Government of Himachal Pradesh

Ropeways and Rapid Transport System Development Corporation HP Ltd.

प्रदूषण मुक्त यातायात के लिए हिमाचल की पहल

U.S. CLUB SHIMLA-172001
HIMACHAL PRADESH

TENDER DOCUMENT FOR

Construction of Indoor Sports Hall in PEB with LGSF Structure including water supply, drainage, sanitary installation, internal & external electrical installations, firefighting, fire alarm system and all other related works on Engineering, Procurement and Construction (EPC) contract mode at Nurpur, Kangra (Himachal Pradesh)

Tender Number: ……
Date: 01/06/2021
Project Cost: Rs. 525 Lacs

2. INDEX

NAME OF THE WORK: Construction of Indoor Sports Hall in PEB with LGSF Structure including water supply, drainage, sanitary installation, internal & external electrical installations, firefighting, fire alarm system and all other related works on Engineering, Procurement and Construction (EPC) contract mode at Nurpur, Kangra (Himachal Pradesh)

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3. NOTICE INVITING TENDER

(SECTON – I)

NOTICE INVITING TENDER (NIT)

NIT No. ……. **Dated: 01/06/2021**

Ropeways and Rapid Transport System Corporation Limited (RTDC), A Govt. of Himachal Pradesh Undertaking, for and on behalf of Governor of Himachal Pradesh invites "**Online Tenders"** on **"Engineering Procurement and Construction (EPC) mode"** from experienced and competent bidders, meeting prescribed qualifying criteria as mentioned in tender document.

1.	Name of Work / Project	:	Construction of Indoor Sports Hall in PEB with LGSF Structure including water supply, drainage, sanitary installation, internal & external electrical installations, firefighting, fire alarm system and all other related works on Engineering, Procurement and Construction (EPC) contract mode at Nurpur, Kangra (Himachal Pradesh)
2.	Site / Location	:	Nurpur in Kangra (Himachal Pradesh)
3.	Website for viewing/Downloading Tender	:	https://hptenders.gov.in
4.	Website to submit the Tender Online		https://hptenders.gov.in
5.	Estimated Cost of Work inclusive of O &M Cost	:	Rs 525 Lacs inclusive of GST
6.	Cost of Tender Document	:	Rs. 10,000/- Plus GST (in form of Demand Draft in favour of General Manager, RTDC payable at Shimla)
7.	Amount of Earnest Money Deposit	:	Rs. 5.0 Lakhs (Refundable) in the form of D.D./Banker's cheque/FDR/ Bank Guarantee in favors of 'Ropeways and Rapid Transport System Development Corporation HP Limited' payable at Shimla
8.	Project Completion Period	:	7.5 Months from the Date of Award
9.	Defect Liability Period		**12 months** from the date of handing over the completed building to the engineer in charge except for the items specifically mentioned in this tender document. Other related details are elaborated in the tender document.
10.	Validity of Bid/Tender		120 Days
11.	Pre Bid Meeting	:	07/06/2021 at 15:00 hours through VC

12.	Offline Submission of Technical document, Tender Fees, EMD etc.as detail in Tender for bidders**.**		24/06/2021 up to 14:30 hours in the office of Chief General Manager, RTDC
13.	Online Submission of BID		24/06/2021 up to 14:30 hours on the website https://hptenders.gov.in
14.	Opening of Technical Bid	:	24/06/2021 at 15:00 hours
15.	Online opening of Financial Bid	:	To be Intimated to Technical Qualified Bidders.
16.	Communication address during Tendering and execution of works	:	**Chief General Manager** **Ropeways & Rapid Transport System Development Corporation HP Ltd. Us Club Shimla-172001** E-mail: cgmrtdchp@gmail.com Phone: 01772811001,01772811003
Exemption in Tender document fee & EMD by Micro, Small & Medium Enterprises registered with NSIC: NOT APPLICABLE			
***If the office of RTDC happens to be closed on the last date and time mentioned for any of the event, the said event will take place o10n the next working day at the same time and venue.			

The intending bidder must read the terms and conditions carefully. He should submit his bid only if he considers himself eligible and he is in possession of all the documents as required.

