and wind resistance up to 2400pa.

STRENGTH AND SAFETY OF MOVING PARTS: The moving parts of the Windows must have sufficient strength and robustness to withstand accidental Static and Dynamic loads in use, without any permanent deflection or breakage. The overall evaluation will be based on the experience from use and subject to approval by the Design Consultant/Client.

GLAZING BEADS : Glazing beads shall be of the one foot snap in design and shall be extruded UPVC mitred at the corners. All glazing beads shall be with a co-extruded gasket of a multi-fin design to maintain security and weather performance. Gasket material shall be thermo Plastic Elastomer.

GLAZING GASKETS: All glazing gaskets as well as weather seals are to be extruded from non migratory EPDM . Glazing gaskets shall be a continuous length. Gasket may be subjected to random testing and shall be obtained from the profile Systems supplier.

WEATHER SEALS : Weather seals shall consist of a double sealing Systems. Seals on the sash and the frame shall be continuous length and for outward opening windows the seal on the sash shall be joined to a 50mm length of pressure relief seal at the bottom of the opening whereas the seal on the frame shall be joined on the top of opening.

Weather seals and pressure relief seals, which shall be obtained from the profile Systems supplier, shall be capable of removal without disturbing the glazing Systems or removal of the frame or sash.

GLAZING: All double glazings shall be internally beaded. The window shall be constructed in such a manner that the glazing or deglazing can take place without the removal of the sash or frame.

WELDED JOINTS: All corner joints shall be homogeneously fusion heat welded in accordance with the instructions of the profile Systems supplier. The resulting joints shall be finished by the grooving/knifing method. Solvent welded joints shall not be allowed.

REINFORCEMENT : All transoms and mullions shall be fully reinforced, irrespective of size, with corrosion resistant galvanized steel. All other profiles to be reinforced as per the specification of the profile Systems supplier which shall suit the proposed style application relative to exposure, elevation and height above the ground level. Reinforcing shall be secured by suitable screws in accordance with the instructions of the profile Systems supplier.

All galvanized steel reinforcing profiles shall comply with BS 2989 1982 Grade G 275N / IS 4759-1996 or equivalent.

MECHANICAL JOINTS: The mechanical jointing of mullions and transoms shall be carried out in strict accordance with the instructions/recommendations of the profile Systems supplier using only approved mechanical coupling components.

HARDWARE GENERAL : All hardware shall be manufactured from corrosion resistant material and be approved by the profile System supplier.

All ferrous screws, nuts, bolts and other fastening or fixing shall be of stainless grade or of a suitable coated steel recommended for use in the fabrication of UPVC windows. Metal that are in contact with each other shall be compatible so as to prevent galvanic corrosion of dissimilar metals by electrolytic action. All hardware should ideally be fixed by attachment through the UPVC to the reinforcement; alternatively it should be fixed in purpose designed screw ports or at least two thickness of UPVC.

Hardware with provision for adjustments shall be accessible for adjusting after the window has been installed. Hardware used to open and close the window shall be replaceable without removing the outer frame from the structure.

FRICTION HINGES: Top hung and side hung opening out lights shall have two friction stays per light and be of stainless steel construction.

The size of the friction stay will depend on size, weight, hanging and exposure of the relevant sashes. This will be determined from table provided by the hinge manufacturer. All side hung friction stays are to incorporate a riser block to allow the sash to be supported in its closed position.

BUTT HINGES : Where external butt hinges are used they must be of the security pin type which do not allow removal of the hinge pin from outside.

ESPAGNOLETTE HANDLES: All espagnolette striking plates are to be purpose designed and secured to the outer frame by approved screw fixing. The espagnolette mechanism shall be of multi locking points dependant on size. All ironmongery where possible shall be screwed into frame reinforcing, or fixing screws must penetrate a minimum of two wall thickness or an equivalent screw port, to obtain sufficient purchase.

FIXING THE FRAME TO THE BUILDING: The gap between the structural opening and the uPVC frame shall be between 5 to 10mm all round, which should be filled by injectable PU foam after completion of fixing for best frame and wall bonding, and for sound and thermal insulation and finally applying neutral cure low modulus Silicone sealant to make joint waterproof.

Fixing points shall be to all four sides of a frame, spaced 150mm to 250mm from corners and not more than 600mm apart elsewhere. Fixing shall be by direct drilling 10mm hole through uPVC frame to building wall. Each fixing shall penetrate into building structure by no less than 40mm and ultimate fixing with anti corrosive plated anchor bolts through these holes. All heads of all fixing screws shall be covered with appropriate plastic cover caps.

HANDLING AND TRANSPORT : Windows may be transported either glazed or unglazed. All windows or prefabricated units shall be transported and stacked in a vertical position and properly anchored to prevent movement in transit, windows shall be separated from each other by adequate packing pieces during transport.

WARRANTEE: The window manufacturer shall issue a certificate of warranty against any manufacturing or installation defect, valid for minimum of five years for rectification of the defect.

S.NO.	TECHNICAL SPECIFICATION	VALUE
1	Impact strength down to 400C	No breakage
2	Notch impact strength	>30kJ/m ²
3	Ball impact hardness	100N/mm ²
4	Tensile strength	>40 N/mm ²
5	E modulus	>2500N/mm ²
6	Linear Thermal Expansion	Coefficient 300C to +500C 0.80x 10 ⁻⁴ K ⁻¹
7	Thermal Conductivity	0.16W/mK
8	Specific volume resistance	1016Ωcm
9	Relative Permittivity	3.3 at 50GHz 2.9 at 106Hz
10	Fire behaviour	Self extinguishing
11	Weathering stability RAL GZ 716/1	After 8.0GJ/m ² irradiation energy better than an authenticity grade 4 of grey scale
12	Special Resistance	Resistance to termites, decay, chemicals e.g. alkalines, acids, salts, salty solutions, seawater, petrol, oil, lime, cement, any kind of emissions Physiological Behaviour and

LIST OF MAKES (Preferred Makes/Brands/Manufacturer)

STRUCTURAL AND CIVIL/PLUMBING AND SANITARY

S.No.	Material	Preferred Makes/ Brands/Manufacturer
1.	Cement (OPC 43 or 53)	WONDER/ULTRATECH/AMBUJA
2.	White Cement	BIRLA CEMENT/ J. K WHITE /TRAVANCORE

3.	ReinforcementSteel	SAIL/TATASTEELLTD/ JSW/Vizag
4.	ParallelThreadedCouplers	DEXTRA/G-TECH/TATA
5.	Re-barringChemical	HILTI/3MINDIA
6.	StructuralSteel	TATA/ JSW STEEL LTD/ SAIL/ JINDALSTEEL& POWERLTD.
7.	Plasticizer,SuperPlasticizer,Admix tures,Otherconstructionchemicals	M.C. BAUCHEMIE / FOSROC /SIKABASF
8.	AACBlock	AEROCON / BILTECH/ J K Laxmi/MAGICRETE
9.	AACBlock Adhesive	ULTRATECH / FERROUS CRETE /BALENDURA/AEROCON/JKLaxmi
10.	Polymer modified cementitiousgrout	WEBBER/ MAPAI / CAPA /KERAKOLL
11.	List ofRMCproducers	ULTRATECH/ACC/READYMIXIN DIAPVT.LTD
12.	Curing Compound	FOSROC / SIKA / PIDILITE / STP /CICO/BASF
13.	ExpansionJoint- modular	HERCULES/Z-Tech/SANFIELD
14.	Bricks	1 st Class

WATERPOOFING

1.	Waterproofing Self Adhesive(HDPE) Membrane	GRACE / FOSROC / MYKSCHOMBURG
2.	SingleComponentLiquidPU(Elasto mericMembrane(sprayapplied)for DeckWaterproofing	BASF/ SIKA/FOSROC/MYKSCHOM BURG/GRACE
3.	Waterproofing Compound (Crystalline)andSwellableBar	XYPEX / KRYTON / PENETRON /BASF / SIKA / FOSROC / MYKSCHOMBURG/GRACE
4.	PolymericCementitiousCoating	BASF / FOSROC / GRACE / STP /PIDILITE
5.	ElastomericAcrylicUVresistantliqui d applied coating	BASF/ FOSROC/SIKA/GRACE

DOOR,WINDOWS&WOODWORK

1.	Laminated Particle Board /Particle board / Laminates /Plywood/ Water Proof PlyBoard/ Marine	MERINO / GREENLAM / CENTURY /ARCHIDPLY
2.	VeneeredParticleBoard	MERINO/DURO/GREENLAM/KI TPLY

3.	SSMesh	GKD/WMW
4.	Flush doorshutters	GREENPLY/ ARCHIDPLY / DURO /MERINO /CENTURY/KITPLY
5.	GlasswoolInsulation	UP TWIGA / POLY GLASS / LLOYDS/OWENSCORNING
6.	RockWoolInsulation	LLOYDS/ROXULROCKWOOL
7.	Polycarbonate Sheet	GELEXAN/ DANPALON/GALLINA
8.	DeckingSteelsheet	TATASTEEL/ LLOYDS/ JSW
9.	Naturalwoodveneer	GREENPLY/ ARCHIDPLY / DURO /MERINO /CENTURY/KITPLY
10.	Anti-static high-pressure laminate	FORMICA/BAKELITEHYLAM/D ECOLAMMERINO/KITMICA
11.	FireSealant	HILTI/3MINDIA/FISCHER
12.	ExtrudedPolystyreneBoard	STP / SUPREME / OWNE SCORNING,SHALIMAR
13.	Wooden/Metal/Glaze-fireratedDoor Shutters&Acoustic	NAVAIR/ KUTTY/GODREJ/ SUKRI/SHAKTIMET
14.	UPVC Doors&Windows	NCL / REHAU / FENESTA / LG-HAUSYS/SALAMANDER
15.	Fireratedglass(2hoursfirerating)	GLAVERBEL/SAINTGOBAIN/PI LKINGTON/PYROGUARD/ SCHOTT
16.	Hardwood	TeakWood/CPTEAK/BTCWOOD

FINISHING

1.	MelaminePolish/PUPolish	ASIANPAINTS/PIDILITEINDUSTRIES/DULUX/BERGER/ICI
2.	Polyester Powder CoatingShades	NEROLAC/BERGER/AKZONOBEL
3.	WallPutty	BIRLA WHITE / JK WHITE / BERGER /SAINTGOBAIN
4.	Oil BoundWashable Distemper	ASIANPAINTS/BERGER/NEROLAC /ICI/ AKZONOBELDULUX
5.	AcrylicDistemper	BERGER/ ASIAN/DULUX/NEROLAC
6.	CementPrimer	BPWHITE(BERGER)/DECOPRIMEWT (ASIAN) / NEROLAC /AKZONOBEL(DULUX)
7.	Steel /WoodPrimer	AKZONOBEL (DULUX) / NEROLAC /BERGER / ASIAN PAINT / JENSON &NICHOLSON

8.	Adhesives	ANCHOR / DUNLOP / PIDILITE-FEVICOL/
9.	Premium Acrylic Emulsion paints	DULUX AKZONOBEL / NEROLAC /ASIANPAINTS/BERGER
10.	Textured Exterior Finish	ASIAN (ULTIMA) / BERGER(WEATHER COAT ALL GUARD) /DULUXAKZONOBEL(ULTRACLEAN) / NEROLAC(EXCEL TOTAL)
11.	Synthetic Enamel Paint	ASIAN / BERGER / NEROLAC /AKZONOBEL(DULUX)
12.	Epoxy Paint	AKZONOBEL (DULUX) / NEROLAC /ASIANPAINTS/FOSROC/BERGER
13.	Fire Paint	ASIAN PAINT / BERGER PAINTS /SHALIMAR/ JOTUN/AKZONOBEL
14.	POP/Gypsum Plaster	FERROUSCRETE/ ULTRATECH /INDIA GYPSUM / ELITE (90) OFGYPROC
15.	Cement based Ready Mix Plaster	FERROUSCRETE / ULTRATECH /SAINTGOBAIN
16.	Pre-Cast GRC Jali	UNISTONE/KERAKROME GRC
17.	Polysulphide sealant	FOSROC / SIKA / TUFFSEAL /PIDILITE / WACKER/ DOW CORNING /GE/STP
18.	Silicone/Weather Sealant	WACKER/ DOW CORNING/GE

STEEL & ALUMINIUM WORKS

1.	Stainless Steel	SALEM STEEL / JINDAL ALLOYS /SAIL/ USHA MARTIN
2.	Welding Electrodes	ADVANI-OERLIKON/MODI
3.	Dash/Anchoring Fasteners	HILTI/FISHER/BOSCH/AXEL
4.	Anodised Aluminium Hardware (Heavy Duty)	HARDIMA / ALU ALPHA / PULSE OFLGFSYMAC/ HINDALCO/ EVERITE
5.	Aluminium Structural Members – Windows, Glazing and Partitions	JINDAL / HINDALCO / NALCO /INDALCO
6.	Stainless Steel Railing, Accessories etc (Grade SS316)	OZONE/GEZE/KICH/DORMA /JINDAL STAINLESS STEEL
7.	G.I Steel door frame	SYNERGY THRI SLINGTON /SHAKTIMET/NAVAIR

CEILINGS

1.	False ceiling Grid system	AMSTRONG/SUPER BOND GYPROC /GRIDLINE/RK/GRIDSYS TEM

2.	FalseCeiling–Gypsum	SAINT GOBAIN GYPROC / AMF /BORAL/LAFARGE/INDIAGYPSUM/H UNTERDOUGLAS
3.	MetallicFalseCeiling	ARMSTRONG / DURLUM / HUNTERDOUGLAS/SAINTGOBAIN
4.	AcousticalTileFalseceiling	ARMSTRONG / SAINT GOBAIN/ECOPHON/DEXUNE/A NUTONE
5.	Calciumsilicateceilingtiles/Boar d	GYPROC / AEROLITE / BORAL /HILUX / ARMSTRONG(MYLAR) /EVEREST/NCL
6.	AluminiumCompositePanel	ALUCOBOND/ALPOLIC/ALUDECOR /REYNOBOND
7.	AcrylicSolidSurfaces	HANEX/L.G-HIMAC/ DUPONT

FLOORINGS/WALLTILES

1.	GlassMosaicTiles	BISAZZA,MRIDUL,OPIO,PALLADIO,I TALIAGLASS
2.	Floor&WallTiles:Ceramic/Vitrifiedti les/Antiskid/Matt/Glazed	KAJARIA/H&RJOHNSON/SOMANY/VA RMORA
3.	PVC/SPCFlooring	ARMSTRONG / TARKETT / LGHAUSYS/WELSPUN
4.	Laminatedflooring	ACTION TESA / PERGO / CENTURY/DURO/GREENLAM
5.	Engineered stone - Marble /Quartz	ASIAN / JOHNSON / KALINGA /QUTONE
6.	Chequered Tiles, Paver Block &KerbStone(ofNon-RecycledC&DWaste)	MAYUR/ULTRA/NITCO/UNISTONE
7.	Tile/StoneAdhesive/TileGrout	MAPAI /CAPA/KERAKOLL/MYK
8.	Floorhardener	PIDITOP 333 BY PIDILITE / FOSROC /SIKA / IRONITE / FERROK /HARDONITE
9.	EpoxyFlooring	FOSROC/SIKA/CICO/BASF/MYK
10.	HeatResistantTiles	THERMATEK/NATIONAL/THERMAX
11.	FloorTrap	JAYNA/ CHILLI/ NIRALI

GLAZINGS

1.	Glazing Structural / Suspended /Skylight/clear/float/frosted/mirror	SAINT GOBAIN / ASAHI /GLAVERBELL
2.	Clear/Float/FrostedGlass/Mirror	AIS / GLAVERBELL / MODIGUARD /PILKINGTON/SAINTGOBAIN/ATUL

3.	GlassSpiderFittings	DORMA / HAFELE / OZONE /HETTICH
4.	ToughenedGlass/Hermeticallysealedperformanceglass	SAINT GOBAIN / GUARDIAN GLASS /PILKINGTON/MODIGUARD/AIS
HARDWARE		
1.	Nuts/Bolts&Screws	GKW/HILTI/HETTICH
2.	Clamp system for dry stonecladding	HILTI/ FISCHER/BOSCH/AXEL
3.	Hinges&Brassware	EARL BIHARI / KICH / INDO-BRASS /ASSA-ABLOY/ HAFELE/GEZE/DORMA
4.	MDFBoard	NUWOOD/DURATUFF
5.	VitreousChinawarecisternetc.	JAQUAR /TOTO
6.	All type of hardware and fittingforalltypeofglazing/doors/windowsetc.includingmortiselatch& lock,towerbolt,ballbearing butt hinges, friction stayhinges, sliding door bolts, leverhandle,magiceyedoorcloser etc.	HAFELE/HETTICH/YALE/GODREJ (HeavyDuty)
7.	ToiletCubicles	MERINO /GREENLAM/ DORMA
8.	Hardware for Fire Check Door/panicbar/panictrim/doorcloser/hinges/locks	HAFELE/HETTICH/YALE/GODREJ (HeavyDuty)
9.	EPDMGasket	HANU/ ANAND/OSAKA
Plumbing& Sanitary		
1.	GI Pipes	JINDAL (HISAR) / TATA / SURYAPRAKASH
2.	GI Fittings	UNIK/ZOLOTO/ SURYA
3.	SS Pipes&fittings	JINDAL / VIEGA / J-PRESS/KANTHERM
4.	Aluminum-reinforcedPE-HDpipe	Hitec/Viega/Jindal/ Kantherm/Kitec
4.	HDPE Pipes	RELIANCE / JAIN IRRIGATION /KISAN/ORIPLAST/SUPREME
5.	DI Pipes	ELECTROSTEEL(VEDANTA)/JINDAL /TATADUCTURA
6.	DI Fittings	ELECTROSTEEL (VEDANTA) /KALINGA/TATADUCTURA
7.	CI Doubleflangedsluicevalve	KIRLOSKAR/SONDHI/KEJRIWAL
8.	FloatValve	LEADER/ZOLOTO/KSB

9.	Centrifugally Cast (Spun) Iron Pipes & Fittings(hubless)	JAYSWAL NECO / RIF / SKF/ SAINTGOBAIN/TATA
10.	Centrifugally Cast (Spun) Iron(ClassLA)Pipes (hubless)	JAYSWAL NECO / ELECTRO STEEL /TATA/SAINTGOBAIN
11.	CI Manhole covers, Frames & GIG ratings	JAYASAWALNECO/RIF/ SKF
12.	SFRC Manhole Covers & Gratings	KK/OCR/PARGATI/T-CON
13.	Stoneware Pipes and Gully Traps	PERFECT / PARRY / BURN / ANAND /RK/HIND
14.	RCC Manhole covers & Frames	KK MANHOLE/GRATING CO.(P)LTD
15.	Gun Metal Valves, Globes	ZOOTO/Castle/KARTAR
16.	Sanitary CP Fittings & Accessories	-ARTIZEI SERIES of JAQUAR or equivalent series of: HANS GROHE/GROHE/KOHLER
17.	CONCEALED FLUSHING CISTERN	VIEGA/GEBERIT/GROHE/ JAQUAR
18.	Water Meter	PRIMA/ ZOOTO/LEADER/CAPSTAN
19.	Brass Stop & Bib Cock	ZOOTO/SANT/L&K/LEADER/ASTRAL
20.	UPVC/CPVC Pipe & Fittings/SILENT FITTINGS	ASHIRWAD/ASTRAL/SUPREME/FI NOLEX
21.	Non-Return Valve(Check valve) and other kind of Valves	ZOOTO/SANT /LEADER
22.	Brass Ferrules	DHAWAN SANITARY UDYOG/KALSI/AN NAPURNA
23.	Insulation for hot water pipes	KAIFLEX / ARMAFLEX / CAREFLEX /LLOYD
24.	Insulation for external/exposed hot water pipes	KAIFLEX/ARMAFLEX / CAREFLEX
25.	Pipe protection for external water supply pipes	PYPKOTE / ARMAFLEX /MAKPOLYKOTE
26.	Stainless Steel Sink	NEELKANTH/ NIRALI/CERA/JAYNA
27.	RCC Pipes	LAKSHMI / SOOD & SOOD / JAIN & CO./PRAGATI CONCRETE
28.	Dash/ Stud/Anchor Fasteners	HILTI/ CANON/BOSCH/ FISCHER

MISCELLANEOUS

1.	IrrigationEquipment	JAIN IRRIGATION, KISAN, FINOLEX, PLASSON
2.	PVCwater tank	SINTEX/ POLYCON
3.	Fabric/Blinds/Curtain	Warwick, DDécor, RRDécor, ManuelRe vertorequivalent
4.	Carpet	Welspun/JaipurRug
HVAC		
1.	ReferigerantPiping	Tootaline/PapdiwalorEquilient
2.	CommunicationCables	Polycab/Finolex/ Anchor
3.	AirConditioners (Window/Split/Ductable Unit)VRV	Mistubishi/Daikin/Ogenral/Hitatchi/Sams ung
4.	DrainPipewithnitrile	Astral/KWing/Prince
5.	Insulation(NitrileRubber)	KFlex/Armaflex/Superlon

1. Equivalentmakes tothemakesmentionedabovemaybeusedwithapprovalfromJDA.

SEC VII

Scope & Specifications ofElectrical&MechanicalWorks

1.0 General Scope and Specifications of Electrical and Mechanical Works

Scope of work

Scope of work covers planning, designing, supply, installation, testing and commissioning of all E & M services such as Electric Sub-Station, D.G. Sets, IEI, External Lighting, Fire alarm, Fire Fighting, Sprinkler System, Solar Power, Basement Ventilation, Lifts & Staircase Access Control-boom barrier, CCTV, Aviation Light, Lightning arrester required to be provided in the said scheme as per norms of various IS codes/ NBC 2016 / JDA specifications/ECBC/CEA, various byelaws and norms of local bodies. The work shall be executed as per scope & specifications of E & M works given hereafter and given in respective head / part of the scheme sub-head. If any services required to make the bldg. / scheme habitable is not covered in the scope of work, interior and services same shall either be pointed out in pre-bid meeting else, it shall be presumed that the same shall be provided within the quoted cost and nothing extra shall be paid on this account.

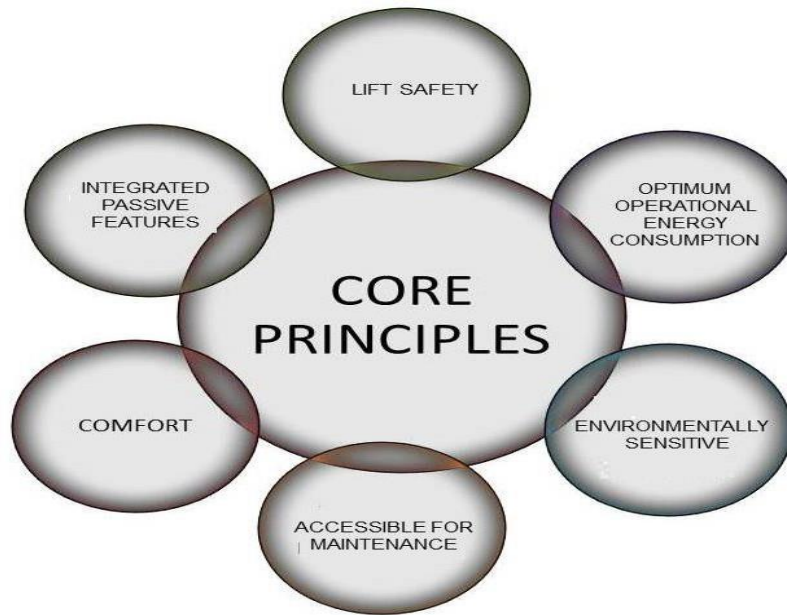
The scope of works also covers the preparation of layout plans, drawings for E&M schemes before the commencement of work. During execution, if the local bodies etc. require a modification, the same shall be executed without any extra cost. Finally, after execution, approvals/NOCs/clearances from local bodies etc. shall be the responsibility of successful bidder for which nothing extra is payable in case any modification / extra work is required. All statutory fees / charges required for obtaining clearances from CEA/Local Bodies shall be paid by the agency.

Power supply required for construction shall have to be arranged by the bidder at his own costs i/c required for testing & commissioning. Water required for testing of equipment's is also in scope of agency.

ELECTRICAL WORKS

The EPC Contractor shall carry out Design, Engineering, Supply, Installation, Testing & Commissioning of complete Internal & External Electrification works including Low Voltage (LV) (Dedicated double circuit 11 KV Charging feeder from nearby 33 KV Substation of JVVNL, RMU, HT Panel, Transformer, earthing and lightning arrester) and other works as required for smooth functioning of the proposed construction of Satellite Hospital, at Achrol, Jaipur. All Electrical & LV works shall be designed and executed as per latest codes of practice for Electrical installations and meeting the requirements of Indian Electricity Rules/ Act, applicable I.S. Codes/ Rules and Latest relevant standards/codes published by B.I.S (formerly I.S.I), Special requirements of JVVNL, CPCB norms, GRIHA-V amended up to date.

ELECTRICAL WORK :



1. Internal electrification.
2. External electrification including transformer, RMU, HT panels, cables Etc.
3. Laying of dedicated double circuit charging feeder from nearby 33/11 KV substation.
4. DG set and UPS of appropriate capacity.
5. Fire fighting, fire protection and fire alarm system.
6. CCTV & EPBAX System.
7. Force ventilation for parking.
8. Facade and campus lighting
9. Solar PV power generation,
10. MGPS & Oxygen plant,
11. Nurse call bell system ,
12. Lighting arrestor & Aviation light,
13. Boom Barrier and ticketing system for parking.
14. Fan , Lighting Fixture and fittings.
15. Passenger and service Lift.
16. HVAC

The Electrical design objective is to achieve a sustainable building that are energy and resource efficient and promote a healthier environment for building occupants & also to achieve GRIHA-5 Rating India Certification

2.0 General

These additional terms & conditions are applicable to all the E&M works.

The Agency shall submit within 45 days after award of work an undertaking from the OEM of lifts and DG sets that they shall unconditionally support the lowest tenderer / JDA technically throughout the execution of contract as well as for Maintenance/Comprehensive Maintenance Contract for the useful life of the system, and

OEM shall provide all the spares required for healthy functioning of the equipment for at least seven years from the date of supply of equipment

The agency must study specifications and conditions carefully. The work shall be executed in close coordination with the progress of building work.

The order of preference in case of any discrepancy shall be as following:

Scope of work Specifications and Conditions, Additional Conditions mentioned in this document.

JDA Specifications for civil and electrical as applicable.

Indian Standard Specifications of BIS including modifications / amendments.

Relevant Sections of National Building Code 2016 with up-to-date amendments.

Sound engineering practice as per directions of the Engineer-in-Charge. All equipment shall be delivered with (i) manufacturer's test certificate, (ii) manufacturer's technical catalogues, and installation/instruction (O&M) manuals.

Scaffolding & any other T&P required for execution of work shall be arranged by the bidder and nothing extra shall be payable on that account. The layout plans/drawings/other documents pertaining to E&M services shall have to be submitted for evaluation & approval, within 45 days of award of work.

Statutory fees required to be deposited for processing the case, shall be borne by the agency.

3.0 Inspection before Dispatch

All routine tests shall be conducted before dispatch of equipment's. No equipment shall be dispatched from the manufacturer's premises without such tests being conducted and test result recorded. These test certificates shall be given along with the supply of equipments. JDA shall, if he so desires, inspect and witness the pre-delivery tests. For this purpose, the agency shall give 15 days' notice. Agency shall

arrange for inspection by the department. Agency shall bear expenses of JDA officials for inspection as far as traveling, boarding and / lodging is concerned. However, waiver if any, for inspection shall be at the discretion of the department without any cost implication but routine test & type test certificate shall have to be submitted for equipments.

Prior to dispatch, all equipments shall be adequately protected & insured for the whole period of transit, storage and erection against corrosion and incidental damages etc.

4.0 Insurance

The agency shall include storage cum erection insurance including third party insurance right from the storage to commissioning of various equipments with beneficiary as Engineer In-charge. All insurance which the agency is required to enter under the contract shall be effected with any authorized general insurance company and the agency shall produce the policies of insurance.

5.0 Remedy of failure to insure

If the agency fails to effect and keep in force the insurance referred to in the preceding sub-clause the department may affect and keep in force any such insurance and pay such premium as may be necessary for that purpose and from time to time deduct the amount, so paid by the department, from any money due or which may become due to bids or recover the same as debit from the agency's bill.

6.0 Quality of material and workmanship

All parts of the equipments shall be of such design, size and material to function satisfactorily under all rated conditions of operation. All components of the equipments shall have adequate factor of safety. The work of fabrication and assembly shall conform to sound engineering practice. The mechanical parts subject to wear and tear shall be easily replaceable type. The construction of the equipments shall be such as to facilitate effortless operation, inspection, maintenance and repairs. All connections and contacts shall be designed to minimize risk of accidental short circuits caused by animals, birds and vermin etc. All identical items and their component parts should be completely interchangeable including spare parts.

7.0 Inspection and testing at site

The installation shall be subject to necessary inspection during every stage of erection, by the JDA or his authorized representative. The successful bidder shall provide all facilities and assistance for the purpose.

The completed installation shall be inspected and tested by the JDA in the manner as will be laid down by him, in consultation with the agency.

All instruments and facilities necessary for the tests shall be provided by the agency.

8.0 Completeness of work

The installations shall be completed in all respects and put in to operation even where certain details have not been mentioned / left out in these specifications. Any discrepancy may be brought out in pre-bid meeting.

All E & M services such as Internal Electrical installations, lifts, fire fighting system & Addressable fire alarm system, DG sets, etc shall be considered for declaring complete by the Engineer in Charge after trial run of 1 month. However, operation and maintenance of these installations during the maintenance / defect liability period of 60 months shall be carried out by the agency.

All electrical & mechanical fittings / fixture / appliances, to be provided for the work, should have latest minimum 3-star rating (of BEE) as available in market. Since, the proposed

construction is for 3-star GRIHA rating, all fittings and fixtures shall be provided which suits to the GRIHA rating.

INTERNAL ELECTRICAL INSTALLATION (IEI)

The work will be carried out in recessed PVC conduit wiring system in accordance of General Specifications for Electrical with amendments up to the date of opening of bids and the governing specifications, which are mandatory including makes for some of the important materials to be used in the work. In case of ambiguity between the two, the specifications shall prevail.

FRLS PVC insulated Copper conductor multi-stranded wires will be used for points, circuit & sub-main wiring.

Agency shall execute the work as per scale of amenities given elsewhere in document after obtaining necessary approval of the layout for internal electrification of all houses, common areas and staircases from Engineer-in-charge. The staircase lighting shall be group control system.

All buildings shall be provided with Modular type switches. Modular type switches, sockets and stepped type fan regulators, bell push along with matching mounting boxes of same makes shall be used.

TV wiring shall be provided from each outlet to TV junction Box located in Balcony. Choice of Balcony for Mounting TV dish antenna shall depend upon direction of TV signal of service provider.

Telephone outlet point wiring of each house shall be terminated in suitable size of GI junction box in DUs direct from floor wise telephone tag block on respective floor. However, conduit for telephone wiring may be provided through branching by providing suitable size of GI box along with suitable tag block at each floor. The inter connections of all junction boxes fixed at all floor shall be done properly making proper distribution system with the prior approval of Engineer in charge. Contractor shall provide Telephone cable from service provider (BSNL/AIRTEL etc). However, pipes for laying of telephone / LV cables shall be provided by the tenderer as per direction of Engineer in charge. 3 Telephone cables (10 Pair each) shall be provided from each floor up to MDF located in the basement for use by service providers.

Suitable rain protection covers made of 16 SWG galvanized MS sheet wherever required shall be provided.

Lighting fixtures LED Type, Ceiling fans & Exhaust fans for all facilities areas including common areas on all floors (Basement, Ground, all floors & Terrace) to be provided by bidder. The model number of fittings and fans shall be got approved from the JDA before execution. Occupancy sensor shall be provided in lift lobbies, common washrooms as per direction of JDA.

Meter Boards & Main Distribution Boards as per DISCOM specification/requirement shall also be provided by the agency. Three phase 415V supply provision shall be made.

Meter Boards are normally provided at ground floor level in panel room as per requirement of the DISCOM & with the approval of the Engineer-in-charge. Energy meters for Common areas (L&P) & for common services shall be got provided & fixed from DISCOM. Connection in getting energy meter installed for common service shall be in the scope of the Agency. However, charges paid to the DISCOM shall be reimbursed on production of original deposit receipt.