The tender document has to be downloaded from above specified websites. Bidders are advised to visit above specified websites regularly for updates /Amendments/ Corrigendum, if any. The Updates/Corrigendum/Addendum shall be followed up to submission of tender and it will be the part of tender. The full details about the work, specifications, Drawings, terms and conditions shall be available in the Tender Document.

The purpose of this NIT is to provide interested parties with information to assist the preparation of their bid. While RTDC has taken due care in the preparation of the information contained herein, and believe it to be complete and accurate, neither it nor any of its authorities or agencies nor any of its respective officers, employees, agents or advisors give any warranty or make any representations, expressed or implied as to the completeness or accuracy of the information contained in this document or any information which may be provided in association with it.

Further, RTDC does not claim that the information is exhaustive. Respondents to this NIT are required to make their own inquiries/ surveys and will be required to confirm, in writing, that they have done so and they did not rely solely on the information in NIT. RTDC is not responsible if no due diligence is performed by the bidders.

The tender document can be downloaded from https://hptenders.gov.in (website). “Corrigendum if any would appear only on the https://hptenders.gov.in (website) and not to be published in any News Paper”.

The Bidder if required may submit queries in writing on E-mail Id cgmrtdchp@gmail.com & gmrtdchp@gmail.com before or up to 07/06/2021.

IMPORTANT POINTS

The bidder should be a registered contractor of appropriate class having valid registration with HPPWD/HPJSW.

All Bidders are hereby cautioned that Bids containing any deviation or reservation as described in Clauses of “Instructions to Bidders” shall be considered as non-responsive and shall be summarily rejected.

RTDC reserves the right to accept or reject any or all bids without assigning any reasons. No Bidder shall have any cause of action or claim against the RTDC for rejection of his Bid and will not be bound to accept the lowest or any other tender.

No reimbursement of cost of any type or on any account will be paid to persons or entities submitting their Bid.

All information submitted in response to this NIT shall be the property of RTDC and it shall be free to use the concept of the same at its will.

It is hereby declared that RTDC is committed to follow the principle of transparency, equity and competitiveness in public procurement. The subject Notice Inviting Tender (NIT) is an invitation to offer made on the condition that the Bidder will sign the integrity Agreement, which is an integral part of tender/bid documents, failing which the tenderer/bidder will stand disqualified from the tendering process and the bid of the bidder would be summarily rejected. This declaration shall form part and parcel of the Integrity Agreement and signing of the same shall be deemed as acceptance and signing of the Integrity Agreement on behalf of the RTDC.

For and on behalf of

RTDC Chief General

Manager

4. INSTRUCTION TO BIDDER

(SECTON – I)

INSTRUCTIONS TO BIDDER

The purpose of these instructions to serve as a guide to Bidders for preparing offer for carrying out the project in all respect.

a) Submission of a tender by a tenderer implies that the tenderer has read this notice and all other Tender Documents and has made himself aware of the scope, the specifications, conditions of contract, local conditions and other factors having bearings on the execution of the work.

b) RTDC desires that the bidders, suppliers, and Sub-contractors under the Project, observe the highest standard of ethics during the performance, procurement and execution of such contracts. In pursuance of this requirement, RTDC, defines, for the purposes of this provision, the terms set forth below:

i. "Corrupt Practice" means the offering, giving, receiving, or soliciting, directly or indirectly, anything of value to influence improperly the actions of another party;

ii. "Fraudulent Practice" means any act of submission of forged documentation, or omission, including a misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation, or to succeed in a competitive bidding process;

iii. "Coercive Practice" means impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party;

iv. "Collusive Practice" means an arrangement between two or more parties designed to achieve an improper purpose, including influencing improperly the actions of another party.

Will reject the award of Contract, even at a later stage, if it determines that the bidder recommended/ selected for award/awarded has, directly or through an agent, engaged in Corrupt, Fraudulent, Collusive, Or Coercive Practices in competing for the Contract;

Will sanction a party or its successors, including declaring ineligible, either indefinitely or for a stated period of time, to participate in any further bidding/procurement proceedings under the Project, if it at any time determines that the party has, directly or through an agent, engaged in Corrupt, Fraudulent, Collusive, Or Coercive Practices in competing for, or in executing, the contract; and

The party may be required to sign an Integrity Pact, if required; and RTDC will have the right to require the bidders, or its suppliers, contractors and consultants to permit RTDC to inspect their accounts and records and other documents relating to the bid submission and contract performance and to have them audited by auditors appointed by RTDC at the cost of the bidders.