Separate vertical shaft is proposed for laying of sub main conduits from various floor up to ground level shall be provided for laying of Electrical, Sub mains & cables. Man holes & HDPE ducts for cable entry, Cable for Power backup supply shall also be provided. Cables from sub-station location up to meter Boards shall be fixed on MS Cable trays suitably suspended from ceiling slab. Sub main wiring conduit from Meter Boards up to Electrical shaft (for vertical distribution) shall be on MS cable suspended. Sub main conduits in vertical shaft from Meter Board floor up to respective Quarters shall be properly supported on MS suspended / bracket etc & layout of sub main conduit shall be such that it ensures adequate space for future serviceability/Maintenance. Shaft layout to be got approved from Engineer-in Charge. Humepipes for taking LT cables up to Meter Boards along with brick masonry chambers of suitable size shall be provided by the contractor wherever required.

Separate shaft shall be provided for laying of Electrical, mechanical & fire services. DWC pipes for taking L.T. cables up to Meter Boards in the Meter Rooms along with brick masonry chambers of suitable size shall be provided by the agency wherever required.

Laying of DWC / Hume pipes for road crossing or in pucca portion & CC path etc. for electric / telephone / street lighting cables / CCTV cable complete with adequate number of cable chambers shall be provided by the agency.

After completing the work, necessary test results as envisaged in Indian Electricity Rules 2005, shall be recorded and submitted to the department. The results shall be within the permissible limits. Test report forms duly signed by authorized person for obtaining electric connections (energy meters) from Power Distribution Company by the agency shall be given to the JDA.

Ceiling fans, exhaust fans & LED light fixtures of suitable wattage, call bell in these buildings shall also be provided by the agency as per direction of JDA.

Lightning arresters as per IS: 2309 -1989 as amended upto date & aviation lights (LED Type) shall also be provided by successful bidder.

Internal Electrification of all buildings and services infrastructure shall be done by the contractor as per layout approved from the JDA.

Ceiling fans, exhaust fans, LED indoor type light fittings & LED outdoor light fixtures (IP-66) of suitable lumen output / wattage for compound lighting shall also be provided by the Agency / Contractor as per direction of Engineer in Charge. Luminaire shall be LM 79 and LM 80 tested from NABL accredited lab.

10.0 DGSET

DG Sets Installation

DG sets outdoor Silent type with radiator cooled. DG Set shall be within an acoustichood. Each DG Set shall be provided with its own day oil tank suitable for at least 10 hrs operations.

Silent DG Sets (radiator cooled) along with AMF Panel for giving three phases, 415V at 50Hz LT supply to meet Power backup requirement shall be provided. DG sets shall be of primerating.

DG Set shall be provided for total connected Electrical Loads of complete Guest house building including Common Services viz, Lifts, Basement / Parking, Drinking Water Pumping Sets, STP, External Lighting, Sentry Posts, Mechanical Ventilation. Smoke Management system. CC-TV, boom barrier, common area load (L&P) for all floors including Basement, Staircase and E&M Rooms.

Scope of work for DG Sets and allied works

- SITC of DG Sets along with AMF panel, DG exhaust piping
- DG fuel piping
- Cabling & Electrical Panel Earthing (Body & Neutral)

The capacity of DG sets should be worked out with following consideration: Power Factor – 0.80.

Provision for Future expansion / addition – 2% of the connected load

The diversity factor to be, as per the National Electric Code 2011 or latest. Loading factor 80%

DG Sets shall be 415V, 3 Phase, 4 wire, 50Hz, 0.8 PF with acoustical enclosure.

DG Set Flue Stack

DG Sets shall be located on periphery of the plot. DG exhaust stack shall be provided as per Norms.

DG Set Start/Stop & changeover shall be fully automatic.

DG sets shall start automatically within 10-30 seconds in the event of a power failure and shall transfer power to emergency/critical loads automatically.

DG Set operations shall incorporate:

(iv) Auto Start/Stop of DG Sets i.e. auto mains failure.

(v) Auto Transfer of Load.

DG Set Panel shall be synchronizing cum Load Management Panel. DG Panel and All Grid Supply Panels

- Breaker shall have Protection for Overload/Short Circuit and Earth Fault
- All Breakers shall have Microprocessor Release.
- All Breaker Release shall be Communication Capable and Compatible with BMS.
- All Breaker Release shall be settable for overload and Earth Fault.

EXTERNAL STREET LIGHTING

The scope of work under External Street Lighting System requires illumination of all external areas like streets, roads, entrance gates, boundary walls, parks, gardens, landscaping, porches, walkways, pathways, sports area etc., which shall be illuminated conforming to NBC 2016, ECBC 2017 and JDA specifications maintaining required Lux levels. Suitable LED fixtures with IP-66 rating shall only be used within built harmonics up pressure mechanism for external area illumination. All LED luminaire shall be LM79, LM80 tested from NABL accredited govt lab and Test-Reports shall be made available to the JDA. Solar, decorative and conventional street light poles, bollards, gate lights, post-top lantern etc. shall be used for this purpose keeping in view aesthetic and architectural requirements. The external lighting shall be fed from outdoor type feeder panels and automatically controlled through 24-hour Digital/Astronomical Timers.

Incoming cable from sub-station / source of supply to street lighting main feeder pillar shall subsequently feed to feeder pillars located at different locations for street lighting.

These feeder pillars shall be fabricated as per approved drawing and technical specification. Moulded case circuit Breaker (MCCB) as incoming and MCBs for outgoing circuits, AC contactor, Time switch (Programmable) and bus-bars shall be provided in the feeder pillar. Provision shall also be kept for providing Energy Meter inside the feeder pillar. Electrical single line diagram of feeder pillar shall be got approved from JDA.

Two core XLPE aluminum conductor armoured cable of 2Cx16sq.mm (minimum) from pole to pole & 4 core of suitable size to energize the feeder pillar shall be used and laid through DWCP pipe throughout the entire work.

Pole height, single or double arm bracket, wattage of the luminaires, lux level etc. shall be decided as per Street Lighting Standards as per DBR. However, for street lighting in areas other than specified in the table, decision of JDA shall be final & binding.

Street Lighting fixtures shall be LED type made of high pressure die-cast Aluminium housing single piece in construction with IP-66 protection. The luminaire shall be complete with electronic controllers, LED lamps and accessories, protective glass cover.

Independent circuits shall be provided to alternate poles so that one circuit can be switched off automatically during night time to save energy.

Street / Road lighting pole shall be octagonal type GI (Hot dip galvanized as per BS EN ISO 1461 Standard 70 Microns) with welded base plate and with built cable loop in box 500mm length (Box height). Street / Road lighting poles shall be mounted on precast RCC foundation of minimum 600x600 x1200 (D) with suitable reinforcement (Foundation bolt EN 8 grade) Octagonal pole shall be designed to withstand the maximum wind speed as per IS 875. The top loading i.e. area & the weight

are to be considered to calculated maximum deflection of the pole and same shall meet the requirement of BSES 40-3-3-2003. Pole shall be HT Steel conforming to grade S 355 & base plate Fe 410 conforming to IS 2062, & Bracket ERW tube as per IS 1161.

The street lighting scheme prepared on the above lines shall be got approved from JDA (Electrical) before execution. Layout shall be made in such a manner that metering is done at one/two point only.

Park Lighting

Technical Specifications

All parks irrespective of area will have lighting arrangement with LED lights. Gate Entry passage to the entry of pathway and security lighting (for park having large area) shall be properly illuminated.

On pathways decorative poles/bollards shall be provided to achieve desired illumination levels. Independent circuit shall be provided to alternate poles so that one circuit can be put the lights automatically during night time to save energy.

- I. Foundation: Foundation for pole shall be having RCC-M-25 grade with pedestal size 400mm x 400mm x 1200mm deep (Below NGL and above NGL) as per drawing approval from Engineer-in-charge. The tor steel (grade Fe 415) used in pedestal shall be as below:
- II. Pedestal: 12 mm dia, 8 nos. vertical with 10 mm dia rings for @ 200C/c as binders complete with digging, shuttering & back filling etc. as required. Foundation bolts shall be of 16mm dia 600 mm long J type MS bolts (threaded portion shall be galvanized) along with 3 nos. GI nuts & 2 no. GI washers etc.
- III. Junction box: If required, Junction Box shall be made out of Glass Reinforced Polyester Sheet Moulding Compound conforming to IS: 13410-1992 grade S1 of outside dimensions 230mm (H) x 170mm (W) x 105 mm (D) (all the corners of the box should be round and not pointed ones) suitable to mount on 65 mm dia GI pole with following provisions /accessories mounting in box complete as per drawing No. 3 & 4.

2 Nos clamps made out of 19mm x 3mm GI strip of suitable length for mounting box on the pole.
Watertight front cover with 2 No. stainless steel hinges & 2 Nos screws for tightening & GIU.
Clamp for closing of cover along with ABS panel lock.

4Way,220,30A,toughmouldedstainlesssteelterminalconnector
16amp.MouldedSMC rewirablekit-kit-1 no.
76mm diaholeatsuitablelocationonrear wallfor cable&wireentry
Earthing boltM6x20mm

- a) TheJunctionboxshallwithstandharshweather,externalhazards,andinternal hazards, having anti- corrosive, dust proof, rust proof, shock proof,vermin and water proof, UV stabilizer and pilfer proof features, resistant tohighheatandshould notdeformbyflame.
 - b) Junction Box will comply with requirements as given in as per drawingsapprovedfromEngineer-in-charge.
 - c) JunctionBoxshould besuitableforout doorus
 - d) JunctionBoxshouldnotmeltat hightemperature.
 - e) Mountingarrangementinsideboxhastobemadeasperrequiredofelectricalitem.
 - f) All MSpartsshouldbezinc passivated.
 - g) Hingesshallbemadeout of Anti corrosiveMaterial.
 - h) JunctionBoxshallcompriseofamouldedbaseandmouldeddoor.
 - i) Thicknessof SMCDoor /basewillbeminimum2mm.
 - j) Thedoorinclosedpositionshouldbeoverlappedoncollarofbasesuchastoprotectelectricalite mfromingressofexternalsolid,dustandliquidobject.
 - k) Allthecornersofthejunctionboxshould beroundand notpointedones.
- IV. Polelight:IntegraltypeluminaireshallbeLEDtype&outdoortype(IP-66)with separate electronic driver & suitable to provide required illumination levelwithaestheticsmatchingtheprojectarchitectureandapprovedfromEngineer-in- charge.
- V. Gate light: Integral type luminaire shall be LED outdoor type (IP-66 & suitableto provide required illumination level with inbuilt electronic driver with suitablemounting arrangement atentrancegate/plazaetc completeasrequired.

LAND SCAPINGLIGHTING

TheScopeofworkoftheContractor shallbeasunder:-

- a) Designingthesystem&obtainingJDAapproval
- b) DetailedDesigning/preparationofShopdrawingsanditsapprovalfromJDA;
- c) Supply,Fabrication,Construction,InstallationandCommissioning.

Further,details(inbrief)are asunder:-

All external landscaped areas will be adequately lit with approved LED lightingfixturessoastoprovidelightingtoallpedestrianwalkway,vehicularroads,entrances to complex, to Podium, to buildings, to basements etc. & to all fire exits.Thelandscapelightingwillbedonesoastocreateapleasantworldclass environmentintheeveningforasafe&pedestrianfriendlyenvironment.Thelighting will accentuate trees by up lighting, direct traffic by motorable embeddedlights,highlightrampsbywallembeddedlights,and highlightraffictdirectionsbycorner

/curved street markings. There will be green planter that will have sufficient bollards/planters ground embedded lights to showcase the greenery in the evenings. There will be uplighting in the water bodies with underwater lighting.

The design of lighting and fixture selection in these areas shall harmonize with the landscape.

Ornamental and pole-mounted light fixtures are to be appropriately scaled for each landscape situation. Alternatives to pole lighting shall be considered to provide ambient and pathway lighting.

Accent lighting must be located to avoid glare viewing bright sources from buildings and public areas.

Pavement lights to be selected and spaced to provide even illumination. Intersections, crossings, steps and ramps to be adequately illuminated for safety.

Provide adequate lighting and fixture selection for all directional, location and safety signage.

13.0 BOOMBARRIER

General

Proposed complex shall be provided with Boom Barriers approx. 6m x 2 No. for Security.

Proposed scheme of Boom Barriers should not create traffic hindrance but ensure security to the complex.

Tenderers shall have listed out size of Boom Barrier & the quantity required.

S.No.	Description	Technical details
1.	Application	Outdoor
2.	Drive	Hydraulic type with piston & Hydraulic pump
3.	Version	Left hand or right hand as per site requirement
4.	Opening time or Closing time	Less than 5 seconds
5.	Logic control	Included/624 BLD
6.	Drive	Hydraulic type with piston & Hydraulic pump
7.	Power supply	230 +/- 10% VAC, 50Hz

8.	Boomspecification	Electromechanical,AluminiumandantiUVraysepo xypowdercoatedbarriercompletewith 24 VDC motor, with control unit box, withencoder, double built-in LED flashing light andfittedtotake additional accessories. Anti-UVraysepo xypowdercoated Aluminium barrier 6m barrier round aluminiumboom L = 8550mm dia 60/90 mm, with counterweight, joints and fixed support including a pair of photocells with anodised aluminium vertical mountings. Colour shall be RAL standard lightcolours, with reflective tapes/strips, if required.The boom shall be swing away type or shall be detachable boom.Vehicle and the housing.The boom shall be reinstated in a simple manner by any individual without affecting the functionality of the system. The boom shall have RED LED lighting for enhancing the visibility to the driver while opening & closing of boom barrier.
9.	Housingdimension	IP 44 protection of Barrier body & IP 54 Control Unit. All housing and internal parts shall be rust & corrosion free metal or alloy of high strength with suitable epoxy/powder coating as applicable.
10.	Finish	Housing-Epoxy/Powder coated (colour RAL standard light colours, orange preferred).
11.	Power-off	Configurable/Adjustable to 1. Remain open/closed 2. Automated opening and closing
12.	Safety	Buried loop sensor shall be used to prevent boom barrier from closing on the vehicle. If the vehicle comes over the loop, the barrier shall not fall over the vehicle. If a vehicle crosses over the loop while the boom is closing down, the barrier shall go up so that it will not hit the vehicle. Even if the boom barrier accidentally hits a vehicle while closing down, the barrier shall immediately go up. The bidder has to take all the precautionary measures to ensure that the barriers will not fall on a vehicle even through manual operation by operator mistakes.
13.	Certification	Shall be CE or ISO 9001
14.	Mean time between	1 million cycles. System does not require any greasing/oiling for 1 million operations.

	failures(MTBF):	

14.0 CLOSE CIRCUIT TV (CCTV)

Location & Quantity shall be as per approved drawing. The number of CCTV cameras is estimated to be minimum 80 Nos. This number is indicative only, agency shall work out the scope in view of ensuring coverage of all security-vulnerable points.

General: CCTV camera shall be provided to cover entrance / exits at all floors including Terrace, Lift lobby staircase, CCTV to be provided in basement and podium level parking also.

CCTV cameras shall generally cover all important vantage points around these buildings.

Road junction & plot periphery area to be covered for CCTV coverage without outdoor camera through a combination of PTZ cameras & Bullet cameras.

All Control Room, Entrance points and Guard Rooms of Main Gates are to be connected with an Intercom network.

Scope of Work:

Providing suitable number of IR cameras including bracket / supports around the boundary wall at suitable intervals and all the main gates with suitable mounting arrangement in a Vandal Proof Housing. Laying, terminating & connecting copper cables with redundancy between cameras & control room.

Establishing control rooms for configuration, operation, monitoring & maintenance with high resolution 40" LED display along with one workstation. Number of control room to be as per master layout plan with approval of JDA. Installation, configuration & customization of Network Video Recorder (NVR) with 30 days storage capacity for cameras, Switches, Signal / Power cables, Centralized UPS of suitable capacity to power the entire CCTV System, Poles for cameras, Power to camera and weather proof enclosure and Surge & lightning protection for each camera etc.

Cameras should be of outdoor application, IR Range 50 metre, IR Distance or more, Min Illumination Colour - 0.2 Lux, B/W - 0.002 Lux, Resolution 1280 x 1024 pixels: 1.3MP @ 30 fsp PAL compatible.

NVR should be of suitable no. of video channels, having storage capacity for 45 days, Full DNA support, sophisticated failover and mirroring strategies amongst multiple NVRs for increased resilience and redundancy, Policy based management option for automatic deletion or protection of old footage, Recording Hard Drive 3.5in SATA Seagate SV35 Series optimized for 24x7.

Complete system is to be designed as per above requirements and a scheme along with layout and inventory is to be submitted to the JDA for approval, before taking up the installation work.

15.0 AVIATION OBSTRUCTION LIGHTS:

Provision for mounting LED type aviation obstruction lights of reliable design shall be provided on top of Tower including 20m high masts light poles.

16.0 LIGHTNING PROTECTION SYSTEM

The earthing system conforming to IS / IEC – 62305 – 2010 for grounding of all metallic non-current carrying parts of the system shall be provided. Special earthing with copper ear electrodes and copper conductors for special equipment/applications has been considered. Lightning protection system with air termination/downcomers shall be provided at the top of tower to meet the requirement of IS / JDA.

17.0 LIFTS

Provision of lifts in the Hospital will be kept as per National Building Code-2016 / JDA Specifications considering no. of floors, height of the building and speed of elevators which shall be submitted to JDA for approval before commencement of work. At least one lift shall be made barrier free as per specifications & passengers capacity to minimum 13 passengers for barrier free lift. Block should have one goods/Bed lift.

Work of supplying and installation of lifts will be carried out by the agency as per provisions contained in General Specifications and local bylaws as amended up to date.

Scope of work of the successful bidder shall be inclusive of the following and shall be done by the agency at no extra cost.

Provision of proper ventilation in machine rooms, lift wells and water proof lift pits including lighting & Power point outlets.

Electric supply to individual lift shall be given by two independent feeders (one working & other stand by) from main electrical panel through change over switch in the machine room/ground floor panel room.

Agency shall furnish the following drawings and data to the JDA in triplicate, for approval.

General arrangement drawing.

Detail of foundations for equipment, load data of various assembled equipment's. Data will include breaking load on guides, reactions on buffers, reaction on support in machine room, lift well etc.

Dimensions for every unit and group of units for erection purpose, as required.

The correction/changes, if any, intimated by the JDA shall be incorporated and three sets of such corrected drawing shall be furnished to the JDA within 15 days from the date of approval of drawings. The work shall be executed in accordance with the approved drawings.

Inspection and Testing at Site:

The lift installation shall be subject to necessary inspection during every stage of erection, by the JDA or his authorized representative. The bid shall provide all facilities and assistance for the purpose.

On completion of the installation, all adjustments as necessary shall be made for the satisfactory performance of the lifts. The completed installation shall be inspected and tested by the JDA in the manner as will be laid down by him, in consultation with the contractor.

Technical Specification

The lift shall work on microprocessor-based control system with self-diagnostic features, site programming to suit the changing need of the user.

The lift shall be silent in operation & shall have smooth and controlled acceleration and deceleration with levelling accuracy of ± 5 mm.

Potential free contacts for each floor position and up and down movement of the lift shall be provided in the controller.

Technical Particulars

Type of lift: Lift with machine room.

Rated Speed & Rated load shall be as per NBC 2016 / JDA specification and with the approval of JDA.

Type of operation: Automatic group supervisory control with/without attendant.

Type of control: A.C. drive variable voltage variable Frequency with Microprocessor based group control system.

Type car doors: Centre opening stainless steel sliding door in the moon rock finish.

Automatic power operated horizontal sliding-center opening construction & design and stainless-steel body. Interior finish of the lift car shall be as approved by JDA. The car shall be complete with toe guard of adequate depth, cabin fan, light fixtures. Car opens in front only.

Landing doors: Centre opening sliding power operated stainless steel doors & shall have a fire resistance of not less than one hour.

Type of signal system: All signal & operating fixtures shall be provided with stainless steel faceplates.

Call registration indication in buttons of operating panel. Digital car position indicator in

car.

Digital car position indicator with up & down direction on all floors separately for each lift.

Back lift hall call buttons on all floors.

Maintenance free re-chargeable battery-operated alarm bell & emergency light.

Fireman's switch at ground floor for each group of passenger lift.

Overload warning with visual indication 'OVERLOADED' and audio beep of overloading.

Voice announcement system having standard features.

Intercom system in each lift for communication between the passengers in the elevator & fire control room & machine room (press & speak type) with rechargeable maintenance free battery backup.

Elevator should be equipped with manual as well as automatic rescue devices (ARD).

Infra-red beam type door safety devices shall be provided for full height of door.

Minimum 04 No. of lift shall be provided in each tower including 01 No. Bed Lift.

Technical Specifications: For Lift/Elevator

S. NO.	Item	Specification
1.	Designation of Lifts	Passenger/Stretcher Elevator – Gearless with Machine Room
2.	Capacity	Minimum 13 Passenger
3.	Car Speed	1.75 MPS
4.	Total Travel	32 mt. (approx.)
5.	No. of Stops	5
6.	Clear Opening for Door	800 MM (W) x 2000 MM (H) with advance door opening, ACO/ATO/Asper site/Asper OEM
7.	Door Safety	Full Height Infrared Light Curtain
8.	Safety Devices	Automatic Rescue Device and manual rescue operation
9.	Other Main Features	Overload Device with Indicator 2 hours fire rated landing doors Full Load Bypass Emergency Light S.S. Handrail on Rear & Both Side Walls Alarm Button & three way intercom including wiring and intercom in Guard Room. Vanity Mirror of standard size Door Open and Close Button (Soft Touch) Phase Failure & Phase Reversal Protection Floor Announcer with Music Synthesizer

S. NO.	Item	Specification
		Anti Nuisance car call protection
		Lift door shall have door nudging feature
10.	Method of Control	Duplex if not possible then simplex, Collective, Selective
11.	Drive/Speed Control	V3F (Variable Voltage Variable Frequency) with Regenerative Drive.
12.	Controller	16/32 bit Microprocessor based with inbuilt/external voltage stabilizer/Asper OEM with regenerative drive

13.	Entrance	One at each floor level and on same side
14.	Landing Entrance	COPD/TOP Din S.S. honeycomb finish
15.	Car Entrance	COPD/TOP Din S.S. honeycomb finish
16.	Traction Machine	Permanent magnet Gearless Machine placed directly above hoist way in machine room
17.	Machine Room Location	Machine Room on the Top
18.	Floor to Floor Height	As per conceptual drawings
19.	Car Enclosures:	
	(a) Car Ceiling	S.S. Finish with LED Lights & centrifugal blower
	(b) Car Panels	S.S. in anti-scratch finish (Honeycomb)
	(c) Car Flooring	Granite Flooring
20.	Car Position Indicator	Digital floor position indicator at all floors along with direction of Travel Indicator.
21.	Power Supply in Machine Room	415V; 3 Phase; 50Hz AC
22.	Auxiliary Power Supply	Single Phase 220V AC
23.	Machine Foundation	The machine will be placed directly above the Hoist Way Upon Machine Room steel section, which shall be provided by the bidder
24.	Pit Depth	Minimum 1600mm as available at site
25.	Guide Rails	The Guide Rails should be of steel duly toughened to carry load of Car & Passengers and Precoated steel belt rely Jointed/aligned for smooth running of the Elevator/As per relevant BIS
26.	Belt Drive	Main hoist belt with poly urethane coated steel belt type shall be with pulse monitoring system for safer and protective run and with adequate section and shall be provided into the sockets of spring loaded self. Thimbles of spring permit adjustment of uniform belt tension for smooth operation of the elevator.
27.	Signals	a) Luminous hall buttons at all floors. b) Digital hall position indicators at all floors. c) Full length COP with Luminous floor buttons integral in SS finish. d) Digital Car position Indicator. e) Card direction Indicator having monochrome LCD. f) Door open and door close buttons in COP g) Emergency light & Emergency alarm through inverter (Rechargeable Batteries).
28.	Type of Buffers	Pit buffers as per OEM
29.	Compliance of Act	National Building Code 2008 & as amended
30.	Guarantee & maintenance etc.	60 months from the date of handing over of lifts along with free comprehensive maintenance including replacement of defective parts
31.	Minor Building Work	The bidders shall include cost of: a) Steel Pit ladder. b) Scaffolding inside the hoist way for erection. c) Cutting of walls with repair including all of bolt members, indicator and button boxes etc. in position. d) Sill angles, fasci plates, Machine beams and rolled steel section with bearing plates for support of the Machine if required. e) Door frames.

S. NO.	Item	Specification
32.	License and Approvals	The supplier shall prepare the necessary documentation and arrange necessary permission required for the operation of lifts from local authorities if applicable on behalf of the JDA.

33.	Witness of Tests	The suppliers shall test/provide factory inspection of the lift in the presence of Third party/ department Engineer/ Consultants if desired. The department however reserves the right to waive off the test.
34.	Miscellaneous	a) The Traction Coated Steel Hoist Belt shall be as per relevant B/S code. b) Car safety and Governor to control excessive descending speed. c) Counterbalance to promote smooth and economic operations. d) Terminal and final limits. e) Terminal Buffer. f) Controller to control starting and speed of Elevator motor and supply brake automatically in case of application of any of the safety device or power failure. g) Steel guides for the Car and Counterweight. h) Electricity for bona fide use for carrying out execution at any point shall be arranged by the bidder itself. i) Single phase power line with bulkheads bulbs and power point shall be arranged in shaft by the suppliers. j) Double earthing at machine room shall be provided by the Bidder at the time of testing & commissioning. k) Watch & ward of the material will be responsibility of the bidder.

Note: certificate from lift inspector shall have to be obtained by the bidder before lifts are put in service.

18.0 FIRE FIGHTING

Fire Protection System including Sprinkler System, wet-risers, Yard-hydrants and pumps etc. wherever required shall be designed and provided as per NBC 2016 with Amendments, Updated BIS Codes & Fire Bye Laws. NOC for the Project from local Fire Service shall be obtained by the agency.

MS pipe -class -C and Valves & Branch pipes shall be of Gun Metal, all other fixtures shall as per Specifications.

Scope of work shall also be as under:

To get the firefighting scheme approved first from local Fire Service before taking up execution of work.

To execute the work as per approval of local Fire Service.

Agency shall arrange for obtaining clearance certificate from local Fire Service of Rajasthan Govt. for the installation of Fire Fighting system.

Compliance of the Fire Approval

It shall be the responsibility of the contractor to ensure compliance with the fire approvals obtained by the department.

On successful completion of work, the contractor shall prepare as built drawings which have been so approved by the Fire Service incorporating all changes that might have been effected during execution of the work and shall assist the Master Architect in Obtaining the Completion Certificate.

Coordination

The Contractor shall be required to co-ordinate his activities with all other services such as Air Conditioning, etc., Electrical and Civil & Interiors worksite.

Addressable Fire alarm system General:

The work shall consist of supplying, installation, testing & commissioning of Hybrid Fire alarm system. NO ChastobeobtainedfromlocalFireService,bythecontractor. The work shall also include planning, designing, preparing drawings and getting the drawings approved from DFO & the JDA.

Automatic fire detection & Alarm system (Hybrid system) with conventional detectors shall be provided as per NBC 2016 (part-4 – fire & life safety).

References for installation.

Indian Standard IS/NBC 2016 and Fire Bye Laws issued by local Fire Authorities.

British Standard Institute / European Standards All Applicable codes and standards including BS EN 54.

NFPA- 72 National Fire Protection Associations.

All major components of fire alarm system shall be product of a single manufacturer as per the list of approved make and shall conform to the requirement of EN 54 / VDS / UL / IS approved and designed according to DIN VDE-14675 and VDE- 0833 Fire Alarm Systems code of practice for system design, installation and servicing.

INSTALLATION

The entire fire alarm system shall be installed in accordance with DIN / BS EN 54 Standards / IS and recommendations of local authority.

Scheme of manual / automatic fire detection & alarm system shall be based on reference standards. Duly approved layout plan from local Fire Service department shall have location of Manual Call Points, Detector & devices.

Contractor shall develop and get formal approval of Scheme & proposed equipment from JDA.

19.0 VENTILATION/EXHAUST SYSTEM

The system shall be provided as per National Building Code of India 2016 and approval of Chief Fire Officer, local Fire Service, and relevant I.S Codes.

Following areas shall be mechanically ventilated & exhausted.

The ventilation rates for mechanical ventilation of various areas shall be as per NBC 2016 and Local bylaws.

Basement/Parking Ventilation

Each basement level shall be ventilated separately by mechanical means. As per NBC/Local Fire Officer

Fresh air shafts, serving the number of basements may be the same but exhaust shafts of each basement shall be separate.

For first basement, 40% fresh air shall be assumed to be drawn through the ramps. While in second and other basement fresh air shall be drawn through fresh air fans.

Ventilation of basements shall be achieved by employing requisite number of exhaust fans, to be calculated, on the basis of required air changes.

For parking ventilation, 6 air changes per hour of ventilation shall be achieved as per NBC 2016 with amendments.

In Fire Mode, Ventilation and smoke extraction for each fire compartment shall have (6+6=) 12 ACPH.

Fire compartmentation of basement has to be done as per NBC 2016 with amendments.

The automatic operation of fans shall be interlinked with the fire detection system. Manual operation shall also be possible.

All exhaust fans and Motors shall be rated for working in fire/smoke duties up to 250 degree Celsius for 2 hours.

Fresh air supply at floor level having drop from main duct through column and exhaust air at ceiling level.

20.0 ELECTRICAL WORKS

All the fan motors which will operate in normal modes shall have IE-3 efficiency. The fan motors required to be operated during fire mode shall be IE-2 efficiency.

The details of electrical components /wires etc for various ratings shall be as under. All starters will be provided with protection for overload and single phasing.

S.No.	Motor Rating (HP)	Contactor Current Rating	Protection MCB / MCCB	Starter Type	Copper Conductor Armoured Cable	GI Earthing
1.	0.75	10amps	TPMCB	DOL	3X 4sq.mm	2x8Gauge
2.	1.0	10amps	TPMCB	DOL	3x 4sq.mm	2 x 8Gauge
3.	1.5	10amps	TPMCB	DOL	3x 4sq.mm	2x8Gauge
4.	2.0	10amps	TPMCB	DOL	3x 4sq.mm	2 x 8Gauge
5.	3.0	16amps	TPMCB	DOL	3x 4sq.mm	2x8Gauge
6.	4.0	16amps	TPMCB	DOL	3x 6sq.mm	2x6Gauge
7.	5.0	16amps	TPMCB	DOL	3x 6sq.mm	2 x 6Gauge
8.	7.5	25amps	TP+NMCB	Star-Delta	2no. 3x 6sq.	2x6Gauge
9.	10.0	32amps	TP+NMCB	Star-Delta	2no. 3x 10sq.	2 x 6Gauge
10.	12.5	32amps	TP+NMCB	Star-Delta	2no. 3x10sqmm	2no. 20X 3strip
11.	15	40amps	TP+NMCB	Star-Delta	2no. 3x10sqmm	2no. 20X 6strip
12.	20	63amps	TP+NMCB	Star-Delta	2no. 3x16sqmm	2no. 20X 3strip
13.	25	63amps	TP+NMCB	Star-Delta	2no. 3x 16sqmm	2no. 20X 3strip

14.	30	63amps	TP+NMC CB	Star-Delta	2no. 3x 16sqmm	2no. 20X 3strip
15.	40	63amps	TP+NMC CB	Star- Delta	2no.3x25sqmm	2no.25X 3strip
16.	50	100 amps	TP+NMC CB	Star-Delta	2no.3x25sq mm	2no. 25X 3strip

Acceptable Makes for Electrical Works

List of approved makes

S. No.	Description of Item	Makes
1.	FRLSPVC insulated copper wire / Telephone cable/copper conductor control cable	L&T/ Havells/ Polycab/Finolex/RR
2.	HT/LTXLPE aluminum cable	Havells/ Polycab/ KEI/RR Kabel
3.	Co-axial TV cable	L&T/Havells/ Polycab/Finolex
4.	Steel Conduit	RMCON/AKG/BECIS/Marked
5.	Conduit fittings	ISI marked
6.	PVC Conduit	AKG /Polycab/JINDAL/ PRECISION
7.	L.T. Panel/Meter Board	Adlec Mundka/Control and Switchgears Pvt. Ltd/Tricolite/SPC Electrotech Ltd/ Ambit Switchgear Pvt Ltd/ Neptune India/Milestone
8.	MCB/MCB DBs sheet steel Metal enclosed industrial socket, plug top and Isolators	Legrand/S Siemens/ L&T/ ABB / chneider
9.	Modular type switch/Socket, Telephone socket, cable TV Antenna socket, Electronic fan regulator and GI Boxes	Legrand (Arteor) Or Equivalent Of Havells / Honeywell / North West/Lutron
10.	LED fitting	Philips/Crompton/Wipro/
11.	Tube/Vane Axial Flow Fan	Kruger/ Greenheck Airflow/ Nicotra/H / umidin/Flaktwood
12.	Ceiling Fan/Exhaust fan (BEE-5 Star)	Crompton Greaves/Usha/Orient/havells
13.	Octagonal steel pole	Bajaj/Valmont/Utkarsh
14.	Conical/ Decorative Poles/Bollards	Bajaj/Philips/Wipro/Jaquar
15.	Air Circuit Breaker	L&T-U Power/ Siemens-3WL/ ABB-Emax/Schneider-Masterpact-NW
16.	MCCB	L&T- Dsine/ Schneider- Compact NSX/ABB-Tmax/Legrand-DPX3/Siemens
17.	Digital Ammeter/ Multi-Voltmeter/	Schenider- konzerv/ Ducati/Secure/AE

	functionmeter	
18.	Capacitor	Epcos / L&T/ Schneider/ Siemens /CromptonGreaves.
19.	APFCRelay	Epcos/ L&T/ Siemens/ Schneider/Enercon
20.	Power Contactor – AC 3 rating / capacitor duty contactor/starter/ Thyristermodule/Harmonicreactors.	Siemens/L&T/ABB/Schneider
21.	11KVHT(VCB)panelOEM	Siemens/ Schneider/ ABB/ CromptonGreaves
22.	DistributionTransformer(drytypecastresintype)	Crompton Greaves/ ABB/ Schneider/Siemens/ Bharat-Bijlee
23.	Distribution transformer (oil type)is-1180,part2	Crompton Greaves/ ABB/ Schneider/Siemens/ Bharat-Bijlee
24.	PackageTypeSubstation	ABB/Schneider/CromptonGreaves
25.	Solarstreetlightfitting	Philips/Bajaj/Wipro/CromptonGreaves
26.	Risingmains/busduct	Legrand/Schneider/C&S/GE
27.	FireExtinguishers	Safex/Minimex/Superex/ Ceasfire
28.	DieselE operated Power Generating engine	CumminsIndia/Caterpillar/kirloskar
29.	AMFPanel	OEM/ OEAof DG Set
30.	Alternator	Stamford/LeroySomer/Caterpillar
31.	HDPE/DWCpipe	AKG/ Duraline/Rex
32.	GI/M.S.Pipe	Jindal(Hissar) /TATA
33.	StandardM.S.Fittings&GIfittings	JainsonsIndustries/INDUS
34.	BallValve/ SluiceValve/ CheckValve /Pot/YStrainer/ButterflyValve	Audco/Kirloskar/ Zoloto/ Advance
35.	PressureSwitch	System Sensor/Indfoss/Denfoss
36.	LIFTS	Mitsubishi/ Schindler/Kone/OTIS Theagencyhastogiveatleastthreeoptions out of the make mentioned abovefor lift and the department will be free toselect anyone ofthem.
37.	BMSOperatorWork Station	HP/ Dell/Acer
38.	BMSControllerandPowerSupply/Software	Siemens/HoneywellEBI/Sauter/TAC(Schneider)/ALC
39.	BMSControllerHousing	Enclotek /Rittal
40.	TemperatureSensor&HumiditySensor/EnvironmentalpySensor/LuxSensor / CO Sensor	Siemens/Invensys/Honeywell/Sontay /Greystone/Sauter/Kele/TAC
41.	Pressure Transmitters / Air VelocityMeter	Siemens/Invensys/Kele/Honeywell/Sontay /Greystone/Sauter/TAC

42.	FlowMeter	Forbes Marshal/ Kele/ Sontay/ Greystone/Siemens/TAC/Honeywell/Sche nitech
43.	DifferentialPressureSwitch	Siemens/Invensys/Honeywell/Sontay /Greystone/Kele /Sauter
44.	PhSensor/Conductivity/TDS	ForbesMarshal/EndresHauser/Kele/Sonta y/Greystone
45.	FlowSwitch/LevelSwitch/LevelIndicator	Siemens/Elektronik/Invensys/Honeywell/S ontay/Greystone/TAC
46.	CurrentTransducer/VoltageTransducer /PowerFactorTransducer / FrequencyTransducer	ABB/SouthernTransducer/Veris/SETO/So ntay/Greystone
47.	Fire/SprinklerMainPump/JockeyPump	Mather&PlattIndiaLimited/Grundfos/Kirlosk ar/KSB
48.	DieselEngine	Cummins/Kirloskar/ Catepillar
49.	Motor	ABB/ Siemens/ Kirloskar / CromptonGreaves
50.	AntiVibrationMounting	Kanwal Industrial Corporation/Resistoflex/Ewre n
51.	Starter	L&T/ Siemens / Crompton/ GE / ABB /BCH
52.	CurrentTransformer(CastResin)	AE/L&T/Kappa
53.	AntiVibration Pad	Cori/Dunlop/DiamondPipeSupport/Easyfle x Flexionics/Resistoflex/Emerald
54.	Factoryfabricatedduct	Waves/Zeco/Ductofab/GPSpira
55.	PerforatedwithpowdercoatingM.S./Hotdip pedG.I.cabletrays	Vinous/Indiana/ steelway/ Slotco/Pilco
56.	AddressableMulticriteriaSmokeDetectors With base / Addressable DuctType Smoke Detectors With base/ FaultIsolatorwithbase/AddressableHeatD etectorswithbase/AddressableManualCall points /AddressableControlModule/Addressable Monitor Module / Sounder/Hooter cum Strobe/ Fire Alarm ControlPanel/PASystemPanel/Telephone Jack /Hand Set/ Software/ Speaker	Notifier/Siemens/Bosch/Edward.
57.	ConventionalFireDetectionandAlarmSyst em DetectorPanels ManualCallPointsHooters	Daksh/Agni/ Bosch
58.	FireSurvivalCable	Fusion Polymer/ Havells/ Bonton/Rallison/BatraHenlay
59.	Thermo plastic (Textilereinforced)HoseReelSI Mark	Mitra/Kesra/ Padmini
60.	StainlessSteelBrachPipe	Safex/Padmini/GETech / NewAge
61.	FiremanAxe/InstallationControlValve	Safex/Padmini/GeTech

62.	2-way/4-wayFBC	Safex/NewAge(Mumbai)/GeTech
63.	SprinklerHeads	Tyco/ HD/ omaxULlisted
64.	Pipe Protection Pypcoat (AW4)Wrapping	IWL/Taxa/Mac-polycoat
65.	RubberBellow	Kanwal Industrial Corporation /Resistroflex/AIP Valves
66.	WindowSprinkler	Tyco/ HD
67.	DelugeValve	Safex/Tyco / HD
68.	Airreleasevalve	Superex/ GeTech/ NewAge/ Safex
69.	WeldingRods	Ador/Esab/Essar/Advani
70.	Fastner	Hilti/Fisher
71.	HoseBox(External)(GIPowderCoated)	SPC Electrotech Ltd/ AdlecMundka/Ambit Switchgear Pvt Ltd/ Milestone/Tricolite
72.	FlexibleDrop(ULApproved)	Safex/HD/Kofulso (Easyflex)
73.	GalvanizedSheet Steel	Tata/Jindal/Sail
74.	IP Based CCTV systemCCTVCameras Bullet, Dome, PTZ CameraNetworkVideoRecorder	Bosch/Axis /Sony
75.	LED TV	Sony/ LG/Samsung
76.	Data Networking SystemInformation	Legrand/Molex/Amp
77.	Cat-6/6ACable	Crestron/Extron/ Kramer
78.	ManagedSwitchforDataNetwork, CCTV system	Cisco/Hewlett Packard
79.	Data Racks	D-link/Legrand/Rital
80.	EPABX	Panasonic/Alcatel/Syltel
81.	TelephoneHandsets	CISCO/Panasonic/Siemens
82.	MDFandTelephoneTag Blocks	Krone
83.	BoomBarriers	Kaba/Magnetic/ SEAA/Makim/ FAAC
84.	SolarPVMmodules	SkySolar/Tata Solar
85.	Inverter(forsolarpowersystem)	Kaco/ Delta/Schneider/SMA
86.	Cablesforsolarpower (XLPO/XLPE)	Lapp/Havells/Universal/Polycab
87.	StringCombinerBox	Hensel/ Schneider
88.	0.2ClassABTCompliantNetMeter	Secure/L&T/Schneider
89.	WeatherMonitoringStation	SMA/ ABB
90.	SplitAirconditioners	Daikin/ Hitachi/OGeneral/ Mitsubishi
91.	VideoDoorPhoneSystemandmartlocks	Panasonic/ Samsung/ CISCO/ YALE

92.	Sound system: BGM/ PA System / Theatre/Guest house/Outdoor	BOSE/TWAudio/Aimline
93.	DigitalSignage	Christie/BARCO/Samsung
94.	Geyser	RACold/Jaquar/orient/Crompton/AOSmith
95.	Individualunit UPSInvertorSystem	Eaton/Luminous
96.	InvertorBattery	Exide/ Amaron
97.	Consumer Appliances: Chimney, hob,fridge,microwaveoven,Washingmachine	Siemens/Samsung
98.	Safe	Yale/Godrej/Samsung
99.	RO	Aquaguard/ Zero-B/Kent

4.2(a) only material bearing ISI/BIS certifications ECBC/BEE mark shall be used in the work. Where articles of different designs/ makes bearing ISI/BIS certifications are available.

(b) Where material bearing ISI/BIS certification marks are not available, material conforming to relevant BIS/ISI shall be used with prior approval of JDA. The decision of JDA about the design/ make to be used in the work shall be final & binding on the agency.

(c) If the specifications of any item are not available then the decision of the JDA regarding quality shall be final & binding on the agency.

All material to be used at site shall be got approved from JDA before using at site.

Sec VIII

Scope & Specifications of Horticulture & Irrigation works

1.0 HORTICULTUREWORKS

The Scope of horticulture work is to provide the whole Guest house with lush green lawns, trees, hedges, shrubs and beautiful flowers so as to provide an excellent ambience of Guest house-environment and at the same time makes the Guest house environmental friendly and to make a good impression on the users and visitors. The contractor has to undertake all such jobs/activities required to maintain the Guest house premises in a presentable condition and in above mentioned spirit at all the time whether such activities are elaborated here under or not.

The above scope of work includes designing and its approval from JDA and executing the work as per drawings.

2.0 LANDSCAPING&PLANTATIONWORKS

While undertaking this work, the contractor shall develop the Lawns, etc. and other activities mentioned below.

Ramps, Driveway, Dropoff Area, to be made as landscaped features by enclosing in Trellis & planters as approved by JDA.

Measures for segregating and calming motorized and non-motorized traffic, pedestrian shall be controlled with level differences, Kerbs, dividers and other traffic controlling measures. Main entrances to the project and the social infra buildings, driveways, ramps, lawns shall be guarded as per approved by JDA.

The Agency shall submit the detailed working drawings to JDA along with the Layout, Material and the execution plan for approval before commencing the work.

PLANTATIONWORKS:

The plants should be as per following specification

- i) The plants should be full of fresh and healthy foliage.
- ii) The plants should be free from insect, pest and disease.
- iii) Plants should be healthy and vigorous growth
- iv) The plants should be well settled and should not be newly shifted.
- v) The plants should be true to the variety and named. Variety should be tagged.
- vi) The rejected plant materials should be removed from the site immediately.
- vii) Moss sticks should be covered with the plants in case of plants supplied with moss sticks.
- viii) The plants should be well established and good spread.
- ix) Good earth and manure used for filling the pot/poly bag free from any inert material and mixed to proper ratio.
- x) Pot/Poly bag used for filling the plants should be proper size good quality not damaged.
- xi) There should be proper drainage in pots for plants if supplied in pots.
- xii) The flowering plants should also have proper flowering and should be true to the variety.
- xiii) All plants should have the tendency of growth and should not be stunted type.
- xiv) There should be no stagnation of water on the ground where plantation is to be done.
- xv) Proper waterproofing treatment must be done over basement slab, where plantation work or green area to be development.

Irrigationwork

Agency shall design the whole irrigation system based on DBR considering the requirement of water as per landscape, plantation and other horticulture work. Use of recycled/treated water be ensured with proper laying of irrigation system.

Agency shall provide robust irrigation system which can sustain in all weath

Sec IX

**ArchitecturalControllingNorms,Scheduleo
fFinishes/Specifications**

Norms Applicable&ScaleofAmenities

The following norms have been adopted for architectural designing purposes which shall also be followed by the Agency:

Description		Minimum Approximate Built-up Area (to be constructed as per details given in this Tender document)
1.	Hospital (Ground floor + 1 floors) and, Mumty, Water tank and lift room etc.	4360 Sqm
2.	Staff Quarters, Laundry, Mortuary, Lab, Kitchen etc	1100 Sqm
3.	Site development	Outer development of complete plot / area including compound walls, and retaining wall and gates as per designs approved.
4.	Miscellaneous & Allied Works as per norms of NBC 2016 and mentioned in this document: i) Detailed design and drawings for this building. ii) Architectural, civil, structural, finishing, interior and furnishing works iii) Plumbing & Sanitary. iv) External Water Supply & Sewerage, Storm Water Drainage System, a. Rain Water Harvesting including Recharge Wells. v) Elevators/Lifts. vi) Electrical Services, HT substation equipment's, LT distribution system, DG sets, rising mains, UPS, aviation obstruction lights. vii) Interior, Furnishing, machines and equipments. viii) Fire Fighting & Fire Alarm system. ix) Water supply & Pumps. x) Site Development & Landscaping including roads, Foot paths, Walkways, tracks, sports facilities, swimming pool, Banquet Lawn, Horticulture works & irrigation system. xi) Internal EI with wiring, fan-fittings, HVAC, CCTV, EPABX, Data xii) Underground water tank with pump house etc. xiii) External Lighting, Landscaping Lighting, Signage, works CCTV, Boom Barrier, Bollard xiv) External Service Connections xv) Arrange conferences, site visits, inaugural and handing over functions, holding meeting etc.	
5.	Allied services as per requirements of service provider or regulatory body.	

The following General Conditions for Calculation of built up area are followed which shall also be adopted by the Agency:

The area of balconies may vary with the design depending on the architectural & structural considerations not exceeding the total balcony area in the norms based on the provision in the Plinth Area Norms.

Staircase/Circulation area in these Plinth area norms cater for low-rise construction having a staircase of 1250 mm with only. However, for multi-storied buildings where the provision of lifts lobbies, wider staircase, additional Fire Escape staircase and extra space for their entry is necessary, additional area over & above the standard plinth area for different types will be allowed for these provisions.

Wherever necessary. Additional Area required for services like Laundry, Canteen, Porch, ESS, Pump room, Meter room, Guard room with frisking area wherever required etc. Will be allowed over & above these prescribed plinth areas.

Shafts for services like sanitary services, electrical and communications services as well as ventilation shafts for toilets etc. are not to be included in these Plinth Area Norms. No Utility balcony be located on the main facade of the building. Special care must be taken in the design so that overall aesthetic is not compromised.

Location of all the electrical points shall be done as per the furniture layout proposed and approved.

All buildings shall be checked for thermal comfort as NBC 2016 by simulation and all measures shall be taken to keep the building /s thermally comfortable for human being as per given parameters in NBC 2016.

Minimum Floor to floor height must be kept as per drawings approved by JDA. Railings shall be of stainless steel (grade 304) as per the design approved.

External finishes shall be used as per the climatic conditions, Architectural design & availability of local materials.

Garbage chute shall be provided as per DBR and Drawings. Complete campus to be elegantly designed.

Vehicular free pedestrian movement & Landscape design element shall be provided.

Provision for barrier free access as per the building by laws, PWD Act 2016 (with latest amendments) & NBC manual shall be provided.

Adequate facility of toilets shall be provided in basement for supporting staff/maids and visitors.

Dual piping system & use of water from Sewage treatment plant for the purpose of landscaping and flushing.

Products made from recycled C & D waste material shall be used for non-structural work such as Boundary wall masonry, Kerb stones, Pavers, open parking, drain/manhole covers etc. with the prior approval of JDA.

Adequate waterproofing shall be done on Terraces .

SMC panel water tanks (of approved make and size of requirement of water for half day) will be installed at terrace. The Under-Ground tank should be of capacity of requirement for one day.

Scale of Amenities

S.N.	AREA/WORK	ITEM	MAKE/DESCRIPTION	BASE PRICE
A				

1	Hospital Building			
	FLOORING	1. Kota Stone flooring in Common areas and kitchen 2. 600mmx600mm Vitrified Tile Flooring in Chambers and other areas	. P & F 1st quality Heavy DutyVitrified Polished Digital tilesapproved by JDA on floor,skirting and steps etc.in differentsizes (thickness minimum 10mm)with water absortion less than orequal0.08%andconformingto IS 15622 of approved make in allcolour and shade, laid with 20mm thick CM 1: 4 includinggrounting the joints with whitecement and matching pigmentetccomplete. Sizeupto1.5Sqm	BaseRateof Granite (south) 200Rssqft
	CURTAINS/BLINDS	Manually OperatedRollerBlinds	Manually Operated Roller Blindswith required pelmet as perapproveddesignanddrawin gsby JDA.	Base priceRs. 150 sqft

	FALSECEILING	POP FalseCeiling	Providingandfixinginposition P.O.P. decorativefalse ceilingover G.I. metal frame work ofapproved. quality and wire mesh asper standard detail. The main G.I.frame (24g x 2" x 1") shall be at2'6" c/c bothways and intermediate frame (21/2" x 3/4" x24g) shall be at 15" c/c bothways. The main G.I. member tobe hanged with help of G.I angleof 1" x 1" x 24 gauge andadditional M.S flats 3/4" x1/8"/m.s angle (duly paintedwith red oxide) and dashfasteners and adjustable clamps with nuts and bolts including allnecessaryworkrequired. Expanded metal mesh (0.07Kg/Sft) shall be firmly stretchedand screwed to the intermediateframe with G.I. washers andaverage 20 mm plaster of paristo beappliedonin twolayers. Necessary provisions shall bemade for cut outs for airconditioners supply, return airgrills, slits, light fittings, smokedetector and music speaker etc.The job shall include makingsteps ceiling, vertical surfacesetc. (PreFunction&PassageArea) 50% OF CeilingArea.	
2	Staff Quarters			
	FLOORING	Tile Flooring	P & F 1st quality Heavy DutyVitrified Polished Digital tilesapproved by JDA on floor,skirting and steps etc.in differentsizes (thickness minimum 10mm)with water absortion less than orequal0.08%andconformingto IS 15622 of approved make in allcolour and shade, laid with 20mm thick CM 1: 4 includinggrounting the joints with whitecement and matching pigmentetccomplete. Sizeupto1.5Sqm	

			with PU polished veener. Therate to include providing 6mmthick seasoned teak woodbeading/lamination to exposededges wherever required complete as per approved design&drawingbyJDA.	
	CURTAINS/BLINDS	Manually OperatedRollerBlinds	Manually Operated Roller Blindswith required pelemet as peraproveddesignanddrawing sby JDA.	Base priceRs. 150 sqft
	FALSECEILING	POP FalseCeiling	Providingandfixinginposition P.O.P. decorativefalse ceilingover G.I. metal frame work ofappd. quality and wire mesh asper standard detail. The main G.I.frame (24g x 2" x 1") shall be at2'6" c/c bothways and intermediate frame (21/2" x 3/4" x24g) shall be at 15" c/c bothways. The main G.I. member tobe hanged with help of G.I angleof 1" x 1" x 24 gauge andadditional M.S flats 3/4" x1/8"/m.s angle (duly paintedwith red oxide) and dashfasteners and adjustable clampswith nuts and bolts including allnecessaryworkrequired. Expanded metal mesh (0.07Kg/Sft) shall be firmly stretchedand screwed to the intermediateframe with G.I. washers andaverage 20 mm plaster of paristo beappliedonin twolayers. Necessary provisions shall bemade for cut outs for airconditioners supply, return airgrills, slits, light fittings, smokedetector and music speaker etc.The job shall include makingstepsceiling,verticalsur faces etc.	

3	Mortuary			
	FLOORING	Tile Flooring	P & F 1st quality Heavy DutyVitrified Polished Digital tilesapproved by JDA on floor,skirting and steps etc.in differentsizes (thickness minimum 10mm)with water absortion less than orequal0.08%andconformingtoIS 15622 of approved make in allcolour and shade, laid with 20mm thick CM 1: 4 includinggrouting the joints with whitecement and matching pigmentetccomplete. Sizeupto1.5Sqm	
	FALSECEILING	POP FalseCeiling	Providingandfixinginposition P.O.P. decorativefalse ceilingover G.I. metal frame work ofapppd. quality and wire mesh asper standard detail. The main G.I.frame (24g x 2" x 1") shall be at2'6" c/c bothways and intermediate frame (21/2" x 3/4" x24g) shall be at 15" c/c bothways. The main G.I. member tobe hanged with help of G.I angleof 1" x 1" x 24 gauge andadditional M.S flats 3/4" x1/8"/m.s angle (duly paintedwith red oxide) and dashfasteners and adjustable clampswith nuts and bolts including allnecessaryworkrequired. Expanded metal mesh (0.07Kg/Sft) shall be firmly stretchedand screwed to the intermediateframewithG.I.wash ersand average20mm plasterofparis	
5	Kitchen, Laundry			

	FLOORING	TileFlooring	P & F 1st quality Heavy DutyVitrified Polished Digital tilesapproved by JDA on floor,skirting and steps etc.in differentsizes (thickness minimum 10mm)with water absortion less than orequal0.08%andconformingtoIS 15622 of approved make in allcolour and shade, laid with 20mm thick CM 1: 4 includinggrouting the joints with whitecement and matching pigmentetccomplete. Sizeupto1.5Sqm	
	CURTAINS/BLINDS	Manually OperatedRoller Blinds	Manually Operated Roller Blindswith required pelemet as peraproveddesignanddrawingsb y JDA.	150 Rs SqftBase PriceofBli nds
	FALSECEILING	PopFalse Ceiling	Providingandfixinginposition P.O.P. decorativefalse ceilingover G.I. metal frame work ofapppd. quality and wire mesh asper standard detail. The main G.I.frame (24g x 2" x 1") shall be at2'6" c/c bothways and intermediate frame (21/2" x 3/4" x24g) shall be at 15" c/c bothways. The main G.I. member tobe hanged with help of G.I angleof 1" x 1" x 24 gauge andadditional M.S flats 3/4" x1/8"/m.s angle (duly paintedwith red oxide) and dashfasteners and adjustable clampswith nuts and bolts including allnecessaryworkrequired. Expanded metal mesh (0.07Kg/Sft) shall be firmly stretchedand screwed to the intermediateframe with G.I. washers andaverage 20 mm plaster of paristo beappliedonin twolayers. Necessary provisions shall bemade for cut outs for airconditioners supply, return airgrills, slits, light fittings, smokedetector and music speaker etc.The job shall include makingsteps ceiling, vertical surfacesetc.	

			50% OF CeilingArea	
5	COMMON TOILET			
	FLOORING	Tile Flooring	P&F 1st quality Heavy Duty Vitrified Digital tiles approved by JDA on floor, skirting and step etc. in different sizes (thickness minimum 10mm) with water absorption less than or equal 0.08% and conforming to IS 15622 of approved make in all colour and shade, laid with 20mm thick CM 1:4 including grouting the joints with white cement and matching pigment etc complete. Size up to 1.5 Sqm	

	WALLS	Dado	Providing and fixing 1st quality tiles approved by JDA on floor, with water absorption less than or equal to 0.08 % confirming to IS:13753 & IS:15622 on Wall laid on a bed of neat cement slurry finished with flush pointing in the white cement mixed with pigment to match the shade of the tile complete .	
		Mirrors Nos 10.	As per design or make approved by JDA.	
	SANITARY & CP FITTINGS		P & F of all the sanitary & CP fittings with all accessories as per design & drawing approved by JDA. Artiz series Jaquar or Equilient. Quantities as per common toilet layout.	
	HVAC	VENTILATION	P & F exhaust inline fan system complete with all accessories as per design drawing & make approved by JDA.	
5	KITCHEN			
	FLOORING	Tile Flooring	P & F 1st quality Heavy Duty Vitrified Polished Digital tiles approved by JDA on floor, skirting and steps etc. in different sizes (thickness minimum 10mm) with water absorption less than or equal to 0.08% and conforming to IS 15622 of approved make in all colour and shade, laid with 20mm thick CM 1:4 including grouting the joints with white cement and matching pigment etc complete. Size up to 1.5 Sqm	
	WALLS	Dado	Providing and fixing 1st quality tiles approved by JDA on floor, with water absorption less than or equal to 0.08 % confirming to IS:13753 & IS:15622 on Wall laid on a bed of neat cement slurry finished with flush pointing in the white cement mixed with pigment to match the shade of the tile complete (excluding the cost of cement plaster on walls and pillar).	

	STONE	Counter	P&F granite counter as per design&drawing approved by JDA.	Base price 200 Rs per Sqft
	HVAC	VENTILATION	P&F exhaust inline fan / Hood system complete with all accessories as per design Drawing & make approved by JDA.	
			Conditioners supply, return air grills, slits, light fittings, smoke detector and music speaker etc. The job shall include making steps ceiling, vertical surfaces etc.	
	PUMP&MACHINES		P&F all type of pumps and machine complete with all accessories required as per design and drawings approved by JDA.	
	SANITARY&CP FITTINGS		P&F of all the sanitary & CP fittings with all accessories as per design & drawing approved by JDA. Aris series Jaguar or Ebullient. Quantiles are as common toilet layout.	
	CURTAINS/BLINDS	Manually Operated Roller Blinds	Manually Operated Roller Blinds with required pelmet as per approved design and drawings by JDA.	150Rs Sqft Base Price of Blinds
			BWP ply, providing and TW lipping to exposed edges of Block board, polishing/painting etc. Complete.	
	FLOORING	Tile Flooring	P&F 1st quality Heavy Duty Vitrified Digital tiles approved by JDA on floor, skirting and step etc. in different sizes (thickness minimum 10mm) with water absorption less than or equal to 0.08% and conforming to IS 15622 of approved make in all colour and shade, laid with 20 mm thick CM 1: 4 including	

			groundingthejointswithwhite cementandmatchingpigmentetcc omplete.Size upto1.5Sqm	
2	TOILETTYPEA			
	FLOORING	TileFlooring	P&F1stqualityHeavyDutyVitrified Digital tiles approved byJDA on floor, skirting and stepsetc.indifferent sizes(thicknes sminimum10mm)withwaterabso rtionlessthanorequal0.08%andco nformingtoIS15622ofapprovedm akeinallcolourandshade,laidwith 20mmthickCM1:4includinggroun tingthejointswithwhitecementan dmatchingpigment etcccomplete.Sizeupto1.5Sqm	
	WALLS	Dado	Providingandfixing1stqualitytiles approvedbyJDAonfloor,withwate rabsortionlessthanorequalto0.08 %confirmingtoIS:13753&IS:1562 2 on Walllaid on a bed ofneat cement slurry finished withflushpointinginthewhitecem entmixedwithpigmenttomatchth eshadeofthetilecomplete(excludi ngthecostof Cementplasteronwallsandpillar).	
	FALSECEILING	GridCeiling	Providing and Fixing 10mm thk e-board/bisonboardfalseceilingfort oiletsusingpowdercoatedAlumini umwallanglessectionsof25mmx2 5mmof24guagewith suspensionsusingAlumi nium angle of25mmx25mm includingscaffoldingsta gingatallfloor levelsetc complete	
	OPERATIONALITEMS		P&Fofalltheoperationalaccessori es like geyser, hand dryeretcasperdesign&drawing approvedby JDA.	

	SANITARY&CPFITTINGS		P&F of all the sanitary & CP fittings of premium quality than common toilets sanitary & CP fittings with all accessories as per design & drawing approved by JDA. Artiz series Jaquar or Equilient. Quantities as per common toilet layout.	
	HVAC	VENTILATION	P&F exhaust fan/ inline fan system complete with all accessories as per design drawing & make approved by JDA.	
3	TOILET TYPE B			
	FLOORING	Tile Flooring	P&F 1st quality Heavy Duty Vitrified Digital tiles approved by JDA on floor, skirting and step etc. in different sizes (thickness minimum 10mm) with water absorption less than or equal to 0.08% and conforming to IS 15622 of approved make in all	
			colour and shade, laid with 20mm thick CM 1:4 including grouting the joints with white cement and matching pigment etc complete. Size up to 1.5 Sqm	
	WALLS	Dado	Providing and fixing 1st quality tiles approved by JDA on floor, with water absorption less than or equal to 0.08% conforming to IS: 13753 & IS: 15622 on Wall laid on a bed of neat cement slurry finished with flush pointing in the white cement mixed with pigment to match the shade of the tile complete (excluding the cost of cement plaster on walls and Pillar).	

	FALSECEILING	GridCeiling	Providing and Fixing 10mm thk e-board/bisonboardfalseceilingfortoiletsusingpowdercoatedAluminiumwallanglessectionsof25mmx25mmof24guagewith suspensionsusingAluminium angle of25mmx25mm includingscaffoldingstagingatallfloor levelsetc complete	
	OPERATIONALITEMS		P&Fofalltheoperationalaccessories like geyser, hand dryeretcasperdesign&drawing approvedby JDA.	
	SANITARY&CPFITTINGS		P&Fofallthesanitary&CPfittings of premium quality thancommontoiletsanitary&CPFittingswithallaccessoriosasperdesign & drawing approvedbyJDA.ArtizeseriesJaquarorEquilient.Quantitiesareas commontoiletlayout.	
	HVAC	VENTILATION	P&F exhaust fan/ inline fansystem complete with allaccessorios as per designdrawing&makeapprovedby JDA.	
4	OUTERDEVELOPMENT			
	FLOORING	80 mm Interlocking Tile flooring/ Cement Concrete pavement flooring	As per BSR specifications	
			Developmentareaathardscapeareawithalltypeofbasepreparing.	
	FABRICATIONWORK		MSFencingworkonboundarywalloranytypeogfabricationworkrequiredforouterdevelopmentasperdesignand drawingapproved byJDA.	
	COMMONWORKSINALLUNITS			
	POPWORK		Providing and applying plaster ofparisputtyof2mmthicknessover plastered surface to preparethesurfaceevenandsmooth complete	

	INTERNAL PAINT		Wall painting with plastic emulsion paint of approved brand and manufacture to give an even shade including scaffolding: Two or more coats on new work including preparation of base with primer, putty, lippy etc complete in all respect	
	EXTERNAL PAINT		Finishing walls with textured exterior or paint of required shade as per approved colour complete as per manufacturer's specifications including primer coat and protecting coat Trowel Finish av. thickness 2000 to 2500 microns.	
	SS RAILING		Providing and fixing stainless steel (Grade 304) railing made of hollow tubes, channels, plates etc., including welding, grinding, buffing, polishing and making curvature (wherever required) and fitting the same with necessary stainless steel nuts and bolts complete, i/c fixing the railing with necessary accessories & stainless steel dash fasteners, stainless steel bolts etc., of required size, on the top of the floor or the side of waist slab with suitable arrangement as per approval of Engineer-in-charge, (for payment purpose only weight of stainless steel members shall be considered excluding fixing accessories such as nuts, bolts, fasteners etc.) as per design & drawing approved by JDA.	

	ALUMINIUM DOORWINDOWS		Aluminium structural glazingwork-Providing and fixing of specially designed high performance semi unitized system using aluminium section of Jindal/ Hindalco/Mahaveer make for main mullion, corner mullion, main transom and top & bottom transom for main frame based structural glazing. Mullion & Transom- shall be out of aluminium section size of 63.5x58x weight 1.350kg/m. Anodizing - The surface of aluminium section shall be finished with 15 micron anodizing in required shade. Silicon- D/C 995/SSG 4000 structural sealant. Weather Silicon- 789/ ultra proof. Single shutter section for Glass panel- 19.0x19.0x0.250kg/m. M.S. clamp-size-75x75x6 with 10	
			mm Hilti fasteners fixing for mullions. Glass 6mm thick pyrolytic solar control coated heat reflective and toughened glass of Saint Gobain make of approved shade. (glasses to be fixed using spacer tape and sealing the glass joints with 789 Dow Coming weather proofing silicon) The whole system after installation shall be completely water proof/ weather resistant, sealed against air and water complete as per drawings, requirements, specifications and as directed by Engineer. as per design & drawing approved by JDA.	
	FLUSH DOORS		P&F laminated and Venner finished complete flush doors 45MM Thick with all accessories like hinges, lock, handles etc as per design, drawing & make approved by JDA.	

	WATERPROOFINGWORK		Providingandlayingwaterproofing treatmenttoverticalandhorizonta lsurfacesofdepressedportionsof W.C.,kitchenandthelikeconsisting of : i) Ist course of applying cementslurry @ 4.4 Kg/sum mixed withwaterproofingcompoundcon formingtoIS2645inrecommended proportionsincluding rounding off junction ofverticalandhorizontalsurface. ii) IIndcourseof20mmcement	
			plaster 1:3(1 cement: 3 coarsesand) mixed with water. proofingcompoundinrecommend edproportion including rounding offjunctionofverticalandhorizont al surface.. iii) IIIrd course of applying blownor residual bitumen applied hotat1.7Kgpersqm.ofarea. iv) IVthcourseof400micronthick PVCsheet.(Overlapsatjoints of PVC sheet should be 100mmwideandpastedtoeachoth erwithbitumen@1.7 Kg/sqm.)	