The Bidder must obtain for himself on his own responsibility and at his own expenses all the information which may be necessary for the purpose of making a bid and for entering into a contract, must examine the Drawings, must inspect the sites of the work, acquaint himself with all local conditions, means of access to the work, nature of the work and all matters pertaining thereto. RTDC will in no case be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.

c) The Contract shall be governed by each SECTION OF TENDER DOCUMENT i.e. instructions to bidders, selection & qualifying criteria, scope of works, General Conditions for Contract (GCC), Special Conditions for Contract (SCC), Annexures, Forms, Drawings, Technical Specification, Addendum / Clarification / Corrigendum etc. and all other Conditions mentioned in the tender documents.

d) All Bidders are hereby explicitly informed that conditional offers or offers with deviations from the Conditions of Contract, the bids not meeting the minimum eligibility criteria, Technical Bids not accompanied with EMD and Tender Document Fees of requisite amount in acceptable format, Bids in altered/modified formats, or in deviation with any other requirements stipulated in the tender documents are liable to be rejected.

e) RTDC reserves the right to waive minor deviations if they do not materially affect the capability of the Tenderer to perform the contract

f) The bidders shall not tamper or modify any part of the tender documents in any manner. In case in part of the bid is found to be tampered or modified at any stage, the bids are liable to be rejected, the contract is liable to be terminated and the full earnest deposit/retention money/performance guarantee will be forfeited and the bidder will be liable to be banned from doing any business with RTDC.

g) Incomplete Price bid shall be liable to be rejected, at the discretion of RTDC. The total bid price shall cover the entire scope of works covered in the tender.

h) The intending bidder must read the terms and conditions of RTDC carefully. He should only submit this tender if he considers himself eligible and he is in possession of all the documents required.

EARNEST MONEY DEPOSIT (EMD)

The Earnest Money Deposit in favor of Ropeways and Rapid Transport System Development Corporation HP Limited payable at Shimla, Himachal Pradesh of the amount **as mentioned in NIT** will be submitted only in the following forms:

- Banker's cheque of a Scheduled Bank.
- Demand Draft of a Scheduled Bank.
- Fixed Deposit Receipt (FDR) of a Scheduled Bank in the name of Ropeways and Rapid Transport System Development Corporation HP Limited.
- Bank Guarantee issued by a scheduled bank

The EMD of unsuccessful tenderer(s) will be refunded after finalization of tender process. The Earnest Money deposit submitted by the successful tenderer shall be retained by RTDC until the Performance Bank Guarantee (PBG) is submitted.

The successful Tenderer shall accept the Letter of Award within 15 (Fifteen) days from receipt of the same, failing which the EMD shall be forfeited and the award of work may be liable to be cancelled.

If any tenderer withdraws or make any changes in his offer already submitted before the expiry of the above validity period or any extension thereof without the written consent of RTDC, the EMD amount will be forfeited for such act of the tenderer.

RTDC reserves the right of forfeiture of Earnest Money deposit (EMD) in case of the successful tenderer.

i. After opening of Tender, revokes his tender within the validity period or increases his earlier quoted rates.

ii. Does not commence the work within the period as per Letter of Award/Contract. In case the Letter of Award/Contract is silent in this regard then within 15 days after award of contract.

iii. EMD shall not carry any interest.

3.0 COST OF BIDDING

The Bidder shall bear all costs associated with the preparation and submission of the Bid as well as costs associated for facilitating the evaluation. RTDC shall in no case be responsible or liable for these costs, regardless of the conduct or outcome of the bidding process.

4.0 LANGUAGE OF BID

The Bid and all related correspondence and documents relating to the Project shall be in English language only. Supporting documents and printed literature furnished by the Bidder may be in another language provided they are accompanied by an accurate English translation which shall be certified by a qualified translator. Any material that is submitted in a language other than English and which is not accompanied by an accurate English translation will not be considered.