			Providing and laying waterproofing treatment in sunken portion of WCs, bathroom etc., by applying cement slurry mixed with water proofing cement compound consisting of applying : a) first layer of slurry of cement @ 0.488 kg/sqm mixed with water proofing cement compound @ 0.253 kg/sqm. This layer will be allowed to air cure for 4 hours. b) Second layer of slurry of cement @ 0.242 kg/sqm mixed with water proofing cement compound @ 0.126 kg/sqm. This layer will be allowed to air cure for 4 hours followed by water curing for 48 hours. The rates include preparation of surface treatment & sealing of all joints, corners, junction with polymer mixed slurry.	
			Providing & applying Three coats of pure Acrylic Water based elastomeric brush applied insulating coating on exterior surface over waterproofing slurry coat, initial coat of 50-75 micron thickness with diluting 1 part of chemical with 2 parts of clean water, over which applying 2 coats at 2 Hrs, interval each with diluting 1 part of chemical with 10% of clean water for total thickness of 400 to 450 microns (covering area 0.9 Sq.M/Kg of	
			chemical) including preparation of surface by cleaning, brushing and dust removing, scaffolding if necessary etc., with contractor's labour, tools, machinery etc, complete as directed by Engineer in Charge.	

			Providing and laying integral cement based waterproofing treatment including preparation of surface as required for treatment of roofs, balconies, terraces etc consisting of following operations. (a) Applying and grouting as slurry coat of neat cement using 2.75 kg/sqm. of cement admixed with proprietary waterproofing compound conforming to IS: 2645 over the RCC slab including cleaning the surface before treatment. (b) Laying cement concrete using broken bricks/brick bats 25mm to 100mm size with 50% of cement mortar 1:4 (1 cement : 4 coarse sand) admixed with proprietary waterproofing compound conforming to IS: 2645 over 20 mm thick layer of cement mortar of mix 1:4 (1 cement : 4 coarse sand) admixed with proprietary waterproofing compound conforming to IS: 2645 to required slope and treating similarly the adjoining walls up to 300 mm height including grounding of junctions of walls and slabs. (c) After two days of proper curing applying a second coat of cement slurry admixed with proprietary waterproofing compound conforming to IS: 2645. (d) Finishing the surface with 20mm thick jointless cement mortar of mix 1:4 (1 cement : 4 coarse sand) admixed with proprietary waterproofing compound conforming to IS: 2645 and finally finishing the surface with trowel with neat	

			ceMENTslurryandmakingof300x300xmm square (e) The whole terrace of finished shall be flooded with water for a minimum period of two weeks for curing and for final test. All above operations to be done in order and as directed and specified by the Engineer-in-Charge. With average thickness of 120mm and minimum thickness at least 65mm.	
	MATKA FILLING/SUNKEN FILLING	Sunken Area / Auditorium Area	P&F matka filling complete with all type of necessary work for base and finished surface preparation as per design and drawing approved by JDA.	
			Waterproofing work mentioned in Chapter-E shall be applicable wherever necessary.	
	LIFTS		P&F as per approved specification, make, design and drawing approved by JDA.	
	OUTER DEVELOPMENT		Complete outer development as per conceptual, design and drawing approved by JDA including landscape work, Lighting work, hardscape work etc.	
	ELEVATIONAL WORK		To be done as per design and drawing approved by JDA	
	FABRICATION WORK		Structural steel work in approved section as design & drawing approved by JDA section, fixed with or without connecting plate including cutting, hoisting (	
			height up to 10m), fixing in position and applying a priming coat of approved steel primer all complete.	

	BMS		Terminology and acronyms. Building Management Systems (BMS) also known as Building Automation Systems (BAS), Building Management and Control System (BMCS), Direct Digital Controls (DDC) and Building Controls. Following functions will be controlled by this system: -Lighting.- - Heating, ventilation and air conditioning (HVAC).- - Fire, smoke detection and alarms.- - Motion detectors, CCTV, security and access control.- - ICT systems.- - Lifts.- - Shading devices.- - Smart meters	

Section X

General Conditions of Contract

("Copy of appendix XI of PWF&AR, Govt. of Rajasthan effective from 01.07.99 and subsequent addendum dated 19.03.2001 & 29.03.2001 and other amendments up to date. In case of any typographical error or omission or alteration the original version of the same shall be valid.")

DEFINITIONS

The "Contract" means the documents forming the bid and acceptance thereof and the formal agreement executed between the Jaipur Development Authority and the Contractor, together with the documents referred to therein, including these conditions, Notice inviting Bids, Instructions to Bidders, Special Conditions of Contract, Specifications, Drawings and Designs, Tender and other information submitted by the Contractor and instructions issued from time to time by the Engineer-in-charge and all these documents taken together shall be deemed to form one contract and shall be complementary to another.

In the contract the following expressions shall, unless the context otherwise requires, have the meanings herein respectively assigned to them:-

The "WORKS OR WORK" shall, unless there be something either in the subject or context repugnant to such construction, be construed and taken to mean the works by, or by virtue of the contract contracted to be executed, whether temporary or permanent and whether original, altered, substituted or additional.

The "SITE" shall mean the land an/or the other places on, into or through which work is to be executed under the contract, or any adjacent land, path or street, through which work is to be executed under the contract, or any adjacent land, path or street, which may be allotted or used for the purpose of carrying out the contract.

The "CONTRACTOR" shall mean the individual or firm or company, whether incorporated or not, undertaking the works and shall include the legal personal representatives of such individual or the persons composing such firm or company, the successor of such firm or company and the permitted assign of such individual or firm or company.

The "ENGINEER-IN-CHARGE" shall mean the Executive Engineer In charge of Jaipur Development Authority who shall supervise and be in-charge of the work.

The "GOVERNMENT DEPARTMENT" shall mean the Jaipur Development Authority (JDA).

The "Accepting Authority" shall mean Executive Committee of Jaipur Development Authority.

The "Director" or "Chief Engineer" shall mean Director (Engineering-III) of Jaipur Development Authority.

The 'Superintending Engineer' shall mean the Superintending Engineer-VI of Jaipur Development Authority.

"ESTIMATED COST" shall mean the cost of the work or works as estimated on the basis of the TENDERED rate or rates agreed to between the parties to the contract.

Where the context so requires, words importing the singular only also include the plural and vice-versa. Any reference to masculine gender shall wherever required include feminine gender and vice versa.

Headings and marginal notes to these General Conditions of Contract shall not be deemed to form a part thereof or be taken into consideration in the interpretation or construction thereof or of the contract.

The clause 23 of condition of contract under section 2 of GCC i.e. standing committee for settlement of disputes is read as:

If any question, difference or objection, whatsoever shall arise in any way, in connection with or arising out of this instrument, or the meaning of operation of any part thereof, of the rights, duties or liabilities of either party men, save in so far, as the decision of any such matter, as herein before provided for, and been so decided, every such matter/ constituting a total claim of Rs. 50,000/- or above, whether its decision has been otherwise provided for an whether it has been finally decided accordingly, or whether the rights or obligations of the parities, as the result of such termination, shall be referred for decision to the empowered standing committee, which would consist of the followings:

Jaipur Development Commissioner, JDA, Jaipur -Chairman

Director (Engineering), JDA, Jaipur

Director (Finance), JDA, Jaipur

Director (Law), JDA, Jaipur

Superintending Engineer, JDA, Jaipur

The Engineer-in-Charge, on receipt of application along with nonrefundable prescribed fee, (the fee would be two percent of the amount in dispute, not exceeding Rs. One lac) from the contractor, shall refer the disputes to the committee within a period of three months from the date of receipt of application.

Procedure and application form referring cases for settlement by the Standing Committee shall be, as given in form RPWA 90.

GENERAL CONDITIONS OF CONTRACT

("Copy of appendix XI of PWF&AR, Govt. of Rajasthan effective from 01.07.99 and subsequent addendum up to date. In case of any typographical error or omission or alteration the original version of the same shall be valid.")

Clause 1: Security Deposit

"The security deposit @ 3% of the gross amount of the running bill shall be deducted from each running bill and shall be refunded as per rules on completion of the contract as per terms and conditions. The earnest money deposited shall however be adjusted while deducting security deposit from the first running bill of the contractor. There will be no maximum limit of security deposit.

A contractor may, however, elect to furnish bank guarantee or any acceptable form of security for an amount equal to the full amount of security deposit @ 3% of the work order before or at the time of executing the agreement. In that case earnest money may be refunded only after furnishing of the bank guarantee as above. During the execution of the work or after completion of the work also a contractor may replace the security deposit by furnishing bank guarantee for an equal amount. However, during execution of the work if cost of work exceeds as shown at the time of furnishing bank guarantee, balance security deposit shall be deducted from the Running Account Bills."

No Price variation is payable in this contract.

All compensation or other sums of money payable by the Contractor to Government under the terms of his contract may be deducted from or paid by the sale of a sufficient part of his Security Deposit, or from interest arising therefrom, or from any sums, which may be due or may become due to the Contractor by the Government on any account whatsoever, and in the event of his Security Deposit being reduced by reason of any such deduction or sale as aforesaid, the Contractor shall within ten days thereafter, make good in cash or Bank Guarantee of Nationalized/Scheduled bank, as aforesaid, any sum or sums which may have been deducted from or raised by sale of his Security Deposit or any part thereof.

In case of Bank Guarantee of any Nationalized/Scheduled Bank is furnished by the Contractor to the Government, as part of the Security Deposit and the bank goes into liquidation or, for any reason is unable to make payment against the said Bank Guarantee, the loss caused thereby shall fall on the Contractor and the Contractor shall forthwith, on demand, furnish additional security to the Government to make good the deficit.

The liability or obligation of the bank under the Guarantee Bond shall not be affected or suspended by any dispute between the Engineer-in-Charge and the Contractor, and the payment, under the Guarantee Bond by the bank to the Government shall not wait till disputes are decided. The bank shall pay the amount under the Guarantee, without any demur, merely on a demand from the Government stating that the amount claimed is required to meet the recoveries due or likely to be due from the Contractor. The demand, so made, shall be conclusive as regards to amount due and payable by the bank, under the guarantee limited to the amount specified in the Guarantee Bond. The guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor.

The Bank Guarantee shall remain valid up to the specified date unless extended on demand by the Engineer-in-Charge which shall include the period of completion of the contract and the defect removal period as per terms of the Agreement. Bank's liability shall stand automatically discharged unless a claim in writing is lodged with the Bank within the period stated in the Bank Guarantee including the extended period. After satisfactory completion of the contract and clearance of all dues by the Contractor, the Chief Engineer or duly authorized Engineer will discharge the Bank Guarantee after expiry of the original or the extended period, as the case

may be. In case the date of expiry of the Bank Guarantee is a holiday, it will be deemed to expire on the close of the next working day.

Government is not concerned with any interest accruing to the Contractor on any form of Security (primary or collateral) lodged by him with the bank or any sums payable to sureties obtained by the Bank as counter guarantee to secure its own position. These will be the matters between the Bank and the Contractor.

Clause 2: Compensation for delay

The time allowed for carrying out the work as entered in the tender, shall be strictly observed by the Contractor and shall be reckoned from the 10th day after the date of written order to commence the work is given to the Contractor. If the Contractor does not commence the work within the period specified in the work order, he shall stand liable for the forfeiture of the amount of Earnest Money and Security Deposit. Besides, appropriate action may be taken by the Engineer-in-Charge/competent authority to debar him from taking part in future tenders for a specified period or black list him. The work shall, throughout the stipulated period of completion of the contract, be proceeded with all due diligence, time being essence of the contract, on the part of the Contractor. To ensure good progress during the execution of work, the contractor shall be bound, in all cases in which the time allowed for any work exceeds one month (save for special jobs), to complete 1/8th of the whole of the work before 1/4th of the whole time allowed under the contract has elapsed, 3/8th of the work before 1/2 of such time has elapsed and 3/4th of work before 3/4th of such time has elapsed. If the contractor fails to complete the work in accordance with this time schedule in terms of cost in money, and the delay in execution of work is attributable to the contractor, the contractor shall be liable to pay compensation to the Government at every time span as below: -

A.	Time Span of full stipulated period	1/4th	1/2th	3/4th	Full
B.	Work to be completed in terms of money	1/8th	3/8th	3/4th	Full
		(Rs.)	(Rs.)	(Rs.)	(Rs.)
C.	Compensation payable by the contractor for delay attributable to contractor at the stage of:	Delay up to one fourth period of the prescribed time span – 2.5% of the work remained unexecuted			
		Delay exceeding one fourth period but not exceeding half of the prescribed time span – 5% of the work remained unexecuted.			
		Delay exceeding half of the prescribed but not exceeding three fourth of the time span – 7.5% of the work remained unexecuted			
		Delay exceeding three fourth of the prescribed time span – 10% of the work remained unexecuted			

Note: In case delayed period over a particular span is split up and is jointly attributable to Government and contractor, the competent authority may reduce the compensation in proportion of delay attributable to Government over entire delayed period over that span after clubbing up the split delays attributable to Government and this reduced compensation would be applicable over the entire delayed period without paying any escalation.

Following illustrations is given: -

First time span is 6 months, delay is of 30 days which is split over as under: -

5 days (attributable to Government) + 5 days (attributable to contractor) + 5 days (attributable to Government) + 5 days (attributable to contractor) + 5 days (attributable to Government) + 5 days (attributable to contractor)

Total delay is thus clubbed to 15 days (attributable to Government) and 15 days (attributable to contractor).

The normal compensation of 30 days as per clause 2 of agreement is 2.5% which can be reduced as $2.5 \times 15 / 30 = 1.25\%$ over 30 days without any escalation by competent authority.

Note: The compensation, levied as above, shall be recoverable from the Running Account Bill to be paid immediately after the concerned time span. Total compensation for delays shall not exceed 10 percent of the total value of the work.

The contractor shall, further, be bound to carry out the work in accordance with the date and quantity entered in the progress statement attached to the tender.

In case the delay in execution of work is attributable to the contractor, the spanwise compensation, as laid down in this clause shall be mandatory. However, in case the slow progress in one-time span is covered up within original stipulated period, then the amount of such compensation levied earlier shall be refunded. The Price escalation, if any, admissible under clause 45 of Conditions of Contract would be admissible only on such rates and cost of work, as would be admissible if work would have been carried out in that particular time span. The Engineer-in-Charge shall review the progress achieved in every time span, and grant stagewise extension in case of slow progress with compensation, if the delay is attributable to contractor, otherwise without compensation.

However, if for any special job, a time schedule has been submitted by the Contractor before execution of the agreement, and it is entered in agreement as well as same has been accepted by the Engineer-in-charge, the Contractor shall complete the work within the said time schedule. In the event of the Contractor failing to comply with this condition, he shall be liable to pay compensation as prescribed in forgoing paragraph of this clause provided that the entire amount of compensation to be levied under the provisions of this Clause shall not exceed 10% of the value of the contract. While granting extension in time attributable to the Government, reasons shall be recorded for each delay.

Clause 3: Risk & Cost Clause

The Engineer-in-charge or the Competent Authority defined under rules may, without prejudice to his rights against the Contractor, in respect of any delay or inferior workmanship or otherwise, or any claims for damages in respect of any breaches of the contract and without prejudice to any rights or remedies under any of the provisions of this Contract or otherwise, and whether the date for completion has or has not elapsed, by notice in writing, absolutely determine the Contract in any of the following cases:

If the Contractor having been given by the Engineer-in-charge, a notice in writing to rectify, reconstruct or replace any defective work or that the work is being performed in any inefficient or otherwise improper or un-workman like manner shall omit to comply with the requirements of such notice for a period of seven days, thereafter, or if the Contractor shall delay or suspend

the execution of the work so that either in the judgement of the Engineer-in-charge (which shall be final and binding) he will be unable to secure completion of the work by the date for completion or he has already failed to complete the work by that date,

If the Contractor, being a company, shall pass a resolution or the court shall make an order that the company shall be wound up or if a receiver or a manager, on behalf of a creditor, shall be appointed or if circumstances shall arise, which entitle the court or creditor to appoint a receiver or a manager or which entitle the court to make a winding up order,

If the contractor commits breach of any of the terms and conditions of this Contract,

If the contractor commits any acts mentioned in, clause 19 thereof.

When the Contractor has made himself liable for action under any of the cases aforesaid, the Engineer-in charge on behalf of the Governor of Rajasthan shall have powers: -

To determine or rescind the contract, as aforesaid (of which determination or rescission notice in writing to the Contractor under the hand of the Engineer-in charge shall be conclusive evidence), upon such determination or rescission, the earnest money, full security deposit of the contract shall be liable to be forfeited and shall be absolutely at the disposal of Government.

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

After giving notice to the contractor to measure up the work of the contractor and to take such part thereof, as shall be unexecuted out of his hands, and to give it to another contractor to complete, in which case any expenses which may be incurred in excess of the sum which would have been paid to the original contractor, if the whole work had been executed by him (of the amount of which excess, the certificate in writing of the Engineer-in-charge shall be final and conclusive) shall be borne and paid by the original Contractor and may be deducted from any money due to him by Government under this contract or on any other account whatsoever, or from his Earnest Money, Security Deposit, Enlistment Security or the proceeds of sales thereof, or a sufficient part thereof, as the case may be. In the event of any one or more of the above courses being adopted by the Engineer-in-charge, the Contractor shall have no claim to compensation for any loss sustained by him by reason of his having purchased or procured any materials or entered into any engagements or made any advances on account or with a view to the execution of the work or the performance of contract. And, in case action is taken under any of provisions aforesaid, the Contractor shall not be entitled to recover or be paid, any sum for any work thereof or actually performed under this contract unless and until the Engineer-in-charge has certified, in writing, the performance of such work and the value payable in respect thereof, and he shall only be entitled to be paid the value so certified.

Clause 4: Contractor remains liable to pay compensation, if action not taken under clause 3

In any case in which any of the powers conferred by clause 3 hereof, shall have become exercisable and the same shall have not been exercised, the non-exercise, thereof, shall not constitute waiver of any of the conditions hereof, and such power shall, notwithstanding, be exercisable in the event of any future case of default by the Contractor for which, by any clause or clauses hereof, he is declared liable to pay compensation amounting to the whole of his Security Deposit /Earnest Money/Enlistment security and the liability of the Contractor for past and future compensation shall remain unaffected.

Powers to take possession of, or require removal, sale of Contractor's plant

In the event of the Engineer-in-Charge putting in force, powers vested in him under the preceding Clause 3 he may, if he so desires, take possession of all or any tools, plants, materials and stores, in or upon the works or the site, thereof or belonging to the contractor or procured by him and intended to be used for the execution of the work or any part thereof, paying or allowing for the same in account, at the contract rates or, in case of these not being applicable, at current market rates, to be certified by the Chief Engineer or duly authorized Engineer (whose certificate thereof, shall be final and conclusive), otherwise the Engineer-in-Charge may, by notice in writing to the contractor or his clerk of the works, foreman or other authorized agent, require him to remove such tools, plant, materials or stores from the premises (within a time to be specified in such notice), and in the event of the contractor failing to comply with any requisition, the Chief Engineer or other duly authorized Engineer may remove them at the contractor's expenses, sell them by auction or private sale on account of the Contractor and at his risk in all respects, and the certificate of the Chief Engineer or other duly authorized Engineer, as to the expense of any such removal, and the amount of the proceeds and expense of any such sale shall be final and conclusive against the Contractor.

Clause 5: Extension of time

If the contractor shall desire an extension of the time for completion of the work on the ground of his having been unavoidably hindered in its execution or on any other grounds, he shall apply, in writing, to the Engineer-in-Charge within 30 days of the date of the hindrance, on account of which he desires such extension as aforesaid, and the Authority Competent to grant extension under the rules/delegations of power or other duly authorized Engineer shall, if in his opinion, (which shall be final) reasonable grounds be shown therefore, authorize such extension of time, if any, as may, in his opinion, be necessary or proper, if the period of completion of contract expires before the expiry of the period of one month provided in this clause, the application for extension shall be made before the expiry of the period stipulated for completion of the contract. The competent authority shall grant such extension at each such occasion within a period of 30 days of receipt of application from contractor and shall not wait for finality of work. Such extensions shall be granted in accordance with provisions under clause (2) of this agreement.

Clause 5 A: Monthly Return of Extra Claims

Contractor has to submit a return every month for any work claimed as extra. The Contractor shall deliver the return in the office of the Executive Engineer and obtain Receipt Number of the Receipt Register of the day on or before 10th day of every month during the continuance of the work covered by this contract, a return showing details of any work claimed as extra by the contractor which value shall be based upon the rates and prices mentioned in the contract or in the Schedule of Rates in force in the District for the time being. The contractor shall be deemed to have waived all claims, not included in such return, and will have no right to enforce any such claims not included, whatsoever be the circumstances.

Clause 6: Final Certificate

On completion of the work, the contractor shall send a registered notice to the Engineer-in-charge, giving the date of completion and sending a copy of it to the officer accepting the contract, on behalf of the Governor and shall request the Engineer-in-charge to give him a certificate of completion, but no such certificate shall be given nor shall the work be considered to be complete until the contractor shall have removed from the site on which the work shall be executed, all scaffolding, surplus materials and rubbish and cleared off the dirt from all wood work, doors, walls, floors, or other parts of any building in, upon or about which the work is to be executed or of which he may have possession for the execution thereof, he had filled up the pits. If the contractor shall fail to comply with the requirements of this Clause as to removal of scaffolding, surplus materials and rubbish and cleaning off dirt and filling of pits on or before the date fixed for completion of the work, the Engineer-in-charge may, at the expense of the contractor, remove such scaffolding, surplus materials, and the rubbish and dispose of the same, as he thinks fit, and clean off such dirt and fill the pits, as aforesaid, and the contractor shall forthwith pay the amount of all expenses, so incurred, and shall have no claim in respect of any such scaffolding or surplus materials, as aforesaid, except for any sum actually realized by the sale thereof. On completion, the work shall be measured by the Engineer-in-charge himself or through his subordinates, whose measurements shall be binding and conclusive against the contractor. Provided that, if subsequent to the taking of measurements by the subordinate, as aforesaid, the Engineer-in-charge had reason to believe that the measurements taken by his subordinates are not correct, the Engineer-in-charge shall have the power to cancel the measurements already taken by his subordinates and acknowledged by the Contractor and to take measurements again, after giving reasonable notice to the Contractor, and such re-measurements shall be binding on the Contractor.

Within thirty days of the receipt of the notice, Engineer-in-charge shall inspect the work and if there is no visible defects on the face of the work, shall give the Contractor, a certificate of completion. If the Engineer-in-charge finds that the work has been fully completed, it shall be mentioned in the certificate so granted. If, on the other hand, it is found that there are certain visible defects to be removed, the certificate to be granted by Engineer-in-charge shall specifically mention the details of the visible defects along with the estimate of the cost for removing these defects. The final certificate of work shall be given after the visible defects pointed out as above have been removed.

Clause 7: Payment on Intermediate Certificate to be regarded as advance

No payments shall be made for works estimated to cost less than rupees twenty-five thousand, till after the whole of the works shall have been completed and a certificate of completion given. But in the case of works estimated to cost more than rupees twenty five thousand, the Contractor shall on submitting the bill therefore, be entitled to receive a monthly payment proportionate to the part, thereof, then approved and passed by the Engineer-in-charge, whose certificate of such approval and passing of sum, so payable, shall be final and conclusive. Running Account Bill shall be paid within 15 days from presentation. But all such intermediate payments shall be regarded as payments by way of advance against the final payment only and not as payments for work actually done and completed, and shall not preclude the requiring of bad, unsound and imperfect or unskillful work to be removed and taken away and re-constructed or re-erected, or considered as an admission of the due performance of the contract, or any part thereof, in any respect, or the accruing of any claim, nor shall it conclude, determine, or effect in any way the powers of the Engineer-in-charge under these conditions or any of them to the final settlement and adjustment of the accounts or otherwise or in any other way vary or affect the contract. The final bill shall be made/submitted by the Contractor within one month of the date fixed for completion of the work, otherwise the Engineer-in-charge's certificate of the measurement and of the total amount payable for the work accordingly shall be final and binding on all parties.

Clause 7A: Time Limit for Payments of Final Bills

The final bill shall be paid within 3 months on presentation by the contractor after issuance of final completion certificate in accordance with clause 6 of the conditions of contract. If, there shall be any dispute about any item(s) of the work, then the undisputed item(s) only, shall be paid within the said period of 3 months. If a final bill (which contains no disputed item or disputed amount of any item) is not paid within the period of three months from presentation of final bill or 6 months from the date of receipt of registered notice regarding completion of work in accordance with clause 6 of the conditions of the contract, the defects, if any, shall be brought to the notice of the higher authority. The period of 3 months shall commence from the date of rectification of the defects. The higher authority shall ensure that in no case final bill should be left unpaid after 9 months from the receipt of registered notice regarding completion of work. The contractor shall submit a memorandum of the disputed items along with justification in support within 30 days from the disallowance thereof, and if he fails to do so, his claims shall be deemed to have been fully waived and absolutely extinguished.

Clause 8: Bills to be submitted on completion of specified stage of work

In case of Lump Sum contract, bills will be submitted by the contractor on completion of various stages of work as specified in the contract document. The claim as far as admissible, authorized or paid, if possible, before expiry of 10 days from the presentation of the bill. The claims for additions & alterations, if any, may also be included in the bills if their measurements have been recorded and checked.

Clause 8A: Bills to be submitted on completion of specified stage of work

In case of Lump Sum contract, bills will be submitted by the contractor on completion of various stages of work as specified in the contract document. The claim as far as admissible, authorized or paid, if possible, before expiry of 10 days from the presentation of the bill. The claims for additions & alterations, if any, may also be included in the bills if their measurements have been recorded and checked.

Clause 8B: Recovery of Cost of Preparation of the Bill

In case of contractor of class A and AA do not submit the bill within time fixed, the Engineer in Charge may prepare the bill as per the provision of clause 8 of the general conditions of the contract but @ 0.5 % of amount of such a bill shall be made and credited to the general revenue on account of preparation of bill.

Clause 9: Bills to be on printed forms

The Contractor shall submit all bills on the printed forms, to be had on application, at the office of the Engineer-in-charge and the charges in the Bills shall always be entered at the rates specified in the tender or in the case of any extra work ordered in pursuance of these conditions, and not mentioned or provided for in the tender, at the rates hereinafter provided for such work.

Clause 9A: Payments of Contractor's Bills to Banks

Payments due to the Contractor may if so desired by him, be made to this Bank instead of direct to him, provided that the contractor has furnished to the Engineer-in- Charge(I)an authorization in the form of a legally valid document, such as a Power of Attorney conferring authority on the Bank to receive payments, and (ii) his own acceptance of the correctness of the account made out, as being due to him, by Government, or his signature on the bill or other claim preferred against

Government before settlement by the Engineer-in-Charge of the account or claim, by payment to the Bank. While the receipt given by such bank shall constitute a full and sufficient discharge for the payment, the Contractor should, whenever possible, present his bill duly receipted and discharged through his Banker. Nothing, herein contained, shall operate to create in favor of the Bank any rights vis-a-vis the Governor.

and stores.

Clause 10: Rejection of materials procured by the Contractor

The Engineer-in-Charge shall have full powers to require the removal from the premises of all materials which in his opinion, are not in accordance with the specifications and, in case of default, the Engineer-in-Charge shall be at liberty to employ other person(s) to remove the same without being answerable or accountable for any loss of damage, that may happen or arise to such materials to be substituted thereof, and in case of default, Engineer-in-Charge may cause the same to be supplied and all costs, which may attend such removal and substitution, are to be borne by the Contractor.

Clause 10B: Penal rate in case of excess consumption

The Contractor shall also be charged for the materials consumed in excess of the requirements calculated on the basis of standard consumption approved by the department, at double of the issue rate including storage and supervision charges or market rate, whichever is higher. A Material Supply and Consumption Statement, in prescribed Form RPWA35A shall be submitted with every Running Account Bill, distinguishing material supplied by the Government and material procured by the Contractor himself. The recovery for such material shall be made from Running Account Bill next after the consumption and shall not be deferred. Certificate of such nature shall be given in each Running Account Bill.

Clause 10 C: Hire of Plant and Machinery

Special Plant and Machinery, required for execution of the work, may be issued to the Contractor, if available, on the rates of hire charges and other terms and conditions as per departmental Rules, as per Schedule annexed to these conditions. Rates of such Plant & Machinery shall be got revised periodically so as to bring them at par with market rate.

Clause 11: Works to be executed in accordance with specifications, Drawings, Orders etc.

The Contractor shall execute the whole and every part of the work in the most substantial and satisfactory manner and both as regards materials and otherwise in every respect, in strict accordance with the Specifications. The Contractor shall also conform exactly fully and faithfully to the designs, drawings (either designed by department or designed by contractor and approved by Engineer-in-charge during additional execution) and instructions in writing relating to the work signed by the Engineer-in-charge and lodged in his office and to which the Contractor shall be entitled to have access at such office or on the site of the work for the purpose of inspection during office hours and the Contractor shall, if he so require, be entitled, at his own expense, to make or cause to be made copies of specifications and of all such designs, drawings and instructions, as aforesaid. A certificate of executing works as per approved design, specifications etc. shall be given on each Running Account Bill.

The specifications of work, material, methodology of execution, drawings and designs shall be signed by the Contractor and Engineer-in-charge while executing agreement and shall form part of agreement.

Clause 12:

The Engineer-in-charge shall have power to make any alterations, omissions or additions to or substitutions for the original specifications, drawings, designs and instructions, that may appear to him to be necessary during the progress of the work and the contractor shall carry out the work in accordance with any instructions which may be given to him in writing signed by the Engineer-in-charge and such alterations, omission, additions or substitutions shall not invalidate the contract and any altered, additional or substituted work, which the contractor may be

directed to do in the manner above specified as part of the work, shall be carried out by the contractor on the same conditions in all respects on which he agreed to do the main work. The time for the completion of the work shall be extended in the proportion that the altered, additional or substituted work bears to the original contract work, and the certificate of the Engineer-in-charge shall be conclusive as to such proportion. The rates for such additional, altered or substituted work under this clause shall be worked out in accordance with the following provisions in their respective order:

If the rates for the additional, altered or substituted work are specified in the contract for the work, the contractor is bound to carry out the additional, altered or substituted work at the same rates as are specified in the contract for the work.

If the rates for the additional, altered or substituted work are not specifically provided in the contract for the work, the such rates will be derived from the rates for a similar class of work as are specified in the contract for the work.

If the rates for the altered, additional or substituted work cannot be determined in the manner specified in the sub-clauses (i) to (ii) above, then the rates for such composite work item shall be worked out on the basis of the concerned Schedule of Rates of the District/area specified above minus/plus the percentage which the total tendered amount bears to the estimated cost of the entire work put to tender. Provided always that if the rate for a particular part or parts of the item is not in the Schedule of Rates, the rate for such part or parts will be determined by the Engineer-in-Charge on the basis of the prevailing market rates when the work was done.

If the rates for the altered, additional or substituted work item cannot be determined in the manner specified in sub-clauses (i) to (iii) above, then the contractor shall within 7 days of the date of receipt of order to carry out the work, inform the Engineer- in – Charge of the rate which it is his intention to charge for such class of work supported by analysis of the rate or rates claimed and the Engineer-in-Charge shall determine the rate or rates on the basis of prevailing market rates, and pay the contractor accordingly. However, the Engineer-in-Charge, by notice in writing, will be at liberty to cancel his order to carry out such class of work and arrange to carry it out in such manner, as he may consider advisable. But under no circumstances, the contractor shall suspend the work on the plea of non-settlement of rates on items falling under the clause.

Clause 13: No compensation for alteration in or restriction of work to be carried out.

If, at any time after the commencement of the work the Government shall, for any reason, whatsoever, not require the whole work, thereof, as specified in the tender, to be carried out, the Engineer-in-charge shall give notice, in writing, of the fact to the Contractor, who shall have no claim to any payments or compensation, whatsoever, on account of any profit or advantage, which he might have derived from the execution of the work in full but which he did not derive in consequence of the full amount of the work not having been carried out. Neither, shall he have any claim for compensation by reason of alterations having been made in the original specifications, drawings, and design, and instructions, which shall involve any curtailment of the work, as originally contemplated. Provided, that the Contractor shall be paid the charges for the cartage only, of materials actually brought to the site of the work by him for Bonafied use and rendered surplus as a result of the abandonment or curtailment of the work or any portion thereof, and taken them back by the Contractor, provided however, that the Engineer-in-charge shall have, in all such cases, the option of taking over all or any such materials at their purchase price or at local market rates whichever may be less. In the case of such stores, having been issued from Government Stores, charges recovered, including storage charges, shall be refunded after taking into consideration any deduction for claim on account of any deterioration or damage while in the custody of the contractor, and in this respect the decision of the Engineer-in-charge shall be final.