5.0 CURRENCY OF BID

Bid prices shall be quoted in Indian Rupees. Tender submitted by tenderer shall remain valid for acceptance as mentioned in NIT from the date set for submission of the tender. The tenderer shall not be entitled within the said period to revoke or cancel or vary the tender given or any item thereof, without the consent of RTDC. In case tenderer revokes, cancels, or varies his tender in any manner without the consent of RTDC, within this period, his earnest money will be forfeited.

ANNEXURES

The successful Bidder shall submit the following formats and also follow the guidelines as per "**Section of Annexures"** mentioned in tender document.

ANNEXURE - I	:	FORMAT FOR GUARANTEE BONDS / AFFIDAVIT FOR WORK
ANNEXURE - II	:	FORMAT FOR GUARANTEE BOND FOR WATER PROOFING TREATMENT
ANNEXURE - III	:	FORMAT FOR PERFORMANCE SECURITY
ANNEXURE - IV	:	FORMAT FOR ADVANCE PAYMENT BANK GUARANTEE
ANNEXURE - V	:	FORMAT FOR BANK GUARANTEE (SECURITY DEPOSIT)
ANNEXURE - V	:	SAFETY CODES
ANNEXURE - VI ARRANGEMENTS	:	MODEL RULES FOR THE PROTECTION OF HEALTH AND SANITARY

RTDC reserves the right to reject any or all the bids or to cancel the Tender, without assigning any reason(s) whatsoever.

For & on behalf of RTDC

5. GENERAL GUIDELINES TO THE BIDDER

(SECTON – II)

1.0 SITE VISIT

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

2.0 PRE-BID MEETING

The pre-bid meeting will be held as mentioned in the NIT.

3.0 QUALIFYING CRITERIA: TECHNICAL BID SUBMISSION

The intending bidder must read the terms and conditions of RTDC carefully. He should only submit this tender if he considers himself eligible and he is in possession of all the documents required. The Bidder shall also submit the Technical BID Only in physical form at RTDC's office on or before Bid submission date and time.

The Technical Bid shall be submitted with following documents. **All the documents must be Serial wise as stated below along with check list and clearly marked page no. on each page *(MANDATORY*).**

Format of Check List				
S.N	**Particular of Document**	**Yes**	**No**	**Page Nos. (from – to)**
a)	Authorization Letter to sign the Tender on bidder's original letter head or Power of attorney			
b)	EMD of amount as mentioned in NIT.			
c)	Demand Draft for Tender Fees of the amount as mentioned in NIT.			
d)	Letter of Transmittal on bidder's original letter Head to submit Technical Bid.			
e)	Yearly sales Turnover and Audited Balance Sheet for Last 5 (five) years ending on the financial year 2020-21			

Format of Check List				
S.N	**Particular of Document**	**Yes**	**No**	**Page Nos. (from – to)**
	• The contractor should not have incurred any loss (profit after tax should be positive) in more than two years during last five years ending 2020-21 duly audited and ***Attested by the Independent Chartered Accountant***. **(Form-A)**			
	• **Turnover:** Average annual financial turnover **on Construction works** should be at least 50% of the estimated cost of work during the immediate last 3 consecutive financial years ending 2020-21. This should be duly audited by the Chartered Accountant doing Statutory Audit.			
	• Full Balance Sheet and Profit & loss Statement of Bidder should be verified by Chartered Accountant.			
	• The contractor should also have satisfactorily completed the similar types of works as mentioned below during the last seven years ending previous day of last date of submission of tender.			
	A i) One similar completed work costing not less than 70% of the estimated cost of work. Or ii) Two similar completed works of order value each not less than 50% of the estimated cost of work. Or iii) Three similar completed works of order value not less than 30% of the estimated cost of work. Note: "Similar work" refers to a work involving **building including Civil, plumbing, firefighting, Electrical works and interior finishing works**. The bidder's shall submit Completion Certificate(s) mentioning name, nature of work(s), value(s) of the job(s), date(s) of commencement, stipulated date(s) of completion and actual date(s) of completion along-with LOI(s)/W.O(s) from respective Owner(s)/Client(s). And B i) One completed work of PEB (LGSF/HR Steel/ PUF) of the minimum cost of Rs 150 lacs Or ii) Two completed works of PEB (LGSF/HR Steel/PUF) of the minimum cost of 75 lacs each.			