Clause 14: Action and compensation payable in case of bad work

If, it shall appear to the Chief Engineer or any authorized authority or the Engineer-in-charge or his subordinates in-charge of the work, or to the committee of the retired officers/officers appointed by the State Government for the purpose that any work has been executed with unsound, imperfect or unskillful workmanship, or with material of any inferior description, or that any materials or articles provided by him for the execution of the work are unsound or of a quality inferior to that contracted, or otherwise not in accordance with contract, the Contractor shall on demand in writing from the Engineer-in-charge, specifying the work/materials or articles complained of, notwithstanding that the same may have been inadvertently passed, certified and paid for, will rectify or remove and reconstruct the work, so specified, in whole or in part, as the case may be, remove the materials or articles, so specified, and provide other proper and suitable materials or articles at his own cost, and in the event of his failing to do so, within a period to be specified by the Engineer-in-Charge in his demand as aforesaid, then the Contractor shall be liable to pay compensation at the rate of one percent, on the tendered amount of work for every week not exceeding ten percent, while his failure to do so shall continue, and in the case of any such failure, the Engineer-in-Charge may rectify or remove and re-execute the work or remove and replace with others, the materials or articles complained of as the case may be, at the risk and expense, in all respects of the contractor.

Clause 15: Work to be open to inspection: Contractor or his responsible Agent to be present

All work, under or in course of execution or executed in pursuance of the contract shall, at all times, be opened to inspection and supervision of the Engineer-in-charge and his superior officers e.g. Superintending Engineer, Additional Chief Engineer, Chief Technical Engineer, Chief Engineer, and his subordinates and any other authorized agency of the Government and the contractor shall, at all times during the usual working hours, and at all other times at which reasonable notice of the intention of the Engineer-in-charge or his subordinate and any other authorized agency of Government or committee of retired officers/officers appointed by the State Government for the purpose to visit the works shall have been given to the Contractor, either himself be present to receive orders and instructions or have a responsible agent duly accredited in writing, present for the purpose. Orders given to the Contractor's agent shall be considered to have the same force as if they had been given to the Contractor himself.

Clause 16: Notice to be given before any work is covered up

The Contractor shall give not less than 7 days' notice, in writing, to the Engineer-in-charge or his subordinate-in-Charge of the work, before covering up or otherwise placing beyond the reach of measurement, any work in order that the same may be measured, and correct dimensions thereof, be taken before the same is so covered up or placed beyond the reach of measurement and shall not cover up or place beyond the reach of measurement any work without the consent in writing of the Engineer-in-Charge of the work, and if, any work shall be covered up or placed beyond the reach of measurement without such notice having been given or consent obtained, the same shall be uncovered at the Contractor's expense or in default, thereof, no payment or allowance shall be made for such work, or for the materials with which the same was executed.

Clause 17: Contractor liable for damage done and for imperfections

If the Contractor or his work people or servants shall break, deface, injure or destroy any part of a building, in which they may be working or any building, road, fence, enclosure, or cultivated ground contiguous to the premises on which the work or any part of it is being executed, or if any damage shall happen to the work, while in progress, from any cause, whatsoever, or any

imperfections become apparent in it, within a period specified in clause 37, after a certificate, final or otherwise of its completion, shall have been given by the Engineer-in-charge, may cause the same to be made good by other workmen and deduct the expense (of which the certificate of the Engineer-in-charge shall be final) from any sums that may be then, or at any time thereafter, may become due to the Contractor, or from his security deposit, or the proceeds of sale thereof, or of a sufficient portion thereof.

Clause 18: Contractor to supply plant, ladders, scaffolding etc.

The Contractor shall arrange and supply, at his own cost, all material (except such special materials, if any, as may, in accordance with the contract, be supplied from the Engineer-in-charge's stores), plants, tools, appliances, implements, ladders, cordage, tackle, scaffolding and temporary works requisite or proper for the proper execution of the work, whether original, altered, or substituted, and whether included in the specification or other documents, forming part of the Contract, or referred to in these conditions, or not, or which may be necessary for the purpose of satisfying or complying with the requirements of the Engineer in- Charge, as to any matter as to which, under these conditions, he is entitled to be satisfied or which he is entitled to require, together with carriage thereof, to and from the work. The Contractor shall also arrange and supply, without charge, the requisite number of persons with the means and materials, necessary for the purpose of setting out work and counting, weighting and assisting in the measurement or examination at any time and from time to time of the work, or materials. Failing his so doing, the same may be provided by the Engineer- in-charge, at the expense of the Contractor, and the expenses may be deducted from any money due to the Contractor under the Contract, or from his Security Deposit or the proceeds of sale thereof, or a sufficient portion thereof. The Contractor shall also provide all necessary fencing and lights required to protect the public from accident and shall be bound to bear the expenses of defense of every suit, action or other proceeding at law, that may be brought by any person for injury sustained owing to neglect of the above precautions, and to pay any damages and costs which may be awarded in any such suit, action proceeding to any such person or which may, with the consent of the Contractor, be paid to compromise any claim by any such person.

Clause 19: Work not to be sub-let, Contract may be rescinded and Security

Deposit and Performance Forfeited for sub-letting, bribing or if Contractor becomes insolvent.

The Contractor shall not be assigned or sublet without the written approval of the Director Engineer, and if the contractor shall assign or sublet his contract or attempt so to do, or become insolvent, or commence any insolvency proceedings or mark any composition with his creditors, or attempt so to do, or if any bribe, gratuity, gift, loan, requisite reward or advantage, pecuniary or otherwise, shall either directly or indirectly, be given, promised or offered by the Contractor or any of his servants or agents to any public officer or person, in the employ of Government, in any way, relating to his office or employment, or if, any such officer or person shall become, in any way, directly or indirectly, interested in the contract, the Chief Engineer may, thereupon, by notice, in writing, rescind the contract and Security Deposit of the Contractor shall, thereupon, stand forfeited and be absolutely at the disposal of Government and the same consequences shall ensure as, if the contract had been rescinded under Clause 3 hereof, and in addition the Contractor shall not be entitled to recover or be paid for any work therefore, actually performed under the Contract.

Clause 20: Sums payable by way of compensation to be considered as reasonable compensation without reference to actual loss

All sums payable by way of compensation under any of these conditions shall be considered as reasonable compensation to be applied to the use of Government without reference to the actual loss or damage sustained and whether or not any damage shall have been sustained.

Clause 21: Changes in constitution of firm

Where the Contractor is a partnership firm, the previous approval, in writing, of the Engineer-in-charge shall be obtained before any change is made in the constitution of the firm. Where the Contractor is an individual or a Hindu undivided family business concern, such approval, as aforesaid, shall likewise be obtained before the Contractor enters into any partnership agreement thereunder the partnership firm would have the right to carry out the work thereby undertaken by the Contractor. If, previous approval, as aforesaid, is not obtained, the Contract shall be deemed to have been assigned in contravention of Clause 19 hereof, and the same action may be taken, and the same consequences shall ensure, as provided in the said clause 19.

Clause 22: Work to be under direction of Engineer-in-charge

All the works, to be executed under the contract, shall be executed under the direction and subject to the approval, in all respect, of the Engineer-in-charge of the Government of Rajasthan for the time being, who shall be entitled to direct, at what point or points, and in what manner, they are to be commenced, and from time to time, carried on.

Clause 23: Standing Committee for Settlement of Disputes

If any question, difference or objection, whatsoever shall arise in any way, in connection with or arising out of this instrument, or the meaning of operation of any part thereof, or the rights, duties or liabilities of either party then, save in so far, as the decision of any such matter, as herein before provided for, and been so decided, every such matter constituting a total claim of Rs. 50,000/- or above, whether its decision has been otherwise provided for and whether it has been finally decided accordingly, or whether the Contract should be terminated or has been rightly terminated, and as regards the rights or obligations of the parties, as the result of such termination, shall be referred for decision to the empowered Standing Committee, which would consist of the followings:-

Jaipur Development Commissioner, JDA, Jaipur -Chairman

Director (Engineering), JDA, Jaipur

Director (Finance), JDA, Jaipur

Director (Law), JDA, Jaipur

Superintending Engineer, JDA, Jaipur - Member Secretary

The Engineer-in-charge, on receipt of application along with non-refundable prescribed fee, (the fee would be two percent of the amount in dispute, not exceeding Rs. one Lac) from the Contractor, shall refer the disputes to the committee, within a period of three month from the date of receipt of application. Procedure and Application for referring cases for settlement by the Standing Committee shall be, as given in Form RPWA 90.

Clause 23A: Contractor to indemnify for infringement of Patent or design

Contractor shall fully indemnify the Governor of Rajasthan against any action, claim or proceeding, relating to infringement or use of any patent or design, or any alleged patent or design, rights, and shall pay any royalties, which may be payable in respect of any article or part thereof, included in the contract, in the event of any claims made under or action brought against Government. In respect of any such matters, as aforesaid, the Contractor shall be, immediately, noticed thereof, and the Contractor shall be at liberty, at his own expense, to settle

any dispute or to conduct any litigation, that may arise there from provided that the Contractor shall not be liable to indemnify the Governor of Rajasthan, if the infringement of the patent or design or any alleged patent or design, right is the direct result of an order passed by the Engineer-in-Charge in this behalf.

Clause 24: Imported Store articles to be obtained from Government

The contractor shall obtain from the stores of the Engineer-in-charge, all imported store articles which may be required for the work or any part thereof, or in making up articles required thereof, or in connection therewith, unless he has obtained permission, in writing, from the Engineer-in-charge, to obtain such stores and articles from else-where. The value of such stores and articles, as may be supplied to the Contractor by the Engineer-in-charge, will be debited to the Contractor, in his account, at the rates shown in the schedule attached to the contract, and if they are not entered in the schedule, they will be debited at cost price, which for the purposes of this contract, shall include the cost of carriage and all other expenses, whatsoever, which shall have been incurred in obtaining delivery of the same at the stores aforesaid plus storage charges.

Clause 25: Lump-sums in estimates

When the estimate, on which a tender is made includes lump sums, in respect of parts of the work, the Contractor shall be entitled to payment in respect of the item of work involved, or the part of the work in question at the same rates, as are payable under the contract for such items or if the part of the work in question is not, in the opinion of the Engineer-in-charge, capable of measurement, the Engineer-in-charge may at his discretion pay the lump sum amount entered in the estimate and the certificate in writing of the Engineer-in-charge shall be final and conclusive with regard to any sum or sums payable to him under the provisions of this clause.

Clause 26: Action where no Specification

In case of any Class of work for which there is no such specification as is mentioned in the contract document referred in ITB Clause 4.1, such work shall be carried out in accordance with the detailed specification of the department and also in accordance with the instructions and requirement of the Engineer-in-charge.

Clause 27: Definition of work

The expression “works” or “work” where used in these conditions, shall, unless there be something either in subject or context, repugnant to such construction, be construed and taken to mean the works by or by virtue of the contract contracted to be executed, whether temporary or permanent, and whether original, altered, substituted or additional.

Clause 27A: Definition of Engineer-in-charge

The term “Engineer-in-charge” means the Divisional officer who shall supervise and be in-charge of the work and who shall sign the contract on behalf of the Governor.

Clause 28:

It cannot be guaranteed that the work will be started immediately after the tenders have been received. No claims for increase of rate will be entertained, if the orders for starting work are delayed.

Clause 29: Payments at reduced rates on account of items of work not accepted and not completed to be at the discretion of the Engineer-in-charge

The rates for several items of works, estimated to cost more than Rs. 1,000/-, agreed within, will be valid only when the item concerned is accepted as having been completed fully in accordance with the sanctioned specifications. In cases, where the items of work are not accepted, as so completed, the Engineer-in-charge may make payment on account of such items, at such reduced rates, as he may considers reasonable, in the preparation of final or on account bills, and his decision in the matter shall be final and binding.

Clause 29A: Payments at part rates

The rates for several items of works may be paid at part rates provisionally in running bills in proportion to the quantum of items executed at the discretion of Engineer-in- charge. In case of item rates, if the rate quoted for certain items are very high in comparison to the average/overall tendered premium, then the payment at running stages shall not be made more than the average sanctioned premium. The deferred payment, will however be released after successful completion of the work.

Clause 30: Contractors Percentage:

The percentage referred to in the “Tender for works” will be deducted/ added from/ to the gross amount of the bill before deducting the value of any stock issued.

Clause 31: Contractor to adhere to labour laws/regulation

The Contractor shall adhere to the requirements of the Workmen's Compensation Act and Labour Legislation in force from time to time and be responsible for and shall pay any compensation to his workmen which would be payable for injuries under the Workmen's Compensation Act, here-in-after called the said Act. If such compensation is paid by the State as Principal employer under Sub Section (1) of section 12 of the said Act, on behalf of the Contractor, it shall be recoverable by the State from the Contractor under Sub Section (2) of the said section. Such compensation shall be recovered in the manner laid down in clause 1 of the Conditions of Contract.

Note: All contracts with Government shall require registration of workers under the building & other Construction Workers (Regulation of Employment & Conditions of Services) Act, 1996 and extension of benefit to such workers under the Act. Deduction of cess at source will be made as per provisions of the said Act, in force from time to time.

Clause 32: Withdrawal of work from the Contractor

If the Engineer-in-charge shall at any time and for any reasons, whatever, including inability to maintain prorate progress, think any portion of the work should not be executed or should be withdrawn from the Contractor, he may, by notice in writing to that effect, require the Contractor not to execute the portion of the work specified in the notice, or may withdraw from the Contractor the portion of work, so specified, and the Contractor shall not be entitled to any compensation, by reason of such portion of work having been withdrawn from him. The Engineer-in-charge may supplement the work by engaging another agency to execute such portion of the work at the cost of the original contractor, without prejudice to his rights under clause 2. He shall also be competent to levy compensation for delay in progress. The recovery

of excess cost shall be made from next available running bill or any other claim and shall not be deferred.

Clause 33:

The Contract includes clearance, leveling and dressing of the site within a distance of 15 meters of the building on all sides except where the building adjoins another building.

Clause 34: Protect works

The Contractor shall arrange to protect, at his own cost, in an adequate manner, all cut stone work and other work, requiring protection and to maintain such protection, as long as work is in progress. He shall remove and replace this protection, as required by the Engineer-in-Charge, from time to time. Any damage to the work, so protected, no matter how it may be caused, shall be made good by the Contractor free of cost. All templates, forms, moulds, centering, false works and models, which in the opinion of the Engineer-in-Charge, are necessary for the proper and workman like execution of the work, shall be provided by the Contractor free of cost.

Clause 35: Contractor liable for settlement of claims caused by his delays

If the progress of the work has fallen so much in arrears as to prevent other contractors on the work, from carrying out their part of the work within the stipulated time, he will be liable for the settlement of any claim, put in by any of these contractors for the expenses of keeping their labour unemployed, to the extent considered reasonable by the Engineer-in-Charge.

Clause 36A:

The liability, if any, on account of quarry fees, royalties, Octroi and any other taxes, cess and duties in respect of materials actually consumed on public work, shall be borne by the Contractor.

Clause 36B:

The cost of all water connections, necessary for the execution of work, and the cost of water consumed and hire charges of meters and the cost of electricity consumed in connection with the execution of work, shall be paid by the Contractor, except where otherwise specifically indicated.

Clause 36C: Payment of Sales Tax, and any other Taxes

Royalty or other tax on materials, issued in the process of fulfilling contract, payable to the Government under rules in force, will be paid by the Contractor himself.

Clause 36D:

In respect of goods and materials procured by the Contractor, for use in works under the contract, sales tax will be paid by the Contractor himself. But in respect of all such goods manufactured and supplied by the Contractor and works executed under the contract, the responsibility of payment of sales tax would be that of the Engineer-in-charge.

Clause 37: Refund of Security Deposit

The Security Deposit will be refunded after the expiry of the period, as prescribed below: -

In case of contracts relating to hiring of trucks and other T&P, transportation including loading, unloading of materials, the amount of Security Deposit is refundable along with the final bill.

Supplies of material: As per provisions of G.F.&A.R.

Ordinary repairs: 3 months after completion of the work provided the final bill has been paid.

Original works/special repair works: Security Deposit will be refunded six months after completion, or expiry of one full rainy season, or after expiry of defect liability period as defined in the special condition of agreement, whichever is later provided the final bill has been paid.

In case of PWD original works/special repairs works costing more than Rs. 10.00 Lacs, partial amount of Security Deposit will be refunded during the defect liability period @ 10% of SD amount after lapse of one year of completion and thereafter 10% of original amount of SD at the end of each subsequent year. The remaining amount of SD be refunded after the expiry of Defect Liability period.

Clause 38: Fair Wage Clause

The Contractor shall pay not less than fair wages/minimum wages to labourers engaged by him on the work as revised from time to time by the Government, but the Government shall not be liable to pay anything extra for it except as stipulated in price escalation clause (clause 45) of the agreement.

Explanation: "Fair Wage" means minimum wages for time or piece work, fixed or revised, by the State Government under Minimum Wages Act, 1948.

The Contractor shall, notwithstanding the provisions of any contract to the contrary, cause to be paid fair wages to labourers indirectly engaged on the work, including any labour engaged by his sub-contractors in connection with the said work as if the labourers have been immediately or directly employed by him.

In respect of all labourers immediately or directly employed on the work, for the purpose of the Contractor's part of this agreement, the Contractor shall comply with or cause to be complied with the Public Works Department Contract's Labour Regulations made, or that may be made by the Government, from time to time, in regard to payment of wages, wages period, deductions from wages, recovery of wages not paid, and unauthorized deductions, maintenance of wages register, wage card, publication or scale of wages and other terms of employment, inspection and submission of periodical returns and other matters of a like nature.

The Engineer-in-charge shall have right to deduct from the money due to the Contractor any sum required or estimated to be required for making good the loss suffered by a worker or workers, by reasons of non-fulfillment of the conditions of the contract, for the benefit of the worker or workers, non- payment of wages or of deductions made therefrom, which are not justified by the terms of the contract, or as a result of non-observance of the aforesaid regulations.

Vis-a-Vis the Government of Rajasthan, the Contractor shall be primarily liable for all payments to be made and for the observance of the regulations aforesaid, without prejudice to his right to claim indemnity from his sub- contractors.

The regulations, aforesaid, shall be deemed to be part of this contract and any breach, thereof, shall be deemed to be breach of the Contractor

Clause 39 A	
Requirement of technical representative(s) and recovery rate	

The bidder should propose a panel of expert(s) as under:

- i. Project lead with a recognized degree/ diploma in design from a reputed design institute and at least fifteen (15) years of total professional experience
- ii. At least one expert each having a Degree/ Diploma from a reputed institute in the fields of:
 - (a) Museum/ Exhibit/ Space design;
 - (b) Art & Graphics designing;
 - (c) content Research and Curation.

The bidder should enclose duly attested CVs of the above experts.

Clause 39 B:

The Contractor shall comply with the provisions of the Apprenticeship Act, 1961, and the Rules and Orders issued, thereunder, from time to time. If he fails to do so, his failure will be a breach of contract. The Contractor shall also be liable for any pecuniary liability arising on account of any violation by him of the provisions of the said Act.

Clause 40: Safety code

The Contractor shall follow the safety code (s) of the department and as specified in special conditions of contract. The contractor will take adequate precautions to avoid accidents, occupational illness with least disturbance to the environment, adjoining road users and traffic.

Clause 41: Near Relatives barred from tendering

The Contractor shall not be permitted to tender for works in Circle, in which his near relative is posted as Divisional Accountant or as an officer in any capacity between the grades of the Superintending Engineer and Assistant Engineer (both inclusive). He shall also intimate the names of persons, who are working with him in any capacity, or are subsequently employed by him and who are near relatives to any gazetted officer in the Organization/Department. Any breach of this condition by the Contractor would render him liable to be removed from the approved list of contractors of the Department. If such facts are noticed (a) before sanction of tender, his offer shall be declared invalid and earnest money shall be forfeited, (b) after sanction of the tender then the tender sanctioning authority may at his discretion forfeit his earnest money, security deposit and enlistment deposit and work/remaining work may allot to any registered contractor on the same rates as per rules.

Note: By the term "near relative" is meant wife, husband, parents, and grand-parents, children and grandchildren, brothers and sisters, uncles and cousins and their corresponding in-laws.

Clause 42: Retired Gazetted Officers barred for 2 years

No Engineer of Gazetted rank or other Gazetted officer, employed in Engineering or Administrative duties in an Engineering Department of the Government of Rajasthan, is allowed to work as a Contractor for a period of 2 years of his retirement from Government service without the previous permission of Government of Rajasthan. This contract is liable to be cancelled, if either the Contractor or any of his employee is found, at any time, to be such a person, who had not obtained the permission of Government, as aforesaid, before submission of the tender or engagement in the contractor's service, as the case may be.

Clause 43: Quality Control

The Government shall have right to exercise proper Quality Control measures. The Contractor shall provide all assistance to conduct such tests.

Clause 43 A:

The work (whether fully constructed or not) and all materials, machines, tools and plant, scaffolding, temporary buildings and other things connected therewith, shall be at the risk of the contractor until the work has been delivered to the Engineer-in-charge, and a certificate from him, to the effect, obtained.

Clause 44: Death of Contractor

Without prejudice to any of the rights or remedies under the contract, if the Contractor dies, the legal heirs of the Contractor or the Chief Engineer or duly authorized Engineer shall have the option of terminating the contract without any compensation.

Clause 45: Price Variation Clause: Deleted

No Price variation will be paid in this EPC contract.

Clause 46: Force-Majeure

Neither party shall be liable to each other, for any loss or damage, occasioned by or arising out of acts of God such as unprecedented floods, volcanic eruptions, earthquake or other invasion of nature and other acts.

Clause 47: General Discrepancies and Errors

In case of percentage rate tenders, if there is any typographical or clerical error in the rates shown by Department in the "G" Schedule, the rates as given in the Basic Schedule of Rates of the Department for the area shall be taken as correct.

Clause 48: Post payment Audit

The JDA shall have right to cause an audit and technical examination of the works, and the final bills of the contractor, including all supporting vouchers, abstracts, etc., to be made within 2 years after payment of the final bill, and if, as a result of such audit and technical examination, any sum is found to have been over paid in respect of any work done by the Contractor under the contract, or any work claimed by him to have been done by him under the Contract and found not to have been executed or executed below specifications, the Contractor shall be liable to refund the amount of over payment, and it shall be lawful for Department to recover the same from him in the manner prescribed in Clause 50 or in any other manner legally permissible, and if it is found that the Contractor was paid less than what was due to him under the contract in respect of any work executed by him under it, the amount of such under- payment shall be duly paid by the Government to the Contractor.

Clause 48B: Check Measurements

The department reserves to itself, the right to prescribe a scale of check measurement of work, in general, or specific scale for specific works, or by other special orders (about which the decision of the department shall be final). Checking of measurement by superior officer shall supersede measurements by the subordinate officer, and the former will become the basis of the payment. Any over/excess payments detected, as a result of such check measurement or otherwise at any stage up to the date of completion and the defect removal period specified elsewhere in this contract, shall be recoverable from the Contractor, as any other dues payable to the Government.

Clause 49: Dismantled materials

The Contractor, in course of the work, should understand that all materials e.g. stone, bricks, steel and other materials obtainable in the work by dismantling etc. will be considered as the property of the Government and will be disposed off to the best advantage of the Government, as per directions, of the Engineer-in-charge.

Clause 50: Recovery from Contractors

Whenever any claim against the Contractor for the payment of a sum of money arises out of or under the contract, the Department shall be entitled to recover such sum by appropriating, in part or whole of the Security Deposit, Security Deposit at the time of enlistment of the Contractor. In the event of the security being insufficient, or if no security has been taken, then the balance or the total sum recoverable, as the case may be, shall be deducted from any sum, then due or which at any time, thereafter, may become due to the Contractor, under this or any other contract with the Governor of Rajasthan. Should this sum be not sufficient to cover the full amount recoverable, the Contractor shall pay to the Department on demand the balance remaining dues. The department shall, further, have the right to effect such recoveries under Public Demand Recovery Act.

Clause 51: Jurisdiction of Court

In the event of any dispute arising between the parties hereto, in respect of any of the matters comprised in this agreement, the same shall be settled by a competent Court having jurisdiction over the place, where agreement is executed and by no other court, after completion of proceedings under Clause 23 of this Contract.

Section XI

Scope of Work, Planning, Designing & Safety

Scope of Work, Planning, Designing & Safety

1. SCOPE OF WORK

The scope of work has been elaborated here broadly but this shall be read with details given elsewhere in this document and drawings attached herewith.

Scope of Architectural Work:

1. The successful bidder has to submit at least three conceptual plans for the project before the JDA committee and the committee reserves the right for approval of plan.
2. The qualified bidder has to submit the planning and working drawings of approved plan and finally to be vetted from MNIT or IIT at contractors cost. The structural designs should be prepared using latest software's. The same will need approval by JDA before execution.
3. Preparation of Working drawings and their approval from JDA.
4. The Agency shall prepare CAD drawings and get it approved by JDA & using structural design, integrate all aspects of the project into a BIM model which will be shared & used for construction.
5. Complete internal finishes shall be as per Schedule of finishes and drawings as approved by JDA.

Structural Design & Construction

The Structural design should be prepared using latest version of software used for structural design. Reinforced Cement Concrete Structural Works/ pre stressed concrete structure construction as per the Building.

The scope consists: RCC/Prestressed concrete structural Design, preparation of drawings for the buildings, basements for all required elements of building as per scope of work and Architectural Drawings as approved by JDA. The detailed structural design and RCC shall be designed for use of steel form work system.

The Agency shall give the presentations and at least three conceptual drawings to JDA after award of work on the design-schemes to be adopted before taking up the actual design work. A kick off meeting shall be organized by Agency for the same.

The procuring entity requirements (section IV) is the part of the tender document. Based on this section, the detail design and drawings shall be prepared by the Agency.

Design calculations along with drawings shall be submitted by Agency for due vetting by the Design Consultant approved by JDA. The Agency shall get the design proof checked/vetted by IIT or MNIT.

The fees/charges of proof checking/vetting of design etc. is to be borne by Agency.

The Agency has the obligation to make as many changes/modification(s) as required in

Architectural drawings on instruction of JDA/Local Statutory Authorities.

The Agency shall provide the structural stability certificate to JDA. However, the checking and vetting of design/drawings shall not absolve the Agency from the responsibilities of any failure in the structural design and RCC design during construction as well as during the specified life period of the structures.

The Agency shall submit all the submittals like designs, drawings, documents, reports, schedules etc. in minimum six number of hard and six number of soft (CD/DVD) copies. The Agency shall also submit minimum six number of hard and six number of soft copies of drawings and designs, after vetting of designs, for issue of good for construction (GFC) drawings.

It shall be the responsibility of bidder to carry out the Geo-Technical investigation at his own cost as per relevant IS Code.

Agency shall get topographic survey done for their use in planning and designing of the campus. The Agency shall collect data/information, which may be needed for completing the job.

Design and Drawings prepared by the Agency shall be the property of JDA and Agency cannot issue the same to any other person/organization or use for any other project.

JDA will not be responsible for any lapse/s and /or losses, if so occurs, due to absence of any data/knowledge. The information and site data given in the drawings or mentioned in this tender document are furnished for general information and guidance only and JDA does not take responsibility for their accuracy. It is advised that the Agency get itself satisfied for all possible contingencies, situations, bottlenecks and acts of co-ordination, which may be required between the different agencies and due to site conditions. It shall be deemed that agency has satisfied itself as to the nature and location of work, general and local condition and particularly, those pertaining to transport, handling, availability and storage of materials, availability of labour /workforce, weather conditions at site, general grounds/ sub-soil conditions and all other conditions required to execute and complete the work. The agency shall have to quote its offer/rates accordingly and no claim in this regard will be allowed.

Bearing Capacity

It shall be the responsibility of bidder to carry out the Geo-Technical investigation at his own cost as per relevant IS code and based on the geotechnical reports, allowable safe bearing capacity is to be considered for structural design.

Scope of Works

Plumbing & Sanitary

Scope of work consists of: Detailed Designing/preparation of Shop drawings and its approval (reference of DBR shall be taken); Supply, fabrication, Construction, Installation and Commissioning and obtaining Approval and Connection from PHED/Nagar Nigam

/JVVNL/Traffic police/etc. Jaipur

The Plumbing/Sanitary Design & Schematic/Line drawings are part of Scope of work. Detailed fabrication/execution drawings & shop drawings, as required at site are to be prepared by the Agency and got approved from JDA before proceeding with the work.

The preparation of Sanitary/Plumbing fabrication, & shop drawings expressly (but not limited to) includes:

- i. Integration of detailed & shop drawings with Civil/Structural details prepared by Agency for each building and obtaining approval of JDA.
- ii. Preparation of fabrication & shop drawings on a software like AutoCAD etc. of each and every part of building having a sanitary/plumbing aspect within Scope of work on suitable scale.

The Execution of Plumbing/Sanitary work for buildings /spaces as per Scope of the work read with Technical Specifications and Drawings. The Sleeves, cutout, Drainage arrangement, embedment, concealed piping, hot & cold-water arrangement, overhead tanks, water recycling system etc. and connecting the service to the main line of PHED/ Nagar Nigam Jaipur are expressly included (but not limited to) in the scope of work.

The toilets in all floors to be completely fitted & finished with all plumbing & sanitary fixtures and fitting, completely ready for use.

The Agency shall provide exposed gas pipelines to the location as indicated on drawings making it fully functional and connected to the gas bank.

External Water Supply & Sewerage, Storm Water Drainage System, Drainage System, Rain Water harvesting pits.

The scope of work of the Agency shall consist of:-

Detailed Designing/preparation of all drawings (integration of above systems with shop drawings) and its approval; Supply, fabrication, Construction, Installation and Commissioning and Obtaining Approval from JDA/Local Body.

The External Water Supply & Sewerage, Storm Water Drainage System, Drainage System, Rain Water Harvesting pits, Design & Schematic/Line drawings is part of the scope of work.

However, detailed fabrication/execution drawings & shop drawings, as required at site are to be prepared by the Contractor and shall be got approved from JDA before execution of the work. External Water Supply & Sewerage Work for this area shall be executed by the Agency.

The execution of work for above scope of the work read with Technical Specifications and Drawings and connecting the services from first manhole to the main line of the Agency like PHED/ Nagar Nigam Jaipur including approval from the PHED/ Nagar Nigam Jaipur.

Design, installation, testing, commissioning and handing over of the above services with all services in running condition is included in Contractor's scope of work.

Site Development & Landscape

The scope of work of the Agency shall include:

Construction of Internal Roads, Berms, Pathways, lighting, Kerbs, open parking space, entry gate, compound wall etc. including connecting with the external road network as per approved drawing and Technical Specification.

Hard and Soft Landscape in open land area including all horticulture operation, earth filling, grassing, tree plantation etc. as per Drawing and Technical Specification. Hard landscape shall be done to achieve a high quality urban environment with permanent maintenance friendly features using granite in variety of anti-skid finishes.

Work to include built in planters & seating, large tree planters in stone, bush / ground covers in planters, street furniture in monolithic stone benches.

Street furniture to include litterbins, bollards, Fire tender path markers etc. will be developed, approved & installed. Fire tender path to be maintained & marked around all blocks as per Fire norms.

Ramp entrances & exits and all cut-outs / shafts to have MS Trellis with Multiwall polycarbonate canopies as per detailed design so as to shelter the entrances.

Detailed Design for works such as Stainless-Steel works / Art work etc.

Sewage Treatment Plant (STP)

Sewage Treatment Plant shall be based on MBBR (Moving Bed Bio Film Reactor) Technology. STP shall be provided underground which will be used to collect, hold, recycle & redistribute

Water. The waste will be collected from sewerage network. The distribution will be done to horticulture & to dual plumbing network in toilets for flushing & to the proposed construction sites.

The scope consists: Detail design/preparation of drawings based on DBR, Detailed Designing/preparation of Shop drawings and its approval, Supply, Fabrication, Construction, Installation and Commissioning and obtaining statutory approval from NNJ/ PHED/ JDA for Commissioning.

Solid Waste Management

The agency shall propose a system for solid waste management including segregation of wet and dry waste. Agency shall execute the system after due approval of JDA which includes installation of collection chambers for garbage, colour coded dustbins for waste collection and segregation. Agency shall also provide trolleys (mechanical) of adequate sizes for collection of waste and disposal of the same at dedicated place. The agency shall also provide convertor for producing compost manure from available wet waste as per direction of MoEF while according environmental clearance.

WATER CONNECTION

The scope of work consists of detailing and calculating water demand for the project. Agency shall obtain water connection of suitable from service provider i.e. PHED Jaipur. The agency shall execute all necessary piping etc. to bring the water supply to the collecting tank to be constructed by the agency as a scope of work. Alternate arrangement to maintain water supply by providing tube well shall also be done by agency with due approvals.

Diversion of Services

All works pertaining to services including rerouting/diversion of services, routine testing, installation etc., embracing in one or more than one process shall be subject to examination and approval to each stage thereof by the JDA or concerned department as would be notified by the JDA or accredited representative when such stage is ready. In

default of such notice, the JDA shall be entitled to appraise the quantity and extent thereof and the decision of JDA or his accredited representative in this regard shall be final and binding.

The Agency will not have any claim in case of any delay in removal of trees or shifting, raising, removing of telephone or electric lines (overhead or underground), water and sewer lines and other structures etc., if any, which may come in the way of the work.

Water Supply and Electricity

The Agency shall carry out construction activities while maintaining and permitting the access & use of all amenities, services.

Arrangement of water for drinking purpose in addition to the water required for construction work is also to be made by the Agency at his own cost. The Agency shall also make his own arrangement for obtaining electric connection (s) and make necessary payment directly to the department concerned.

JDA will however make all reasonable recommendations to the authority concerned in this regard.

The Agency shall make his own arrangement of water for completion of work and nothing will be paid on this account. The Agency shall get the water tested with regard to its suitability and conforming to the relevant IS Code. The Agency shall obtain written approval from the JDA before he proceeds by using the same for execution of work. The Agency shall arrange recycled water for construction purpose from STPs of nearby areas/colonies at his own cost. In case the above supply is short of total requirement of water for construction purpose, then the Agency shall arrange suitable water at his own cost.

Scope of planning work

Architectural Planning and design

Preparation of detailed drawings for the entire work following unified bylaws Rajasthan 2017 (or latest applicable bylaws at the time of design finalization)/ National Building code 2016 and as per Specifications/Conceptual drawings given in this document.

Preparation of interior design and Room Wise Equipment/furniture layout / furnishing plans. Equipment layout drawings to be at 1:100 scale or any other suitable scale as per prior approval of the JDA.

Any other designing and detailing required for comprehensive planning and designing of the proposed project.

Structural planning and design:

Framing and preparation of structural system.

Building/structure wise structural analysis and design using latest Software which shall be made available to JDA.

Preparation of building/structure wise preliminary structural drawings.

Preparation of building/structure wise detailed structural Good for Construction drawings and getting them vetted from MNIT or IIT.

3D Model minimum size 6'X 4', and walk through of the project also to be provided by contractor.

The structural design shall be carried out in terms of latest editions and up-to-date correction/amendment/errata of BIS Codes (Bureau of Indian Standards), other relevant seismic/other codes for making Building Earthquake Resistant, sound engineering practices and as desired by the Employer. The Consultant will assist the agency in proof checking of structural drawings with Reputed Engineering Institutes like a) IITs b) MNIT as appointed by the JDA for proof checking of structural drawings / proposals. The fee for proof checking shall be borne by the agency. The consultant will provide relevant drawings and documental support with such Institute approved by JDA as and when required and as per the direction of JDA.

Submission of all design calculations in hard and soft copies as per the direction of JDA. Any other designing and detailing required for comprehensive planning and designing of the proposed building.

Minimum six sets of all Drawings shall be submitted in hard copies free of cost. However, in case additional sets of drawings in hard copy are essentially required, the same shall also be provided free of cost and nothing extra shall be payable.

Services and Miscellaneous work

Schematic planning and designing of Internal Electrification, Automatic Fire Alarm System, wet risers, fire-fighting system, Sprinklers, Fire sensing Fire egress pathways, security system, CCTV, access control system, UPS, TV, Point wiring, Dish antenna, call bell system, Lifts, Electric Sub Station building with all equipment's and DG Sets and load factor/DG Set specifications, external lighting, car parking, solar power generation over building and any other essential services as per requirement of the JDA and also required for satisfactory completion of project.

Interior and Furnishing work

Schematic planning and designing of complete interior and furnishing work of all component of building complete with specification as per requirement of JDA and also required to make complete Hospital Building functional.

Tree Cutting Permission

All necessary approvals required for tree cutting, shall be taken by the Agency. The compensation fee, cost of compensatory plantation or any others such fee payable to Government Body shall be borne by agency. However, the efforts shall be made to Transplant maximum trees on the site in consultation with Forest Department. The cost of transplantations shall be borne by the agency.

Adherence to Approved plans

The agency shall adhere to the building plan which has been approved by various Authorities and plan accordingly.

JDA Site Office

The Agency shall construct site office (semi-permanent structure) for JDA officers and staff, which should be equipped with all necessary equipment's required for functioning the office. The area of this office should not be less than 100 Sqm with pantry, conference room, toilets and other requisite facilities. A proposal of site office shall be submitted by the agency 15 days after award of work and the same should be constructed and made functional within 45 days after approval of JDA.

The Agency shall provide necessary Air Conditioners, lighting and fixtures i/c fan, RO etc. Two office attendants and four data entry operators shall also be provided by the agency during the whole agreement period. AMC charges, Electricity bill, water supply bills, RO/drinking water bills etc. shall be borne by the agency. The agency shall provide the following furniture (new) for use of JDA staff at site office.

S.No.	Articles	Quantity
1.	Executive table (wooden) with side racks	3 Nos.
2.	Executive Chair	3 Nos.
3.	Office Tables	5 Nos.
4.	Office Chairs	5 Nos.
5.	Steel Almirah	4 Nos.
6.	Conference table (for 30 seats)	1 Nos.
7.	Conference chairs	12 Nos.
8.	Digital display arrangement & sound system	1 set
9.	Four wheeler for staff	1 Nos.

2. SAFETY, HEALTH AND ENVIRONMENT (SHE) Protection of Environment

The Agency shall take all reasonable steps to protect the environment on and off the Site and to avoid damage or nuisance to persons or to property of the public or other resulting from pollution, noise or other causes arising as a consequence of his methods of operation. The Agency shall be required to follow all the rules/norms of National Green Tribunal applicable to this work.

During continuance of the contract, the Agency and his sub-agencies shall at all times, abide by all existing enactments on environmental protection and rules made thereunder, regulations, notifications and bye-laws of the State or Central Government, or local authorities and any other law, by-law, regulations that may be passed or notification that may be issued in this respect in future by the State or Central Government or the local authority. However, Salient features of some of the major laws that are applicable are given below:

Water Pollution is to be prevented as per **The Water (prevention and Control of Pollution) Act, 1974** which provides for the prevention and control of water pollution and the maintaining and restoring of wholesomeness of water. 'Pollution' means such contamination of water or such alteration of the physical, chemical or biological properties of water or such discharge of any sewage or trade effluent or of any other liquid, gaseous or solid substance into water (whether directly or indirectly) as may, or is likely to, create a nuisance or render such water harmful or injurious to public health or safety, or to domestic, commercial, industrial, agricultural or other legitimate uses, or to the life and health of animals or plants or of aquatic organisms.

Air Pollution is to be prevented as per **The Air (prevention and Control of Pollution) Act, 1981** which provides for prevention, control and abatement of air pollution. 'Air Pollution' means the presence in the atmosphere of any air pollutant, which means any solid, liquid or gaseous substance (including noise) present in the atmosphere in such concentration as may be or tend to be injurious to human beings or other living creatures or plants or property or environment.

Environment is to be protected as per **The Environment (Protection) Act, 1986** which provides for the protection and improvement of environment and for matters connected therewith, and the prevention of hazards to human

beings, other living creatures, plants and property. Environment includes water, air and land and the inter-relationship which exists among and between water, air and land, and human being, other living creatures, plants, micro-organisms and property.

The public Liability Insurance Act, 1991: This provides for public liability insurance for the purpose of providing immediate relief to the persons affected by accident occurring while handling hazardous substances and for matters connected herewith or incidental thereto. Hazardous substance means any substance or preparation which is defined as a hazardous substance under the Environment (Protection) Act 1986, and exceeds such quantity as may be specified by notification by the Central Government.

Conditions of National Green Tribunal

The agency shall not store/dump construction material or debris on the metaled road.

The agency shall get prior approval from JDA/NNJ/Traffic department for the area where the construction material or debris can be stored beyond the metaled road. This area shall not cause any obstruction to the free flow of traffic /inconvenience to the pedestrians/public in general. It should be ensured by the agency that no accidents occur because of such permissible storage.

The agency shall take appropriate protection measures like raising wind breakers of appropriate height on all sides of the plot/area to ensure that no construction material dust fly outside the plot area.

The agency shall ensure that all the trucks or vehicles of any kind which are used for construction purposes or are carrying construction material like cement, sand, earth and other allied material are fully covered. The agency shall take every necessary precaution that the vehicles are properly cleaned and dust free to ensure that en route their destination, the dust, sand or any other particles are not released in air/contaminate air.

The agency shall provide mask to every worker on the construction site and involved in loading, unloading and carriage of construction material and construction debris to prevent inhalation of dust particles.

The agency shall compulsorily use wet jetting grinding and stone cutting.

The agency shall comply with all the preventive and protective environmental steps as stated in the MoEF guidelines, 2010.

The agency shall carry out on-Road-Inspection for black smoke generating machinery. The agency shall use cleaner fuel.

The agency shall ensure that all DG sets comply with emission norms notified by MoEF.

The agency shall use vehicles having pollution under control certificate. The emissions can be reduced by a large extent by reducing the speed of a vehicle to 20 Kmph. Speed bumps shall be used to ensure speed reduction. In case where speed reductions cannot effectively reduce fugitive dust, the agency shall divert traffic to nearby paved areas.

The agency shall ensure that the construction material is covered by tarpaulin. The agency shall take all other precaution to ensure that no dust particles are permitted to pollute air quality because of such storage.

The paving of the path for plying of vehicles carrying construction material is more permanent solution to dust control and suitable for longer duration projects.

As per EIA Notification of 2006, sufficient green belt around the buildings shall be provided. Such green belts shall be in existence prior to applying for handing it over.

Any violation of orders of MoEF including guidelines of State Government, SPCB or any officer of any department shall lead to stoppage of work for which Agency shall be responsible and no hindrance shall be accounted in this regard.

Prevention of Nuisance and Pollution

The Agency shall take all necessary precautions to prevent any nuisance or inconvenience to the owners, tenants or occupiers of adjacent properties and to the public in general and to prevent any damage to such properties and any pollution. He shall make good at his own cost and to the satisfaction of the JDA, any damage to roads, paths, drainage works or public or private property whatsoever caused by the execution of the work or by traffic brought thereon by the Agency. All waste or superfluous materials shall be cleaned away by the Agency without any reservations entirely to the satisfaction of the JDA at no extra cost.

The site shall be kept clean of all debris, rubbish and dirt & surplus/waste material all the time. It also includes maintenance, cleaning & de-silting the pipe lines laid by the agency for all internal services etc. executed by the agency to the entire satisfaction of the JDA during the maintenance periods. Cleaning and de-silting will also be done by the agency before handing over the completed structures to JDA. All machines, equipment and labour for this purpose will be arranged by Agency at no extra cost to JDA.

Security of the Site

The Agency shall be wholly responsible for security of site and works. The Agency shall be responsible for keeping unauthorized persons off the Site; and Authorized persons shall be limited to the Employees of the Agency, Sub Agency or persons authorized by the JDA.

Lighting: The contractor shall provide sufficient lighting at project site, of the right type and at the right place / location for it to be properly effective. Lighting ought not to introduce the risk of electric shock. Therefore, 230V supplies should be used for those fittings, which are robustly installed, and well out of reach e.g. flood lighting or high-pressure discharge lamps. The contractor shall ensure that luminaries should always be so placed that no person is required to work in their own shadow and that the local light for one person is not a source of glare for the others. Strongly made clamps should be available for attaching luminaries to poles and other convenient supports.

Luminaries shall be robust, resistant to corrosion and rain proof especially at the point of the cable entry. The correct type of lamp for each luminary should be used and when lamps need to be replaced, it shall be in accordance with the supply voltage. Lamp holders not fitted with a lamp should be capped off. The contractor shall take every effort to illuminate the work site as per the direction of JDA.

Traffic Management:

The basic objective of the following guidelines is to lay down procedures to be adopted by contractor to ensure the safe and efficient movement of traffic and also to ensure the safety of workmen at construction sites.

All construction workers should be provided with high visibility jackets with reflective tapes as most of construction activities shall be done within right-of-way of the roads. The conspicuous of workmen at all times shall be increased so as to protect them from speeding vehicular traffic.

The Agency shall provide safety helmet, safety shoe and high visibility clothing for all employee including workmen, traffic marshal and other employees who are engaged for any work under this contract as per the following requirement:

All employees of the Agency including workmen	Traffic marshals
i) Hard hat with company Logo ii) Safety boots iii) Hi-visibility waistcoat covering upper body and meeting the following requirements as per BS EN 471:1994: i) Background in fluorescent orange-red in colour. ii) Two vertical green strips of 5cm wide on front side covering the torso at least 5cm. iii) Two diagonal strips of 5cm wide on back in an 'X' pattern covering at least 5cm iv) Horizontal strips not less than 5cm wide running around the bottom of the vertical strip in front and 'X' pattern at back. v) The bottom strip shall be at a distance of 5cm from the bottom of the vest.	i) Hard hat with company Logo ii) Safety boots iii) Hi-visibility jacket upper body and meeting the following requirements as per BS EN 471:1994: i) Background in fluorescent orange-red in colour ii) Jackets with full-length sleeves with two bands of retro reflective material, which shall be placed at the same height on the garment or those of the torso. The upper band shall encircle the upper part of the sleeves between the elbow and the shoulder; the bottom of the lower band shall not be less than 5cm from the bottom of the sleeve. iii) Two vertical green strips of 5cm wide on front side covering the torso at least 500cm iv) Two diagonal strips of 5cm wide on front side covering the torso at least 500cm
vi) Strips must be retro reflective and fluorescent vii) Waistcoat shall have a side adjustable fit and a side and front tear away feature on vests made of nylon.	v) Horizontal straight not less than 5cm wide running around the bottom of the vertical strip in front and 'X' pattern at back. vi) The bottom strip shall be at a distance of 5cm from the bottom of the vest. vii) Strips must be retro reflective and fluorescent

Wherever operations undertaken are likely to interface with public traffic, specific traffic management plans shall be drawn up and implemented by the agency in consultation with the prior approval of local police authorities, and /or the concerned metropolitan/civil authorities as the case may be.

Such traffic management plans shall include provision for traffic diversion and selection of alternative routes. If necessary, the agency shall carry out road widening

before commencement of work to accommodate the extra load. The agency shall be responsible for getting the Traffic Management Plan approved from Traffic Police before taking up any construction activity on the road.

The guiding principles to be adopted for safety in construction zone are to Warn the road user clearly and sufficiently in advance, provide safe and clearly marked lanes for guiding road users and marked buffer and work zones. The agency shall provide adequate measures that control driver behavior through construction zones.

The primary traffic control devices used in work zones shall include signs, delineators, Barricades, cones, pylons, pavement markings and flashing lights, deployment of sufficient number of Marshalls on diversion roads.

Regulatory signs impose legal restriction on all traffic and they are to be used only after consulting the local police and traffic authorities.

- i. Warning signs in the traffic control zone shall be utilized to warn the drivers of specific hazards that may be encountered.
- ii. The contractor shall place detour signage at strategic locations and install warning signs. In order to minimize disruption of access to residences and business, the contractor shall maintain at least one entrance to a property where multiple entrances exist.
- iii. A warning sign shall be installed on all secondary roads which merges with the primary road where the construction work is in progress at sufficient distance before it merges with the primary road so as to alert the road users regarding the
-Construction Work in Progress.
- iv. Materials hanging over/ protruded from the chassis / body of any vehicle especially during material handling shall be indicated by red indicator (red light/flag) to indicate the caution to the road users.

The required number of traffic guards/marshals as decided by local Traffic Police

/JDA shall be provided during construction period so as to ensure safe movement of traffic without any extra cost to JDA. In case of default, the traffic guards/ marshals shall be provided by agency and cost of same shall be borne by the Agency in addition to recovery for violation of tender provisions. No claim whatsoever shall be entertained on this account

Incidental Works Such as Bailing-Out Water, Shoring etc.

For execution of any items of work where incidental works such as bailing out water, shoring etc. are actually required but not specifically stated in the scope of item and/or tender document, it is to be understood that the contract amount quoted by the agency shall cover such charges also and nothing extra on account of such incidental charges, if any, shall be paid.

Various Ancillary Provisions at Site

Traffic cones of 500mm, 750mm and 1000mm height and 300mm to 500mm in diameter or in square shape at base and are often made of plastic or rubber and normally having retro-reflective red and white band shall be used wherever required.

Drums about 800mm to 1000mm high and 300mm in diameter can be used either as channelizing or warning devices. These are highly visible, give the appearance of being formidable objects and therefore command the respect of drivers.

The barricading as approved by JDA (or as directed by NGT from time to time) all along the periphery of the project site shall be constructed by the Agency with G.I./Galvalume profiled sheet with structural steel framework, as per design & drawings, for full length of the periphery and around construction area. The barricading shall be aesthetically maintained by regular cleaning and painting by the Agency as directed by the JDA, cost of which is deemed to be included in the rate quoted by the Agency. The structural dimension of the barricade, material and composition, its colour scheme, JDA logo and other details shall be in accordance with the direction of JDA, for which nothing extra will be paid to the Agency.

The barricading shall be provided continuously during the execution of the entire work till completion and shall not be removed at any stage without prior approval of the JDA. All barricades shall be conspicuously visible in the dark/night time by the road users so that no vehicle hits the barricade. Conspicuous shall be ensured by affixing retro reflective stripes of required size and shape at appropriate angle at the bottom and middle portion of the barricade at suitable gap. In addition, minimum one red light or red-light blinkers should be placed at the top of each barricade. The barricading shall include the following without any extra cost:

Traffic signals during construction at site for day and night, reflective signs, direction boards, marking, glow lamps, marking, caution tape, traffic signage as per requirement, flags, Traffic Marshals etc. as directed by the JDA. However, traffic police signals shall not be the responsibility of the Agency.

Cleaning of barricading every fifteen days with water and detergent so as to ensure that there is no dirt or splashes on the barricading. The dust accumulated along the barricades on the carriageway shall be removed every week.

Installation of temporary warning signs/lamps on all barricades during the hours of darkness and kept lit there at all times during these hours.

Shifting and re-fixing in position as per the direction of JDA and all incidentalsto execute the job as many times as directed by JDA.

Repainting of the barricading after regular interval as directed by JDA and Proper maintenance of the barricading till completion of the work by repairing/replacing the damaged barricade. They shall be maintained in one line and level.

Barricading is also required to be erected by the Agency at his own cost for segregating the area of work and deep excavation from the movement of man and machinery.

Fixing of Lit and Non-lit boards on the barricades of various sizes and design as per the direction of JDA and kept the boards lit at all times during hours of darkness.

The Agency shall ensure the cleanliness of roads and footpaths by deploying proper manpower for the same. The Agency shall have to ensure proper brooming, washing of roads and footpaths, at all the time, throughout the entire stretch till the currency of the contract including disposal of sweeping without any extra cost.

Existing Services & Storage/Labour Camps within Site.

a) Land for Storage/Labour Camps/RMC

Agency shall manage all activities within the land portion, JDA is not obliged to make any other land available for Batch Mix Plant, Store, Preserving Top Soil etc.

Agency's care of the Works

The Agency shall bear full risk in and take full responsibility for the care of the Works and Materials, goods and equipment for incorporation therein from the Commencement Date until the Completion Certificate is issued, except and to the extent that any loss or damage to the same shall arise out of any default or neglect of the Employer.

The Agency shall throughout the execution of the Works including the carrying out of any testing, commissioning (including Integrated Testing and Commissioning), or remedying of any defect;

Take full responsibility for the adequacy, stability, safety and security of the Works, Plant, Goods, Agency's Equipment, Temporary Works, operations on Site and methods of manufacture, installation, construction and transportation;

Have full regard for the safety of all persons on or in the vicinity of the Site (including without limitation persons to whom access to the Site has been allowed by the Agency), comply with all relevant safety regulations, including provision of safety gear, and in so far as the Agency is in occupation or otherwise is using areas of the Site, keep the Site and the Works (so far as the same are not completed and occupied by the Employer) in an orderly state appropriate to the avoidance of injury to all persons and shall keep the Employer indemnified against all injuries to such persons.

Provide and maintain all lights, guards, fences and warning signs and watchmen when and where necessary or required by the JDA or by laws for the protection of the Works and for the safety and convenience of the public and all persons on or in the vicinity of the Site; and

Where any work would otherwise be carried out in darkness, ensure that all parts of the Site where work is being carried out are so lighted as to ensure the safety of all persons on or in the vicinity of the Site and of such work.

Agency is required to take note of all the necessary provisions in Employer's Safety, Health and Environment Manual (SHE Manual) and the Agency's price shall be inclusive of all the necessary costs to meet the prescribed safety standards. In the case, the Agency fails in the above, the Employer may provide the necessary arrangements and recover the costs from the Agency.

Housekeeping

Housekeeping is the act of keeping the working environment cleared of all unnecessary waste, thereby providing a first-line of defense against accidents and injuries. General House-keeping shall be carried out by the Agency and ensured at all times at Work Site, Construction Depot, Fabrication Yard, Workshop, Batching Plant, Labour Camp, Stores, Offices and toilets/urinals etc. The Agency shall be responsible to provide segregated containers for disposal of debris at required places and regular cleaning of the same.

All stairways, passageways and gangways shall be maintained without any blockages or obstructions. All emergency exits, passageways, exits, fire doors, break-glass alarm points, fire-fighting equipment, first aid stations, and other emergency stations shall be kept clean, un-obstructed and in good working order.

All surplus earth and debris shall be removed/ disposed-off from the working area immediately. Trucks carrying sand, earth and any pulverized materials etc. shall be covered while moving in order to avoid dust or odour impact. The tyres of the trucks leaving the site shall be cleaned with water, wherever the possibility of spillage on carriageways meant for regular road traffic exists.

No parking of trucks/trolleys, cranes and trailers etc. shall be allowed on roads, which may obstruct the traffic movement.

Roads shall be kept clear and materials like: pipes, steel, sand boulders, concrete, chips and brick etc., shall not be allowed on the road to obstruct free movement of road traffic.

Water logging or bentonite spillage on roads shall not be allowed.

Proper and safe stacking of material are of paramount importance at fabrication stores, stores and such locations where material would be unloaded for future use. The storage area shall be well laid out with easy access and material stored/stacked in an orderly and safe manner.

Flammable chemicals, compressed gas cylinders etc. shall be safely stored. Unused/surplus cables, steel items and steel scrap lying scattered at different places within the working areas shall be removed to marked locations(s). All wooden scrap, empty wooden cable drums and other combustible packing materials, shall be removed from the site. Lumber with protruding nails shall be either bent/removed and properly stacked.

The compliance of above provisions are deemed to be included in the quoted amount of the Agency and no claim/payment whatsoever shall be entertained on this account.

Safety

Minimum one Safety Officer/ Manager is required to be at site at all times.

Qualifications of Safety Coordinator/Managers should not be less than those prescribed in local regulation in building and other construction workers (regulation of employment & conditions of service) central Rules, 1998.

Agency shall arrange for initial Site orientation / induction of all Workmen / Supervising personnel on Safety practices' before beginning of work at site. This shall include a briefing about project, safety policy, site safety rules and site facilities.

Agency shall conduct a daily toolbox talk for all workers previous to starting to work.

These tool box talks should include topics related to ongoing work activities and precautions to be taken on daily activities.

Agency shall ensure participation of his site in-charge and the safety coordinator in the safety meetings arranged at intervals decided by the JDA.

Agency shall also submit a Health & Safety report on monthly basis or as directed to JDA.

Agency's Safety Engineer/Safety Officers shall:

Assist the Agency's Construction Manager and coordinate with consultant's Safety Supervisor for the implementation of the HSE program within corresponding work groups.

Get familiarized with all government, and Owner's safety and health regulations, including reports and work permits procedures.

Inspect the construction area on a regular basis in order to verify appropriate corrective actions and prepare reports to their Construction Manager.

Review the SAP (Safety Action Plan) prepared by line supervisor.

Co-ordinate with supervisors and foremen periodic safety meetings and lead daily safety meetings.

Conduct safety training classes for all workers. Participate in Tool Box Talks.

Suggest safety promotional activities.

Information to Be Provided By Agency

- i) Health, Safety and Environment policy
- ii) A detailed Health, Safety and Environment plan.
- iii) Names of the Safety personnel.
- iv) Employers' liability insurance policy.
- v) Work method statements for critical operations such as lifting etc.
- vi) Test Certificates for lifting gear, lifting equipment and accessories.
- vii) Information related to hazardous materials used and corresponding MSDS (Materials Safety Data Sheets).
- viii) Daily labour returns
- ix) Copies of all Statutory Records.
- x) Copies of the Agency Safety's reports
- xi) Supervisor's report of his findings on-site inspections.
- xii) Covid-19 policy.

Initial site orientation/induction

The number of orientation sessions presented each week will vary to the greatest extent possible in order to accommodate the Agency's needs to bring labour on site.

The following topics shall be included during such presentations, which will change during the course of the project to meet changing site requirements:

- i) Introduction to the site and project, with a brief overview of the project under construction.
- ii) Owner and consultant's HSE policy and safety philosophy.

- iii) PersonalProtectiveEquipment(hardhats,safetyglasses, safetysteel-toedboots)
- iv) Housekeeping
- v) Workinginandaroundexcavations
- vi) Working at height(ladders,scaffolds,freeedgesandopenings)
- vii) TheSafetyActionPlan(SPA)
- viii) First aidfacilities,Accidentreportingsystem
- ix) Emergencyprocedure
- x) Smokingrestrictions,prohibitionofalcoholanddrugs.
- xi) The Agency will conduct a site visit for his new employees in groups of less than 25so that they get acquainted with essential services, their workplace, and generalsite layout.
- xii) Gatepasswillbeissuedonlyafter completionofthesiteorientation/induction.

Personal ProtectiveEquipments(PPEs)

The Agency shall provide required PPEs to workmen to protect against safety and/orhealthhazards. PrimarilyPPEsarerequired forthefollowingprotection.

- i) HeadProtection(Safetyhelmets)
- ii) FootProtection(Safetyfootwear,Gumbootetc.)
- iii) BodyProtection(Highvisibilityclothing(waistcoat/jacket,Apronetc.)
- iv) Personalfall protection (Fullbodyharness,Rope-grapfallarrest器等.)
- v) Eyeprotection(Goggles,Weldersglasses etc)
- vi) Handprotection(Gloves,fingercoatsetc.)
- vii) RespiratoryProtection(Nosemask,SCBAsetc.)
- viii) Hearingprotection(Earplugs,Earmuffs etc)

The PPEs and safety appliances provided by the Agency shall be of the standardas prescribedbyBureauofIndianStandards(BIS).IfmaterialsconformingtoBISstandards are not available, the Agency shall procure PPE and safety appliances, asapprovedbythe JDA.

Safety Helmet ColourCode	Person touse
White	JDA/JDAstaff
Grey	Alldesigners,Architect,Consultantsetc.
Violet	MainAgencies(Engineers/Supervisors)
Blue	AllSub-Agencies(Engineers/Supervisors)
Red	Electricians(bothAgencyandsub-Agency)
Green	SafetyProfessionals(BothAgencyandsubAgencies)
Orange	SecurityGuards/TrafficMarshals
Yellow	Allworkmen
White(with -Visitorll sticker)	Visitors

***(EveryHelmet shouldhavetheLOGOaffixed/painted).**

All construction workers should be provided with high visibility jackets with reflective tapes confirming to the requirement specified under BS EN 471:1994. The conspicuous of workmen at all times shall be increased so as to protect them from speeding vehicular traffic.

In addition to the above, any other PPE required for any specific jobs like, welding and cutting, working at height, tunneling etc. shall also be provided to all workmen and also ensure that all workmen use the PPE properly while on the job. The Agency shall not pay any cash amount in lieu of PPE to the workers/sub-Agencies and expect them to buy and use during work.

The Agency shall at all-time maintain a minimum of 10% spare PPEs and safety appliances and properly record and show to the JDA during the inspections. It is always the duty of the Agency to provide required PPEs for all visitors & JDA staff. Towards this required quantity of PPEs shall be kept always at the security post.

Notwithstanding the above, the Agency shall at their expense arrange for the safety provision as per all relevant Indian Standard Safety Codes & local bye-laws. The Agency shall provide all facilities in connection therewith and shall also issue the identity card to his labourer.

Sanitation and Hygiene Measures

In order to provide adequate sanitary conditions for all personnel at site, the following provisions as a part of the temporary facilities to be provided by the Agency:

- i) Provision for an adequate supply of potable water
- ii) Provision for toilets and hand wash basins
- iii) Garbage disposal and regular collection
- iv) Proper drainage and sewer disposal
- v) Other special hygienic operations viz. Fumigation, pest controls etc.
- vi) Worker's Rest Space:
- vii) Smoking hut
- viii) Sunshade and/or site canteen

Smoking on site is not allowed, « No smoking » signs shall be displayed at prominent location including stores/storage places.

Work at heights

During construction of buildings/towers safety net (horizontal and vertical) shall be used by Agency to check/control falling of any object. The Agency/vendor shall also take the other safety measures used during construction, for e.g. Personal Protective Equipments (PPEs), safety during working at heights etc.

The Agency shall provide proper scaffolding and working platforms with handrails to work at higher elevations and Tools and loose material should not be left on the scaffolding from where they are likely to fall. Persons should use safety belts while working near open edge where it is not possible to provide handrails.

Things should not be thrown from heights and should be brought down or taken up with the help of ropes. While work is being carried on at higher elevations, warning notices should be posted below or barricade the area so as to draw the attention of persons and prevent them from coming under the falling objects.

Defective scaffoldings, damaged ladders, insufficient working platforms etc. shall not be permitted. Wherever necessary, light weight mobile tower scaffolds or hydraulic platforms should be used.

Proper access should be available to the work spot. Nobody should jump over open area between equipment, pipes and rails etc. from where they may slip. Walking over beams, narrow pipes etc. should be prohibited.

The area from where the materials are pulled up with ropes etc. should have handrailings and the person should keep firm footing. They should not lean over the handrails and should use safety belts to protect themselves from fall due to body imbalance.

The Agency should reduce the hazards associated with falls first through engineering controls and Have a formal fall protection program in accordance with Factories Act requirements. Agency should Institute personal fall arrest systems, administrative controls and training when engineering controls are not feasible.

The Agency shall have the necessary fall protection equipment to safely perform the job and properly train workers in the use of fall protection equipment and supervisors (or competent personnel) shall ensure the use of fall protection equipment as required. Agency shall obtain work permit from the Consultant prior to starting of activities requiring fall protection.

Should Use powered access safely and Protect holes and leading edges, e.g. with hand rails and to boards.

The construction waste from the height should be transferred through closed chutes.

All other measures to be taken for the safety at project shall be ensured by the Agency.

It shall be deemed that rates quoted by the Agency are inclusive of all the expenditures incurred in the safety procedures. No extra payment on this account shall be payable to Agency.

Unforeseeable Difficulties

Except as otherwise specifically stated elsewhere in the Contract:

The Agency shall be deemed to have obtained all necessary information as to risks, contingencies and other circumstances which may influence or affect the Works;

By signing the Contract, the Agency accepts total responsibility for having fore seen all difficulties and costs of successfully completing the Works; and The Contract Price shall not be adjusted to take account of any unforeseen difficulties or costs.

JDA shall not provide any material either on chargeable or on free issue basis to the Agency for execution of the project.

SECTION XII

Schedule of Stage Payment

15. Schedule of Stage Payments

PAYMENT-SCHEDULE

All running/intermediate & final payments shall be made to the agency in accordance with the following schedule:

S.No.	Activity	Percentage of Total Quoted Amount	Total payable(%) of PART-I
A	Investigation, Architectural planning, Designing and obtaining necessary permission etc. for entire scope of work (3% of Total Quoted Amount)	3 %	
	1) On approval of inception report & Site survey, Geo-technical investigation and preparation of preliminary Architectural Drawings, Presentations, conceptual plan and themes.		0.4
	2) On obtaining approval of JDA / local authorities on detailed and working drawings of complete complex including infrastructure, facilities & services as per Scope of work.		0.15
	3) On approval of structured design by JDA & Successful structural vetting from NIT or IITs.		0.3
	4) On obtaining other approvals like: Tree Cutting NOC, Traffic NOC, environmental clearance if required, PHED and Electrical Department NOC; etc as required for the starting of the Project.		0.15
	5) On establishing site office, testing laboratory etc.		0.15
	6) After completion of 50 % work of total tendered Cost for arranging various activities, meetings/conferences/visits /etc.		0.2
	7) After completion of 100 % work as per scope of work of total tendered Cost for arranging various activities, meetings/conferences/visits/etc.		0.15
	8) On obtaining Fire NOC, PHED and Electrical Department NOC, completion certificate etc. After completion of work.		1.5

B	Completion of Foundation work as per scope of work	15% of Project Cost	
	a) Foundation: Raft		
	1) Footings/columns/waterproofing- 50% of the work for Foundation		6.00
	2) Footings/columns/waterproofing- 100% of the work for basement.		6.00
	3) Completion of Plinth Beam and Backfilling		3.0
C	Super Structure work (G+1 structure) of in all respect as per scope of work	55 % of Project Cost	
	1) Completion of Civil Structural Work		
	Ground Floor roof Slab Level		6.0
	1 st Floor roof Level		6.0
	(Terrace Floor)		2.60
	ii) Completion of External and Internal Partition walls etc.		
	Ground Floor roof Level		1.10
	1 st Floor roof Level		1.10
	(Terrace Floor)		0.6
	iii) Internal Plaster including electrical conducting, plumbing and sanitary pipes installation		
	Ground Floor roof Level		1.50
	1 st Floor roof Level		1.50
	(Terrace Floor)		0.3
	iv) Completion of Flooring, skirting, tile works doors & windows frames etc		
	Ground Floor roof Level		1.5
	1 st Floor roof Level		1.5
	(Terrace Floor)		0.5
	v) Completion of Door, windows, and other finishing work set c including POP, Waterproofing, False ceiling painting etc.-		
	Ground Floor roof Level		2.5
	1 st Floor roof Level		2.5
	(Terrace Floor)		1.0
	vi) Completion of kitchens, Laundry, Staff Quarters installation of sanitary and CP fittings, internal electrification etc.		