f)	The bidder must not have two or more ongoing works in RTDC at the time of opening of bids.			
g)	Name, Address, details of the Organization, Name(s) of the Owner/Partners/Promoters and Directors of the firm / company. **(Form-B)**			
h)	Copy of P.F and PAN Number.			
Format of Check List				
S.N	**Particular of Document**	**Yes**	**No**	**Page Nos. (from – to)**
i)	**Goods and Service Tax (GST):** Bidders are advised to get themselves registered for GST, which are mandatory, as per Govt. of India notification regarding GST. Accordingly, bidder shall submit relevant documents if already registered. If not registered till date of submission of bid, bidder will give undertaking on bidder letter head stating that they will get registered in GST as per Govt. norms before submission of bills.			
j)	The bidder should be a registered contractor having valid registration of HPPWD/HPJSV. **Documentary Proof is required.**			
k)	Bidder should not be blacklisted/ debarred by any Government/ semi Government Department/ PSU. Bidders shall give undertaking for not being involved in any form of corrupt and fraudulent practices. **(Form-C).**			
l)	Letter of understanding the project site on bidder letter Head **(Form-D).**			
m)	'No Deviation Certificate' in prescribed format in Bidder's Letter Head **(Form-E).**			
n)	Consent Letter to execute the Integrity Pact **(Form-F).**			
o)	Bidder shall submit Information on litigation history, liquidated damages, disqualification etc. in bidder Letter Head **(Form-G)**.			
p)	Each page of the all Volume of Tender document & Addendum/ Corrigendum shall be duly signed by the bidders submitting the Tender in token of his/their having acquainted himself/ themselves and accepted the entire tender documents including various conditions of contract. Any Bid with any of the Documents not so signed is liable to be rejected at the discretion of RTDC.			

SUBMISSIONS OF TECHNICAL BID

The Bidder shall also submit the Technical BID only in physical form at RTDC's office on or before Bid submission date and time, comprising of the following documents along with supporting documents as appropriate:

Checklist for Submission (Envelope A, B & C):

a. Envelope A will contain:

1. Demand Draft towards cost of tender document / Acknowledgement towards cost of tender fee submission.
2. FDR or Bank Guarantee of any Nationalized or Commercial Scheduled Bank against EMD/ FDR in favor GM, RTDC shall be as per this Notice Inviting Tender.

b. Envelope B will contain:

(i) **All the documents in ORIGINAL, mentioned in "Section-II: Selection and Qualifying Criteria" in Para 3: Qualifying Criteria for Technical Bid i.e. at Sr. No. (a) to (o) along with checklist & page numbering *(MANDATORY)*** in separate sealed envelope clearly labeled as "TECHNICAL BID" for the Work (Write Name of Work/Project as mentioned in NIT) along with Details of Bidders Address, Phone, E-mail on Envelope.

(ii) **All other documents/FORMS as asked in the Tender Document.**

c. The Financial Bid Shall be submitted Online Only.

NOTE: All above Two envelopes shall be submitted in one single envelope clearly labeled as "Technical BID" for the Work (Write Name of Work/Project as mentioned in NIT) along with Details of Bidders Address, Phone, E-mail on Envelope before last date & time of submission of Tender Document.

5.0 CONTENTS OF FINANCIAL BID

The Financial Bid shall be submitted online only on the portal/website mentioned in the NIT.

The estimated cost mentioned in NIT is based on market rates/DSR 2018/PAR 2019. The quoted cost filled in Summary of Cost, by bidders, should include all associated costs with the project including any out of pocket / mobilization expenses/ Custom duty (if any), Buildings and other construction workers welfare cess, TDS, taxes (including GST) if any applicable as per Govt. terms, shall be paid by the Contractor. The Goods and Services Tax (GST) shall not be paid extra over quoted cost.