	Ground Floor roof Level		1.80
	1 st Floor roof Level		1.80
	(Terrace Floor)		0.70
	vii) Complete Installation of Air conditioning work, mechanical ventilation work, Fire Fighting system, fire alarm, smoke detection, security system, electrification system, solar system, oxygen gas pipeline, A/C units, ROs, Geysers, water supply, sanitary, lighting, earthling etc. including testing and commissioning		15.50
	viii) On completion Toilet Blocks		5.0
D	Completion of Site Development works including site services	20 % of Project Cost	
	1) Completion of Boundary Wall, Guard Rooms, M.S. Grille etc. including plastering, painting, cladding and finishes etc.		2.50
	2) Completion of water-supply system and sewerage system		5.0
	3) Completion of Drainage system & Rain Water Harvesting including recharge well & Tube Wells.		1.50
	4) Paving, Internal Roads, Pathways, Lawns, Marking, painting of Kerb stone, berm cleaning, connectivity of entry points with external road network Complete in all respect.		3.0
	6) Completion of service connection of Water supply, Sewerage and Drainage etc.		0.50
	7) All Electrical Works including Sub Station, DG Set etc. complete as per the scope of work complete.		
	a) Supply of Equipments/ parts		0.50
	b) Installation, Testing & Commissioning		0.50
	8) External Electrification works: Street Lighting, with LED Lights and sign Boards		2.0

	9) Designing & Installing & commissioning of CCTV Cameras covering all entry & exit points of each building and main gates with adequate display of cameras on LED screens in control rooms, including control rooms, display system and software support system and required data cabling etc. complete.		1.25
	10) Completion of CWR with pump Room, pumping, water supply system.		1.25
	11) Installation of Lifts		2.50
E	Completion of all Horticulture in all respect as per scope of work	2.0% of Project Cost	
	1) Complete supply, installation, testing of the irrigation system for Horticulture works, fountain etc.		0.40
	2) Completion of 100% work of landscaping & other horticulture work such as filling of good earth, grassing, planters, decorative plants, tree plantation etc.		
	2.1) Completion of 50% of total scope of Work		0.80
	2.2) Completion of 100% of total scope of Work		0.80
F	On completion, installation, checking, and making complete building functional in all respect.	5.00 % of Project Cost	5.00%
	TOTAL	100 %	100 %

NOTE:- 1) Any variations in drawings and designs during construction for the betterment of the project with variations upto 2% of the contract value no additional cost shall be payable. The assessment of additional work shall be based on JDA BSR 2016 and market rates as mutually agreed.

2) In case of execution of any additional work if required to be executed for the betterment of the project, the payment of the same shall be made with mutual agreement after proper assessment of rates based on JDA BSR 2016 and market rates.

3) No Mobilization advance is payable in this contract.

4) Price variation is not payable in this contract.

5) The payment will be done on completion of various stages but running payment may also be done on partial completion of the stage.

Advance Payment

Advances to contractors are as a rule prohibited, and every endeavor should be made to maintain a system under which no payments are made except for work actually done.

Exceptions are, however, permitted in the following cases:

- (a) Cases in which a contractor, whose contract is for finished work, requires an advance on the security of the materials brought to site. Divisional officers may, in such cases, make advances upto an amount not exceeding 75 percent of the current value of the materials (as assessed by themselves according to their character), provided that they are of an imperishable nature and that a formal indenture is drawn up in Form 31 with the contractor under which the Government secure a lien on the materials and are safe-guarded against losses due to the contractor postponing the execution of the work or the shortage or misuse of the materials and against the expense entailed for their proper watch and safe custody. Payment of such advances should be made only on the certificate of an officer, not below the rank of Sub-Divisional officer, that the quantities of materials, upon which the advances are made have actually been brought to site, that the contractor has not previously received any advance on that security and that the materials are all required by the contractor for use on items of work for which rates for finished work have been agreed upon. The officer granting such a certificate will be held personally responsible for any overpayment which may occur in consequence. Recoveries of advances, so made, should not be postponed until the whole of the work entrusted to the contractor is complete. They should be made from this bills for work done as the materials are used, the necessary deductions being made, whenever the items of work, in which they are used are billed for.

Note-1 Divisional Officers are responsible that:-

- i. When secured advances have been made for materials, recoveries are made regularly from the very first payment made for those items of actual work in which such materials have been used.
- ii. No secured advances are made for any materials, unless they are to be used within three months at the most.
- iii. Materials are actually measured in details before making secured advances on them and their value is based on the actual rates for the purpose of determining the percentage at which secured advances on materials should be made.

Note-2 Imperishable materials include Bricks, Rolled Steel Joists, etc. while articles such as Lime, Sand, kankar, etc. are perishable. Coal is, however, excluded from both the categories and no advance is permissible on his article.

- (b) Cases in which, in the interest of works, it is absolutely necessary to make petty advances, in such cases advances upto Rs. 250 may be allowed by subordinates.
- (c) In all other cases, only with the sanction of the Government who may, in exceptional circumstances authorize such advances as may be deemed indispensable, taking the necessary precautions for securing the Government against loss and for preventing the system from becoming general or continuing longer than is absolutely essential. A register in Form RPWA 68 shall be maintained in respect of Advance Payments made in exceptional circumstances with the sanction of the Government.
- (d) Note: The Executive Engineer has full powers to make advance payments to Electric Supply under taking under the Indian Electricity Act, 1910 for execution of works.

. Completion

(i) "When whole of the work has been substantially completed and have satisfactory passed any Tests on Completion prescribed by the contractor, the Contractor may give a notice to that effect to the Engineer, with a copy to the Employer, accompanied by a written undertaking to finish with due expedition any outstanding work. The Engineer shall issue a certificate complying completion of the works to the contractor."

(ii) "If any part of the permanent work has been substantially completed and has satisfactorily passed

any Tests on Completion prescribed by the Contract, the Engineer may issue a Completion Certificate in respect of the part of the Permanent Work before completion of the whole of the Works and, upon the issue of such Certificate, the Contractor shall be deemed to have undertaken to complete with due expedition any outstanding work in the part of the Permanent Work during the Defects Notice Period." Hence the defect liability period starts on the date on which part/ substantial completion certificate is issued, for that particular part of the permanent work has been substantially completed.

Taking Over

"The Employer shall take over the whole works or section of works within Seven (7) days of issuance of Completion Certificate, as per Clause no 52.1 and 52.2."

Site Environmental Plan (SEP)

The Contractor should prepare a detailed Site Environmental Plan (SEP) as per the Environmental and Social Management Framework and EMP format attached for location/s identified to be potentially impacted such as but not limited to the work site, base camp. The SEP should include arrangement for disposal of sites for excavated materials, sanitary and other waste, and storage location for fuel, oil and lubricants, facilities for equipment, labour and housing, among others. The SEP should be reviewed and approved prior to construction activities by the Engineer.

. Safety, Security and Protection of the Environment

(A) General

- i. This section of the Specification sets out limitations on the Contractor's activities specifically intended to protect the environment.
- ii. The Contractor shall take all necessary measures and precautions and otherwise ensure that the execution of the works and all associated operations on site or off-site are carried out in conformity with statutory and regulatory environmental requirements including those prescribed elsewhere in this document.
- iii. The Contractor shall take all measures and precautions to avoid any nuisance or disturbance arising from the execution of the Works. This shall wherever possible be achieved by suppression of the nuisance at source rather than abatement of the nuisance once generated.
- iv. In the event of any spoil, debris, waste or any deleterious substance from the Site being deposited on any adjacent land, the Contractor shall immediately remove all such material and restore the affected area to its original state to the satisfaction of the Engineer. This should be monitored regularly in accordance with the Environmental Management Plan.
- v. During construction, the area should be to avoid trespassing of animals and people. Unauthorized persons should not be allowed within the construction area.
- vi. During construction, there should be signs to inform public of on-going work, warning on dangers due to trenches along roads, excavations on different sites.

- vii. Contact town authorities to arrange for the use of excavated material where possible, such as in construction projects, to raise the level of land prior to construction of roads or buildings, or to fill previously excavated areas.
- viii. Especially for cleaning, desilting, and dredging of drainages: Contact town authorities to arrange for testing and analysis of sludge/excavated materials for hazardous components. If material are hazardous, coordinate with authorities for approve disposal sites;
- ix. Prevent generation of dust by removing excavated materials as soon as it is excavated, by loading directly onto trucks and covering with tarpaulins to prevent dust during transportation.
- x. All excavation should be done in the dry seasons to avoid any impacts on surface water drainage if water collects in any quantity, it will need to be pumped out, and it should be then be donated to neighboring farmers to provide a beneficial use to the communities most affected by this aspect of the work.
- xi. Plant five (5) trees for every tree to be cut and can only be cut after taking the necessary approvals.
- xii. Consult town authorities to identify any buildings at risk from vibration damage and avoiding use of pneumatic drills or heavy vehicles in the vicinity.
- xiii. Providing wooden bridges for pedestrians and metal sheets for vehicles to allow access across open trenches where required (including access to houses).
- xiv. Carefully planning of transportation routes with the municipal authorities to avoid sensitive areas as far as possible, including narrow streets, congested roads, important or fragile buildings and key sites of religious, cultural or tourism importance.
- xv. Consulting historical and archaeological authorities at both national and state level to obtain an expert assessment of the archaeological potential of the site. Alternate location should be considered if the area is medium or high risk.
- xvi. Developing a protocol in conducting any excavation work to ensure that any chance finds are recognized and measured are taken to ensure they are protected and conserved this should involve having excavation observed by a person with archaeological field training, stopping work immediately to allow further investigation if any finds are suspected; and calling the state archaeological authority if a find is expected and taking any action they acquire ensuring its removal or protection in situ.
- xvii. Living spaces for access between mounds of excavated soil and providing footbridges so that pedestrians can cross open trenches;
- xviii. Increasing the workforce in these areas to ensure that work is completed quickly;

(B) . Water Quality

- i. The Contractor shall prevent any interference with the supply to or abstraction from, and prevent any pollution of, water resources (including underground percolating water) as a result of the execution of the Works.
- ii. Areas where water is regularly or repetitively used for dust suppression purposes shall be laid to fall to specially constructed settlement tanks to permit sedimentation of particulate matter. After settlement, the water may be re-used for dust suppression and rinsing.
- iii. All water and other liquid waste products arising on the Site shall be collected and disposed of at a location on or off the Site and in a manner that shall not cause either nuisance or pollution.
- iv. The Contractor shall not discharge or deposit any matter arising from the execution of the Works into any waters except with the permission of the Engineer and the regulatory authorities concerned.
- v. The Contractor shall at all times ensure that all existing stream courses and drains

within, and adjacent to, the Site are kept safe and free from any debris and any materials arising from the Works.

- vi. The Contractor shall protect all watercourses, waterways, ditches, canals, drains, lakes and the like from pollution as a result of the execution of the Works.

Air Quality

- i. The Contractor shall devise and arrange methods of working to minimize dust, gaseous or other air-borne emissions and carry out the Works in such a manner as to minimize adverse impacts on air quality.
- ii. The Contractor shall utilize effective water sprays during delivery manufacture, processing and handling of materials when dust is likely to be created, and to dampen stored materials during dry and windy weather. Stockpiles of friable materials shall be covered with clean tarpaulins, with application of sprayed water during dry and windy weather. Stockpiles of material or debris shall be dampened prior to their movement, except where this is contrary to the Specification.
- iii. Any vehicle with an open load-carrying area used for transporting potentially dust producing material shall have properly fitting side and tail boards. Materials having the potential to produce dust shall not be loaded to a level higher than the side and tail boards, and shall be covered with a clean tarpaulin in good condition. The tarpaulin shall be properly secured and extend at least 300 mm over the edges of the side and tail boards.
- iv. In the event that the Contractor is permitted to use gravel or earth roads for haulage, he shall provide suitable measures for dust palliation, if these are, in the opinion of the Engineer, necessary. Such measures may include spraying the road surface with water at regular intervals.

. Noise

- i. The Contractor shall consider noise as an environmental constraint in his planning and execution of the Works.
- ii. The Contractor shall take all necessary measures so that the operation of all mechanical equipment and construction processes on and off the Site shall not cause any unnecessary or excessive noise, taking into account applicable environmental requirements. The Contractor shall use all necessary measures and shall maintain all plant and silencing equipment in good condition so as to minimize the noise emission during construction works.
- iii. Using modern vehicles and machinery with standard adaptations to reduce noise and exhaust emissions and ensuring they are maintained to manufacturers' specifications.

. Control of Wastes

- i. The Contractor shall control the disposal of all forms of waste generated by the construction operations and in all associated activities. No uncontrolled deposition or dumping shall be permitted. Wastes to be controlled shall include, but shall not be limited to, all forms of fuel and engine oils, all types of bitumen, cement, surplus aggregates, gravels, bituminous mixtures, etc. The Contractor shall make specific provision for the proper disposal of these and any other waste products, conforming to local regulations and acceptable to the Engineer.

Emergency Response

- i. The Contractor shall plan and provide for remedial measures to be implemented in the event of occurrence of emergencies such as spillages of oil or bitumen or chemicals.
- ii. The Contractor shall provide the Engineer with a statement of the measures he intends to implement in the event of such an emergency which shall include a statement of how he intends to provide personnel adequately trained to implement such measures.
- iii. Should any pollution arise from the Contractor's activities he shall clean up the affected area immediately at his own cost and to the satisfaction of the Engineer, and shall pay full compensation to any affected party.

Protection of Trees and Vegetation

The Contractor shall ensure that no trees or shrubs or waterside vegetation are felled or harmed except for those required to be cleared for execution of the Works. The Contractor shall protect trees and vegetation from damage to the satisfaction of the Engineer. No tree shall be removed without the prior approval of the Engineer and any competent authorities. Should the Contractor become aware during the period of the Contract that any tree or trees designated for clearance have cultural or religious significance he shall immediately inform the Engineer and await his instructions before proceeding with clearance. In the event that trees or other vegetation not designated for clearance are damaged or destroyed, they shall be repaired or replaced to the satisfaction of the Engineer, who shall also impose a penalty to twice the commercial value of any timber affected, as assessed by the Engineer.

Water Supply and Electric Power

The Contractor shall make his own arrangements at his own expense for water supply and electric power supply for construction, testing and other purposes. Only clean water free from deleterious

Fire Prevention

68.1 The Contractor shall take all precautions necessary to ensure that no vegetation along the line of the road outside the area of the permanent works is affected by fires arising from the execution of the Works. The Contractor shall obtain and follow any instructions of the competent authorities with respect to fire hazard when working in the vicinity of gas installations. Should a fire occur in the natural vegetation or plantations adjacent to the road for any reason the Contractor shall immediately suppress it. In the event of any other fire emergency in the vicinity of the Works the Contractor shall render assistance to the civil authorities to the best of his ability. Areas of forest, scrub or plantation damaged by fire considered by the Engineer to have been initiated by the Contractor's staff or labour shall be replanted and otherwise restored to the satisfaction of the Engineer at the Contractor's expense.

Fossils

The Contractor shall make his staff available for briefing on archaeological matters as directed by the Engineer.

Clearance of Contractor's Facilities

On or before expiry of the Defects Notice Period the Contractor shall clear away all his temporary facilities including but not limited to offices, camps, storage and holding yards, workshops, crushing and mixing plant, diversion and haul roads so that the land is returned to at least its previous condition and, in the case of agricultural land, potential productivity. Clearance shall include but not be limited to tasks such as the removal of unwanted structures, removal of metallic and concrete debris, removal and disposal of any soil contaminated by diesel, bitumen or other polluting material, ripping to relieve compaction, grading, replacement of topsoil, and turfing and grassing, as appropriate. Where improvements have been made such as land filling or installation of boreholes or construction of boat landings these may be retained subject to the agreement of the landowner. The Employer reserves the right to inspect the site of any facilities established or used by the Contractor in connection with the Works and to undertake any corrective measures necessary to restore the land, and to recover the cost from monies due or to become due to the Contractor.

Fair Wages

1.1 The Contractor shall pay not less than fair wage/minimum wages to laborer's engaged by him on the work as revised from time to time by the Government of Rajasthan, but the Government shall not be liable to pay anything extra for it except as stipulated in price adjustment clause (Clause 41) of the Contract.

(Explanation: "Fair wage" means minimum wages for time or piece work, fixed or revised, as established by the State Government under the Minimum Wages Act, 1948.)

- 1.2 The Contractor shall, notwithstanding the provisions of any Contract to the contrary, cause to be paid fair wages to laborers indirectly engaged on the work, including any labour engaged by his sub-Contractors in connection with the said work, as if the laborers have been immediately or directly employed by him.
- 1.3 In respect of all laborers, immediately or directly employed on the work, for the purpose of the Contractor's part of this agreement, the Contractor shall comply with or cause to be complied with, the Public Works Department Contract Labour Regulations' made, or that may be made, by the Government, from time to time, in regard to payment of wages, wage period, deductions from wages, recovery of wages not paid, and unauthorized deductions, maintenance of wages register, wage card, publication of scale of wages and other terms of employment, inspection and submission of periodical returns, and all other matters of a like nature.
- 1.4 The Engineer shall have the right to deduct, from the money due to the Contractor, any sum required or estimated to be required for making good the loss suffered by a worker or workers by reasons of non-fulfillment of the conditions of the Contract for the benefit of the worker or workers, non-payment of wages or of deductions made there from, which are not justified by the terms of the Contract or as a result of non-observance of the aforesaid regulations.
- 1.5 Vs-à-Vs the Government of Rajasthan the Contractor shall be primarily liable for all payments to be made and for the observance of the regulations aforesaid, without prejudice to his right to claim indemnity from his sub-Contractors.
- 1.6 The regulations, aforesaid, shall be deemed to be part of this Contract and any breach thereof, shall be deemed to be breach of the Contract.

Safety and Accident Prevention Officer

Due precautions shall be taken by the Contractor, at his own cost, to ensure the safety and protection against accidents of all staff and labour engaged on the Works, local residents in the vicinity of the Works, and the public travelling through the Works. The Contractor shall have on his staff on Site a designated officer qualified to promote and maintain safe working practices. This officer shall have authority to issue instructions and shall take protective measures to prevent accidents, including but not limited to the establishment of safe working practices and the training of staff and labour in their implementation.

Protective Clothing and Footwear

- 1.1 The Contractor shall, at his own expense, provide protective clothing and equipment to all staff and labour engaged on the Works to the satisfaction of the Engineer, and on his failure to do so the Employer shall be entitled to provide the same and recover the cost from the Contractor. Such clothing and equipment shall include, at a minimum, protective footwear for workmen undertaking concrete mixing work, protective footwear and gloves for any workmen performing bituminous paving works, protective footwear, clothing, cream, gauntlet-type gloves, hats, safety glasses or goggles and filter masks for workmen undertaking lime stabilisation works, hard hats for workmen engaged on bridge construction, and otherwise as appropriate to the job in hand and to the Engineer's satisfaction.
- 1.2 Ensuring that all workers are provided with and use appropriate Personal Protective Equipment (PPE), Health and safety training should be conducted for all site personnel; availability of documented procedures to be followed for all site activities; and documentation of work-related accidents;

First-Aid Services

The Contractor shall, at his own expense, provide first aid equipment at all camps and work sites to the satisfaction of the Engineer, and shall ensure that at all work sites where 40 or more persons are engaged on the Works there shall at all times be a person qualified in first-aid with access to appropriate first-aid equipment. A first-aid post shall be established at each base camp comprising a suitable room with two beds, washing and examination facilities, appropriate medical supplies, and staffed on a full-time basis by a qualified paramedical attendant.

Health and Pests

The Contractor shall at his own expense and throughout the period of the Contract ensure that suitable arrangements are made for the prevention of epidemics and for all necessary welfare and hygiene requirements for his staff and labour, and shall comply with all the regulations and requirements of the local health authorities with respect to disease prevention and control. He shall warn his staff and labour of the dangers of communicable diseases including those transmitted by insects, water, faecal/oral contact and sexual activity. The Contractor shall take the precautions necessary to protect all staff and labour employed on the Site from insect nuisance, rats and other pests and minimise the dangers to health and the general nuisance caused by the same. Should malaria or other insect-borne diseases be prevalent in the area, he shall provide his staff and labour with suitable prophylactics, equip living accommodation with screens and bed-nets, and carry out spraying with approved insecticides, as appropriate and to the Engineer's satisfaction.

. Disorderly Conduct

The Contractor shall at all times take reasonable precautions to prevent any unlawful, riotous or disorderly conduct by or amongst his employees and for the preservation of peace and protection of persons and property in the neighbourhood of the Works against the same. "Disorderly conduct" shall include but not be limited to harvesting of natural resources such as firewood or fish by the Contractor's labour when this is done to the detriment of pre-existing local interests.

Records of Labour and Accidents

The Contractor shall maintain full records of numbers, working hours and wages of labour, safety, health and welfare of persons, accidents, and damage to property and make such reports on these matters to the Engineer as he may from time to time prescribe.

General

Unless otherwise indicated elsewhere in the Contract, The General Specification for civil works and the Quality Assurance and Quality Control (QAQC) document, as issued by the PMU of RUIDP, shall be followed. The QAQC document of JDA is an integral part of the document and it will be provided with the bid document. A copy of the same shall be made available at the site by the contractor.

Site Office for Engineer and Other Supervisory Staff

The Contractor shall arrange to provide office of minimum 300 sq. ft. size as per specification with two tables, four chairs, one steel almirah, sufficient number of display board, telephone etc. fully furnished office accommodation within 15 days from the date of commencement of same and shall become property of the Contractor at the completion of the work. The electrical charges / water charges and all other charges shall be arranged within the area of the work. Approval shall be taken from Engineer prior to making arrangement of the office. The construction of site office and its or maintenance are incidental to the work. The office shall be functional until work is completed. If Engineer found that office arranged by the contractor is not being maintained properly then Engineer has right to deduct a reasonable amount from that payment. In case adequate space is not available for setting up of such office, the

Engineer may waive such requirement on being requested by the Contractor, in writing.

Site Office

- 40.1 Within 15 (Fifteen) days from the date of commencement of the work, the Contractor shall arrange to provide a furnished and adequately equipped site office. This shall be removed at the completion of the work..

Pre-Construction Inspection, Testing & Review of Data for Materials, Plant & Equipment

- 1.1 The contractor shall place order for the material and the equipment only after the approval of the Engineer. The Contractor shall submit the detailed drawings for the approved manufacturer and the procedure of submission, review and revision shall be specified herein below.
- 1.2 The Contractor shall inform the Engineer about the likely dates of manufacturing, testing and dispatching. The Contractor shall notify the Engineer for Inspection and Testing, at least twenty-eight days prior to packing and shipping and shall supply the manufacturer's test results and quality control certificates. The Engineer will decide whether he or his representative will inspect and test the material/ equipment or whether he will approve it on the basis of manufacturer's certificate.
- 1.3 The inspection and test categories shall be applied prior to delivery of the equipment, of various categories as indicated in the technical specifications for each type of the equipment.

Category A: - The Drawing has to be approved by the Engineer before manufacturing and Testing. The material has to be inspected by the Engineer or by an Inspecting agency approved by the Engineer at the manufacturer's premise before packing and dispatching. The Inspection charges of the agency will be borne by the Employer but the contractor has to pay the inspection charges. The Contractor shall provide the necessary equipment and facilities for tests and the cost, thereof, shall be borne by the

Category B:- The drawings of the Equipment have to be submitted and to be approved by the Engineer prior to manufacture. The material has to be tested by the manufacturer and the manufacturer's test certificates are to be submitted and approved by the Engineer before dispatching of the Equipment. Notwithstanding the above, the Engineer, after examination of the test certificates, reserves the right to instruct the Contractor for retesting, if required, in the presence of Contractor's representative.

Category C: The material may be manufactured as per standard and delivered to the site.

Supply of Colored Record Photographs

The Contractor shall, at his own cost, arrange to take colour photographs at various stages / facets of the work including interesting and novel features of the work as directed by the Engineer and supply two copies of colour record photographs mounted in the albums including negatives with specification and these shall be kept by Employer.

43. Public Awareness / Information Display

The Contractor shall, at his own cost, arrange to provide, erect and maintain necessary display boards/ banners etc. at selection points of project site giving such information as considered necessary for public awareness/ information/ safety as directed by the Engineer.

44. Contractor's Responsibilities

The contractor shall promptly inform the Employer and the Engineer of any error, omission, fault, or any other defect in the design or drawings or specification for the works, which he discovers when reviewing the contract documents, or in the process of execution of the works. The Engineer will resolve the ambiguity or correct the error and will notify the contractor of the interpretation to be adopted.

45. Services

45.1 Underground and overhead services are likely to be met with during construction. These are to be protected against damage by the Contractor at his own cost.

45.2 The contractor shall be required to carry out removal / shifting of existing utilities at his own cost. The contractor work program shall include this activity. The work shall be carried out under supervision of concerned department. The supervision charges of the line agencies shall be paid by the contractor and shall be reimbursed on actual on submission of receipt.

45.3 In cases of utilities to be shifted by Govt. departments, no amount shall be paid extra for shifting/ co-ordination. The employer would provide full support to contractor in coordinating with line agencies; however, no claim on account of delay in shifting of utilities by line department will be admissible.

46. Setting Out

46.1 The Contractor(s) shall set out the whole of the work in conjunction with an officer to be deputed by the Engineer and during the progress of the work to amend on the requisition of the Engineer any errors which may arise therein and provide all the necessary labour materials and equipments for so doing. The contractor(s) is/are to provide all tools, plant, machinery, labour and materials (with the exceptions noted in the relevant clauses for issue of departmental materials as per schedule attached) which may be necessary and required for the work. All materials and workmanship shall conform to the relevant specifications mentioned in the tender documents.

46.2 During execution of pile foundation, if there is any variation in soil strata which was not anticipated earlier, the matter shall be referred to Engineer – in – charge for review and modification of design by the competent authority, if considered necessary. Time taken in this process is consider in the original completion period, however no claim on account of delay in getting the sanction from competent authority will be admissible.

46.3 The contractor shall carryout the detailed topographic survey at site and prepare the pre-commencement survey map for approval of the Engineer's representatives. Based on the approved Pre-commencement survey map, the contractor will prepare the necessary working drawings for the purpose of execution.

46.4 Contractor shall be responsible for taking all traffic block and shutdowns etc. from west central railway authority for execution in railway land / spans. Contractor will get all designs and drawings approved from west central railway authority for all temporary and permanent works of railway land / spans. This will be all incidental to the work. No separate claim on this account shall be payable.

46.5 Defect liability period shall be 5 year. Contractor shall furnish an affidavit from the manufacture / supplier firms before actual date of completion.

47. Labor

47.1 Engagement of Staff and Labor

- a) Except as otherwise stated in the Specification, the Contractor shall make arrangements for the engagement of all staff and labor, local or otherwise, and for their payment, housing, feeding and transport.
- b) The contractor shall pay equal wages for men and women for work of equal value or type.

- c) The Contractor shall provide and employ on the Site in the installation of the Facilities such skilled, semi-skilled and unskilled labor as is necessary for the proper and timely execution of the Contract. The Contractor is encouraged to use local labor that has the necessary skills.
- d) The Contractor shall be responsible for obtaining all necessary permit(s) and/or Visa(s) from the appropriate authorities for the entry of all labor and personnel to be employed on the Site into the country where the Site is located. The Employer will, if requested by the Contractor, use his best endeavors in a timely and expeditious manner to assist the Contractor in obtaining any local, state, national or government permission required for bringing in the Contractor's personnel.
- e) The Contractor shall at its own expense provide the means of repatriation to all of its and its Subcontractor's personnel employed on the Contract at the Site to the place where they were recruited or to their domicile. It shall also provide suitable temporary maintenance of all such persons from the cessation of their employment on the Contract to the date programmed for their departure. In the event that the Contractor defaults in providing such means of transportation and temporary maintenance, the Employer may provide the same to such personnel and recover the cost of doing so from the Contractor.
- f) Be required to employ atleast 50% of the labour force from communities within a radius of 2kms from the site, if sufficient people are available.

47.2 Persons in the Service of Employer

The Contractor shall not recruit, or attempt to recruit, staff and labor from amongst the Employer's Personnel.

47.3 Labor Laws

- (a) The Contractor shall comply with all the relevant labor Laws applicable to the Contractor's Personnel, including Laws relating to their employment, health, safety, welfare, immigration and emigration, and shall allow them all their legal rights.
- (b) The Contractor shall at all times during the progress of the Contract use its best endeavors to prevent any unlawful, riotous or disorderly conduct or behavior by or amongst its employees and the labor of its Subcontractors.
- (c) The Contractor shall, in all dealings with its labor and the labor of its Subcontractors currently employed on or connected with the Contract, pay due regard to all recognized festivals, official holidays, religious or other customs and all local laws and regulations pertaining to the employment of labor.

47.4 Rates of Wages and Conditions of Labour

- (a) The Contractor shall pay rates of wages, and observe conditions of labor, which are not lower than those established for the trade or industry where the work is carried out. If no established rates or conditions are applicable, the Contractor shall pay rates of wages and observe conditions which are not lower than the general level of wages and conditions observed locally by employers whose trade or industry is similar to that of the Contractor.
- (b) The Contractor shall inform the Contractor's Personnel about their liability to pay personal income taxes in the Country in respect of such of their salaries, wages and allowances as are chargeable under the Laws for the time being in force, and the Contractor shall perform such duties in regard to such deductions thereof as may be imposed on him by such Laws.

47.5 Working Hours

- (a) No work shall be carried out on the Site on locally recognized days of rest, or outside the Normal working hours, which shall be 9.00 AM to 5.00 PM on all days of the week. Unless:
 - (i) Otherwise stated in the Contract,
 - (ii) The Engineer gives consent, or
 - (iii) the work is unavoidable, or necessary for the protection of life or property or for the safety of the Works, in which case the Contractor shall immediately advise the Engineer.
- (b) If and when the Contractor considers it necessary to carry out work at night or on public holidays so as to meet the Time for Completion and requests the Engineer's consent thereto, the Engineer shall not unreasonably withhold such consent.
- (c) This Sub-Clause shall not apply to any work, which is customarily carried out by rotary or double-shifts.

47.6 Facilities for Staff and Labor

- (a) Except as otherwise stated in the Specification, the Contractor shall provide and maintain all necessary accommodation and welfare facilities for the Contractor's Personnel. The Contractor shall also provide facilities for the Employer's Personnel as stated in the Specification.
- (b) The Contractor shall not permit any of the Contractor's Personnel to maintain any temporary or permanent living quarters within the structures forming part of the Permanent Works.

47.7 Health and Safety

- (a) The Contractor shall at all times take all reasonable precautions to maintain the health and safety of the Contractor's Personnel. In collaboration with local health authorities, the Contractor shall ensure that medical staff, first aid facilities, sick bay and ambulance service are available at all times at the Site and at any accommodation for Contractor's and Employer's Personnel, and that suitable arrangements are made for all necessary welfare and hygiene requirements and for the prevention of epidemics.
- (b) The Contractor shall appoint an accident prevention officer at the Site, responsible for maintaining safety and protection against accidents. This person shall be qualified for this responsibility, and shall have the authority to issue instructions and take protective measures to prevent accidents. Throughout the performance of the Contract, the Contractor shall provide whatever is required by this person to exercise this responsibility and authority.
- (c) The Contractor shall send, to the Engineer, details of any accident as soon as practicable after its occurrence. The Contractor shall maintain records and make reports concerning health, safety and welfare of persons, and damage to property, as the Engineer may reasonably require.
- (d) The Contractor shall throughout the contract (including the Defect Liability Period):
 - (i) conduct Information, Education and Consultation Communication (IEC) campaigns, at least every other month, addressed to all the Site staff and labor (including all the Contractor's employees, all Sub-Contractors and Employer's and Engineer's employees, and all truck drivers and crew making deliveries to Site for construction activities) and to the immediate local communities, concerning the risks, dangers and impact, and appropriate avoidance behavior with respect to Sexually Transmitted Diseases (STD)—or Sexually Transmitted Infections (STI) in general and HIV/AIDS in particular;
 - (ii) Provide male or female condoms for all Site staff and labor as appropriate; and

- (iii) Provide for STI and HIV/AIDS screening, diagnosis, counseling and referral to a dedicated national STI and HIV/AIDS program, (unless otherwise agreed) of all Site staff and labor.

The Contractor shall include in the program to be submitted for the execution of the Facilities under Sub-Clause 18.2 an alleviation program for Site staff and labor and their families in respect of Sexually Transmitted Infections (STI) and Sexually Transmitted Diseases (STD) including HIV/AIDS. The STI, STD and HIV/AIDS alleviation program shall indicate when, how and at what cost the Contractor plans to satisfy the requirements of this Sub-Clause and the related specification. For each component, the program shall detail the resources to be provided or utilized and any related sub-contracting proposed. The program shall also include provision of a detailed cost estimate with supporting documentation. Payment to the Contractor for preparation and implementation of this program shall not exceed the Provisional Sum dedicated for this purpose

47.8 Funeral Arrangements

In the event of the death of any of the Contractor's personnel or accompanying members of their families, the Contractor shall be responsible for making the appropriate arrangements for their return or burial, unless otherwise specified in the SCC.

47.9 Records of Contractor's Personnel

The Contractor shall keep accurate records of the Contractor's personnel, including the number of each class of Contractor's Personnel on the Site and the names, ages, genders, hours worked and wages paid to all workers. These records shall be summarized on a monthly basis in a form approved by the Engineer and shall be available for inspection by the Engineer. Until the Contractor has completed all work.

47.10 Supply of Foodstuffs

The Contractor shall arrange for the provision of a sufficient supply of suitable food as may be stated in the Specification at reasonable prices for the Contractor's Personnel for the purposes of or in connection with the Contract.

47.11 Supply of Water

The Contractor shall, having regard to local conditions, provide on the Site an adequate supply of drinking and other water for the use of the Contractor's Personnel.

47.12 Measures against Insect and Pest Nuisance

The Contractor shall at all times take the necessary precautions to protect the Contractor's Personnel employed on the Site from insect and pest nuisance, and to reduce their danger to health. The Contractor shall comply with all the regulations of the local health authorities, including use of appropriate insecticide.

47.13 Alcoholic Liquor or Drugs

The Contractor shall not, otherwise than in accordance with the Laws of the Country, import, sell, give barter or otherwise dispose of any alcoholic liquor or drugs, or permit or allow importation, sale, gift barter or disposal by Contractor's Personnel.

47.14 Arms and Ammunition

The Contractor shall not give, barter, or otherwise dispose of, to any person, any arms or ammunition of any kind, or allow Contractor's Personnel to do so.

47.15 Prohibition of All Forms of Forced or Compulsory Labour

The contractor shall not employ "forced or compulsory labor" in any form. "Forced or compulsory labor" consists of all work or service, not voluntarily performed, that is extracted from an individual under threat of force or penalty.

47.16 Prohibition of Harmful Child Labor

The Contractor shall not employ any child to perform any work that is economically exploitative, or is likely to be hazardous to, or to interfere with, the child's education, or to be harmful to the child's health or physical, mental, spiritual, moral, or social development. "Child" means a child below the statutory minimum age of 14 years.

48. MONITORING

Provision for regular monitoring will be commensurate as per the Environmental Management Plan and actions will be taken in case of non-compliance.

49. Change of Scope

49.1 Authority may, notwithstanding anything to the contrary in this Agreement, require provision of such addition/deletion to the works and services on or about the Project which are beyond the scope of the Project as contemplated by this Agreement (Change of Scope), Provided such change do not require expenditure exceeding/reducing by 10% of project cost and do shall be made by Authority by an order (the "change of Scope order") issued in accordance with the procedure set forth in sub clause 49.2

49.2 Procedure for Change of Scope

- a. Authority shall whenever it desires provision of addition/deletion of works and services referred to in sub clause 49.1 above, issue to bidder a notice of Change of Scope (the "Change of Scope Notice") through Engineer In-charge.
- b. Upon receipt of Change of Scope Notice, the bidder shall, within a period of 15 (fifteen) days, provide to the Engineer In-charge such information as is necessary and reasonable together with preliminary documentation in support of the following:
 - I. The impact which the Change of Scope is likely to have on the Project Completion Schedule if the work is required to be carried out before construction period and
 - II. The cost to the bidder of complying with such Change of Scope Notice on account of increases in quantities of items of work mentioned in the Bill of Quantities at the rate mentioned therein. In case the Bill of quantities does not carry certain items of work required under the Change of Scope, the bidder shall provide the analysis of rates-for carrying out such items of work.
- c. Engineer-in-charge shall review the information provided by the bidder, assess the change in quantities of items of work, verify the analysis of rates if required, determine the additional cost to the bidder as a result of such Change of Scope and determine the extension/ reduction, if any, to the construction period provided that there will be no change in construction period if the change in the project cost is upto 2%, Provided that where the change in project cost is beyond 2%, then the proposed extension/ reduction to the construction period would take into account the total change in the project cost (including 2% above).
- d. Authority shall issue the Change of Scope Order within a period of 15 (fifteen) days from the date of recommendation made by the Engineer In-charge in accordance with preceding sub clause (c) above.

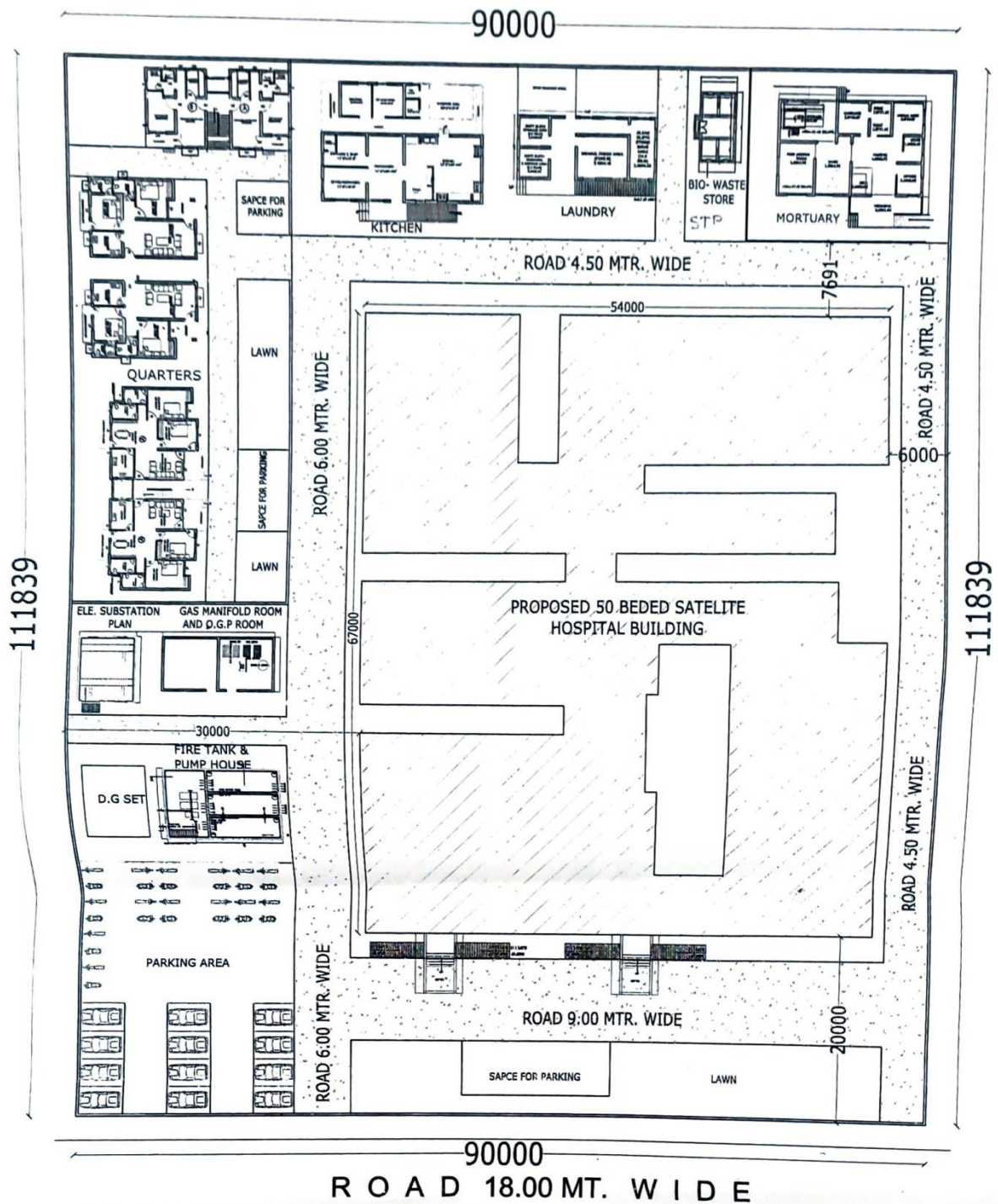
- e. The Change of Scope Order shall be effective and binding upon receipt thereof by the bidder, Notwithstanding a Dispute regarding cost and time for implementation of such order, the bidder shall proceed with the performance of such order promptly following receipt thereof. Any Dispute regarding the extension in the construction period recommended by the Engineer In-charge shall be resolved in accordance with the Dispute Resolution Procedure.

SECTION XIII
DRAWINGS
(These conceptual drawings are only for
indicative purpose)

VOLUME II

FINANCIAL BID

**Construction of 50 bedded Satellite Hospital
at Achrol (Delhi Road), Zone 13, JDA, Jaipur**



NOTE:-

1. DRAWING PREPARED AS PER MEETING ON DATED:-05-06-2023 WITH DIRECTOR PH
2. DRAWING PREPARED AS PER IPHS NORMS

MEDICAL & HEALTH RAJSTHAN	PROJECT:-	TYPE DESIGN OF 50 BEDED DISTRICT SATELITE HOSPITAL		PROJECT NO.	DRAWN BY
	DRAWING TITLE:-	SITE PLAN	DRAWN BY		

SE/MHM

CH/CH

CH/CH

CH/CH

CH/CH

CH/CH

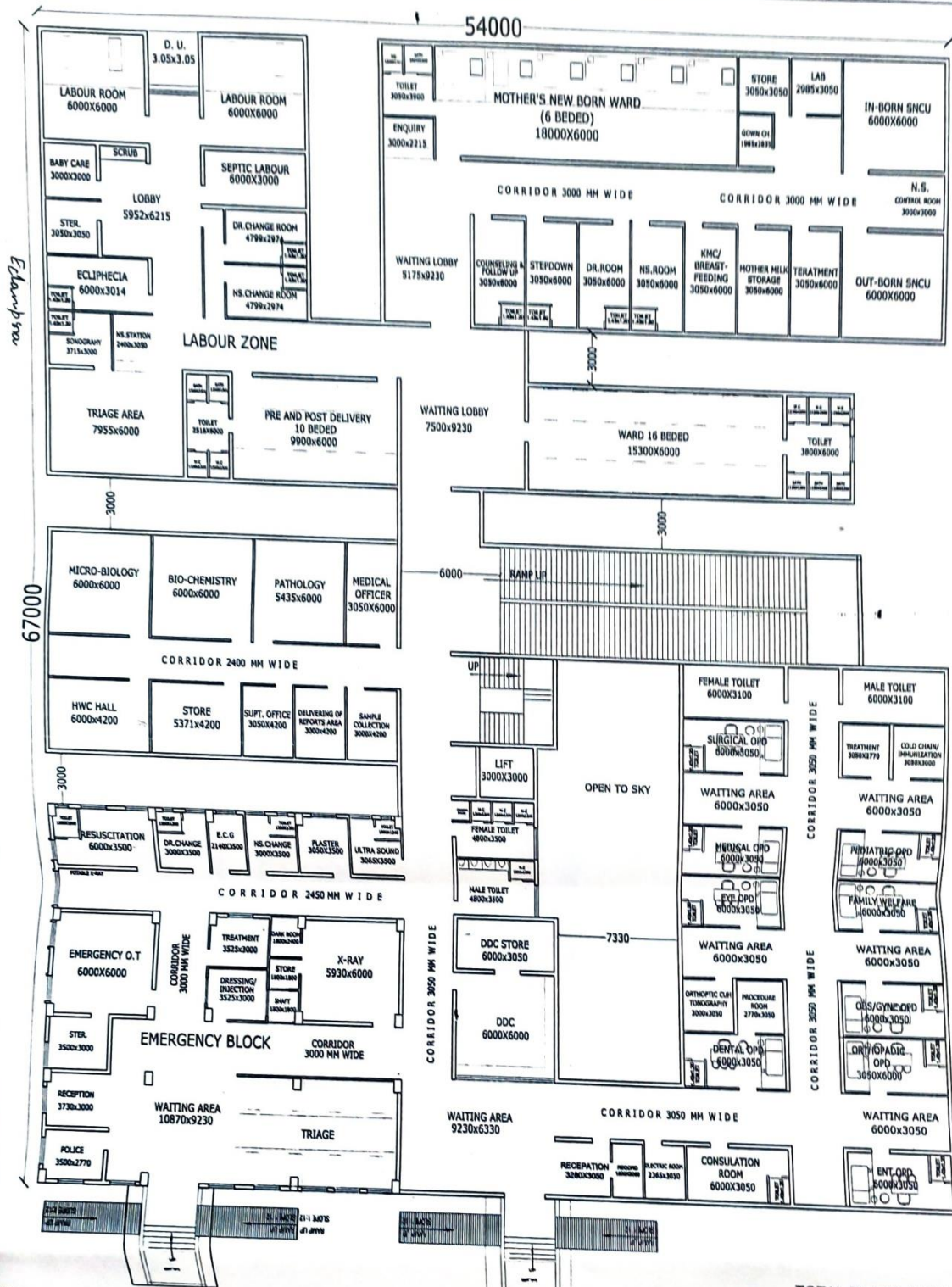
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- NOTE:-
 1. DRAWING PREPARED AS PER MEETING ON DATED:-05-06-2023 WITH DIRECTOR PH
 2. DRAWING PREPARED AS PER IPHS NORMS

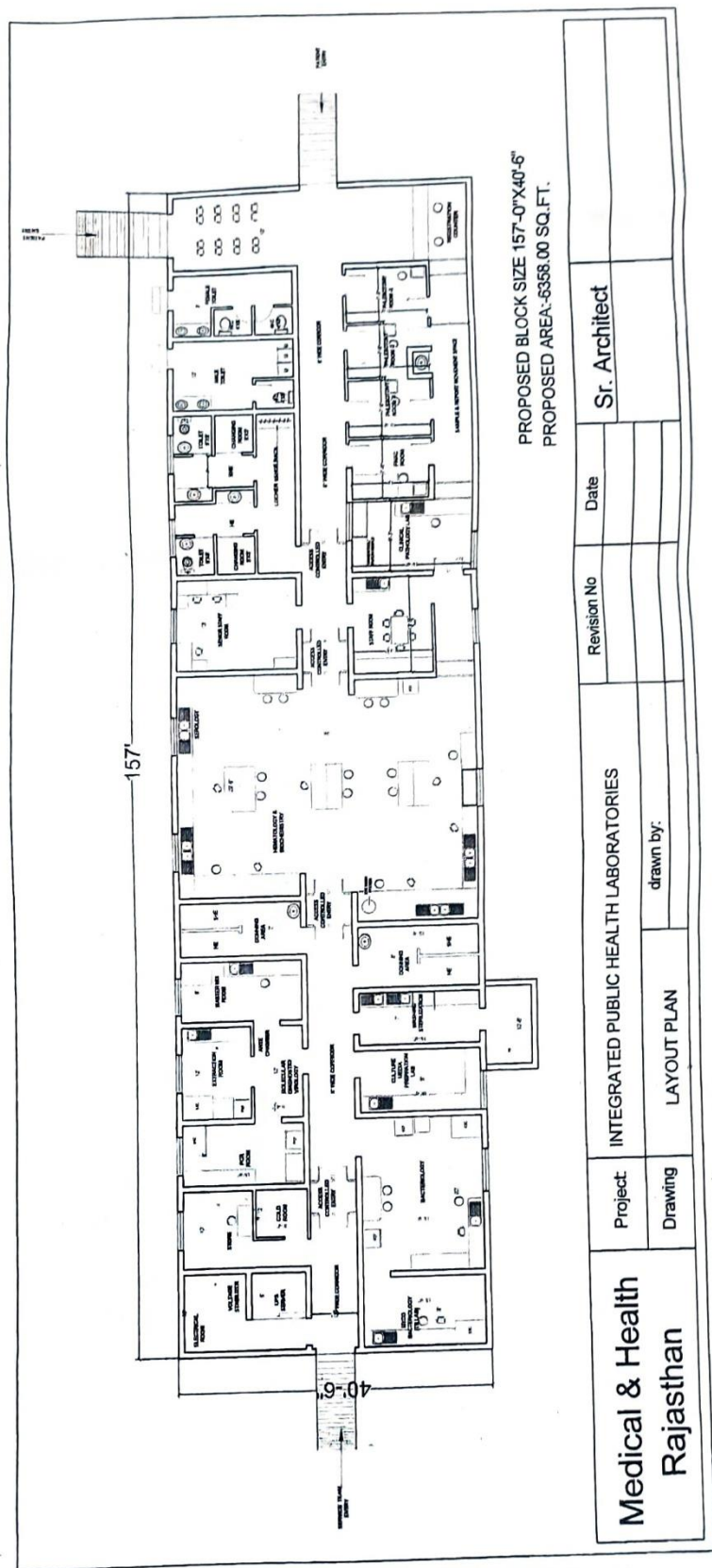
TOTAL FLOOR PLAN (G+1)
 BUILT-UP AREA :-4357.69 SQ.MTR.

GROUND FLOOR PLAN
 BUILT-UP AREA :-3003.84 SQ.MTR.

MEDICAL & HEALTH RAJSTHAN	PROJECT:-	TYPE DESIGN OF 50 BEDED DISTRICT SATELITE HOSPITAL	DRAWING NO.	DATE	PROJECT NO.	DRAWING NO.	DATE
	DRAWING TITLE:-						

Handwritten signatures and stamps are present below the table, including 'R.P. Doria' and 'Dr. R.B. Jha'.



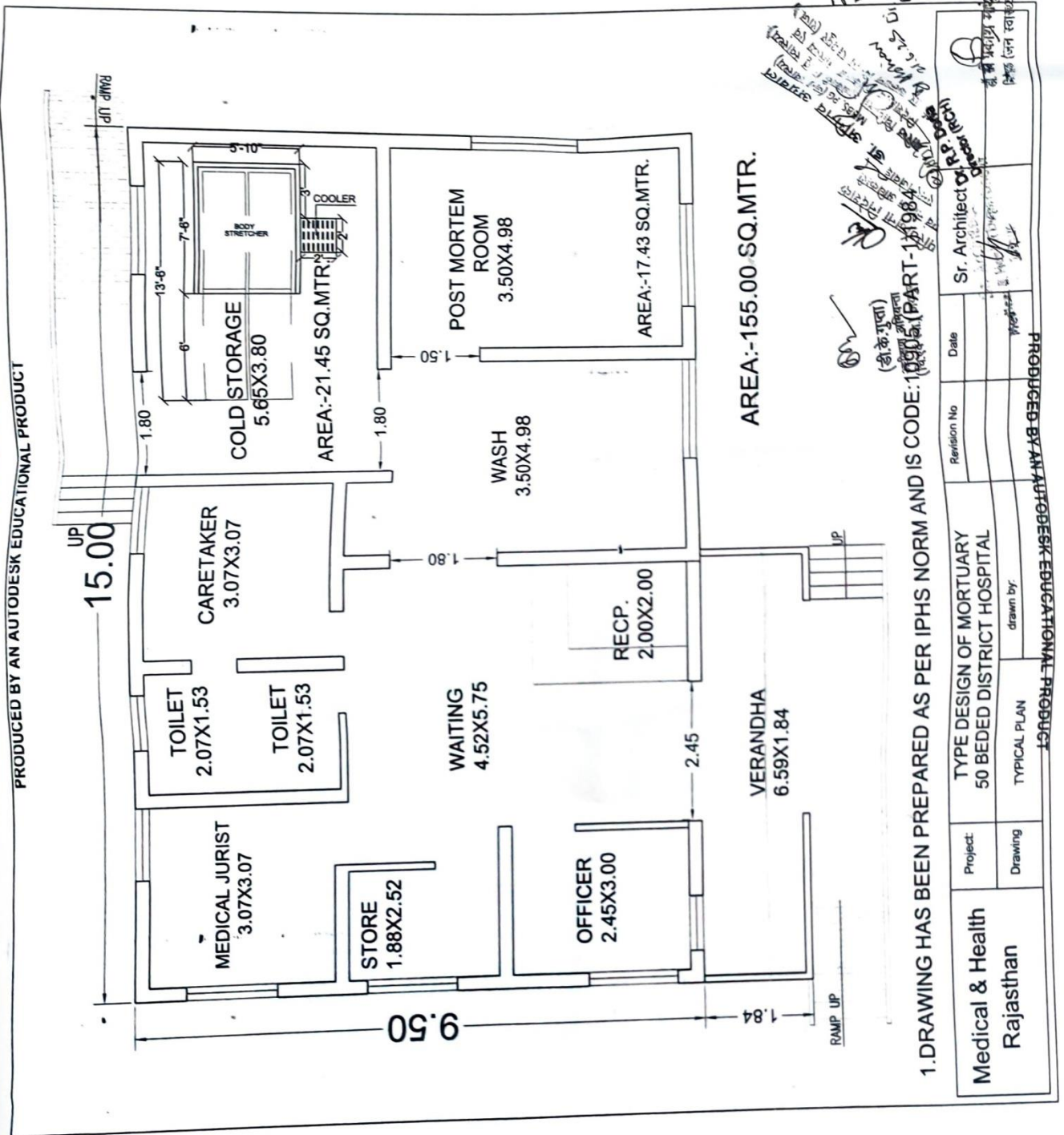


Dr. K. L. Meena
Director (RCH)

Dr. K. L. Meena
Director (RCH)

Dr. K. L. Meena
Director (RCH)

PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT

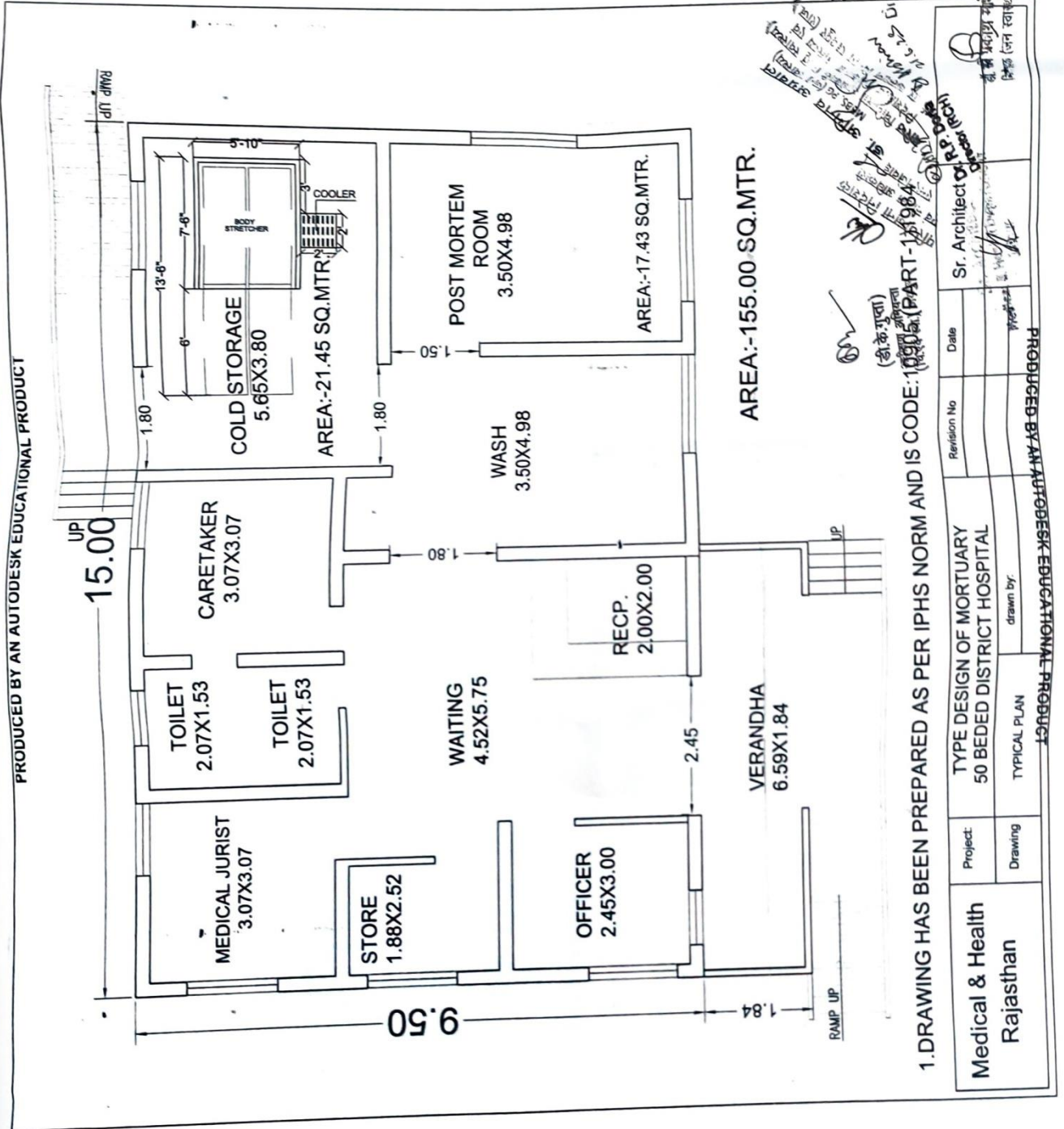


1. DRAWING HAS BEEN PREPARED AS PER IPHS NORM AND IS CODE: 109015 (PART-1) 1984

Project: Medical & Health Rajasthan	Type	TYPE DESIGN OF MORTUARY	Revision No.	Date	Sr. Architect Dr. B. B. Sharma
	Drawing	50 BEDED DISTRICT HOSPITAL			
TYPICAL PLAN		drawn by:			

Dr. B. B. Sharma
Sr. Architect
Project Director, IPHS
21.02.84

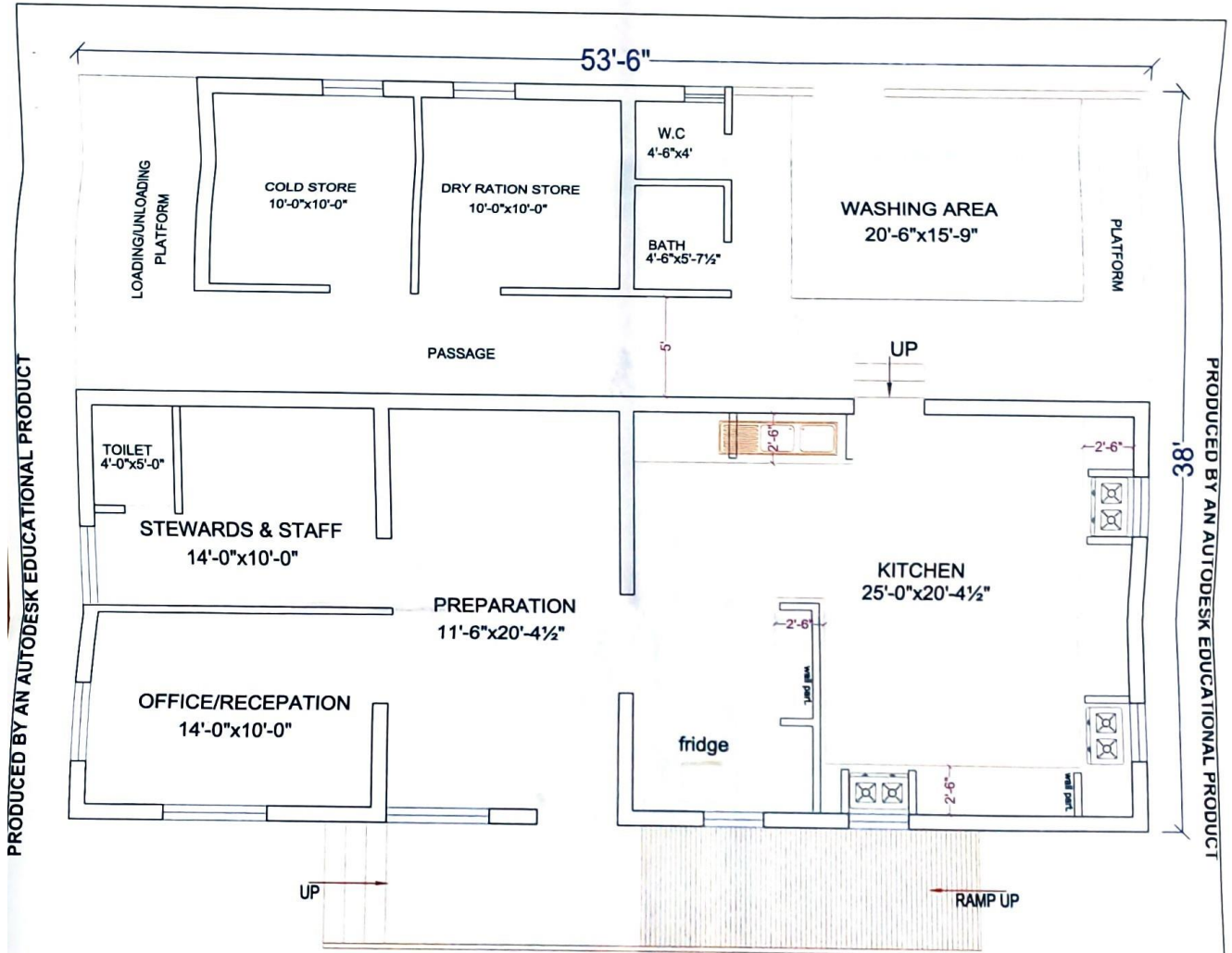
PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT



Medical & Health Rajasthan		Project	TYPE DESIGN OF MORTUARY 50 BEDD DISTRICT HOSPITAL	Revision No	Date	Sr. Architect of
Drawing		drawn by	TYPICAL PLAN			

1. DRAWING HAS BEEN PREPARED AS PER IPHS NORM AND IS CODE: 10901a (PART-1) 1984

Dr. B. B. Sharma
Medical Officer
Rajasthan
Project Director, CH, NHM
21/11/2022



AREA:-1777.00 SQ. FT.

1.DRAWING HAS BEEN PREPARED AS PER IPHS NORM AND IS CODE:10905 (PART-1)1984

Medical & Health Rajasthan	Project:	TYPE DESIGN OF KITCHEN 50 BEDED DISTRICT HOSPITAL		Revision No	Date	Sr. Architect
	Drawing	TYPICAL PLAN	drawn by:			

(डी.के.गुप्ता)
अधीक्षण अभियन्ता
(वि.एवं स्वा.) जयपुर

Dr. R.P. Doria
Director (RCH)

Dr. R.B. Jaiswal
Nodal Officer

Dr. P. Pradyumn
Project Director

[Validate](#)[Print](#)[Help](#)**Item Rate BoQ**

Tender Inviting Authority: JAIPUR DEVELOPMENT AUTHORITY, JAIPUR

Name of Work: Construction of 50 bedded Satellite Hospital at Achrol (Delhi Road), Zone 13, JDA, Jaipur on Engineering Procurement and Construction (EPC) Basis

Contract No: JDA/EE 13/22/2023-24

Bidder Name :						
PRICE SCHEDULE (This BOQ template must not be modified/replaced by the bidder and the same should be uploaded after filling the relevant columns, else the bidder is liable to be rejected for this tender. Bidders are allowed to enter the Bidder Name and Values only)						
NUMBER	TEXT #	NUMBER #	TEXT #	NUMBER #	NUMBER #	TEXT #
Sl. No.	Item Description	Quantity	Units	BASIC RATE In Figures To be entered by the Bidder Rs. P Rates are including GST	TOTAL AMOUNT Without Taxes	TOTAL AMOUNT In Words
1	2	3	4	5	6	7
1	Construction of 50 bedded Satellite Hospital at Achrol (Delhi Road), Zone 13, JDA, Jaipur	1	Lumsum		0.00	INR Zero Only
Total in Figures					0.00	INR Zero Only
Quoted Rate in Words		INR Zero Only				