It is mandatory to bidders to deposit GST within time limit framed by Govt. of India, if applicable. The Goods and Services Tax (GST), shall be reimbursed to the Agency only after uploading of bills by Contractor on GST Portal "to avail Input benefit of GST".

RTDC shall be performing all its duties of deduction of TDS and other deduction on payment made to the contractor as per applicable legislation in force on the date of submission of bid or to be newly / amended introduced during the execution of the Contract.

The tenderer shall quote cost up to zero decimal and as well as in words. In case of any discrepancy rate quoted in words shall prevail.

The payment will be made in percentage as per the schedule of stage wise payment.

6.0 OPENING OF FINANCIAL BID

The financial bids of the technically qualified bidders shall be opened at the notified date & time mentioned in NIT.

For & on behalf of RTDC

GENERAL CONDITIONS OF CONTRACT
(SECTON – III)

INDEX

1	GENERAL RULES AND DIRECTIONS
2	CONDITIONS OF CONTRACT
3	CLAUSE OF CONTRACT
4	CONTRACTORS LABOUR REGULATIONS

GENERAL CONDITIONS TO CONTRACT

1.0 GENERAL RULES AND DIRECTIONS

General Rules & Directions	1.	The work proposed for execution by contract will be notified in a form of invitation to tender by publication in News-papers and / or posted on website as the case may be. This form will state the work to be carried out, as well as the date for submitting and opening tenders and the time allowed for carrying out the work, also the amount of earnest money to be deposited with the tender, and the amount of the security deposit and Performance guarantee to be deposited by the successful tenderer and the percentage, if any, to be deducted from bills. Copies of the specifications, designs and drawings and any other documents required in connection with the work signed for the purpose of identification by the officer inviting tender shall also be open for inspection by the contractor at the office of officer inviting tender during office hours.
	2.	In the event of the tender being submitted by a Partnership firm, it must be signed separately by each partner thereof or in the event of the absence of any partner, it must be signed on his behalf by a person holding a Power of Attorney authorizing him to do so, such power of attorney to be produced with the tender, and it must disclose that the firm is duly registered under the Indian Partnership Act, 1952.
	3.	Receipts for payment made on account of work, when executed by a firm, must also be signed by all the partners, except where contractors are described in their tender as a firm, in which case the receipts must be signed in the name of the firm by one of the partners, or by some other person having due authority to give effectual receipts for the firm
Applicable for Item Rate Tender only (CPWD - 8)	4	Any person who submits a tender shall fill up the usual printed form, stating at what rate he is willing to undertake each item of the work. Tenders, which propose any alteration in the work specified in the said form of invitation to tender, or in the time allowed for carrying out the work, or which contain any other conditions of any sort, including conditional rebates, will be summarily rejected. Tender shall have the name and number of the works to which they refer, written on the envelopes. The rate(s) must be quoted in decimal coinage. Amounts must be quoted in full rupees by ignoring fifty paisa and considering more than fifty paisa as rupee one. In case the lowest tendered amount (worked out on the basis of quoted rate of Individual items) of two or more contractors is same, then such lowest contractors may be asked to submit sealed revised offer (through limited tender process) quoting rate/ cost of work of each item of the schedule of quantity for all sub sections/sub heads as the case may be, but the revised quoted rate of each item of schedule of quantity for all sub sections/sub heads should not be higher than their

		respective original rate quoted already at the time of submission of tender. The lowest tender shall be decided on the basis of revised offer.
		If the revised tendered amount (worked out on the basis of quoted rate of individual items) of two or more contractors received in revised offer is again found to be equal, then the lowest tender, among such contractors, shall be decided by draw of lots and the lowest contractors those have quoted equal amount of their tenders. In case of any such lowest contractor in his revised offer quotes rate of any item more than their respective original rate quoted already at the time of submission of tender, then such revised offer shall be treated invalid. Such case of revised offer of the lowest contractor or case of refusal to submit revised offer by the lowest contractor shall be treated as withdrawal of his tender before acceptance and 50% of his earnest money shall be forfeited. In case all the lowest contractors those have same tendered amount (as a result of their quoted rate of individual items), refuse to submit revised offers, then tenders are to be recalled after forfeiting 50% of EMD of each lowest contractors. Contractor, whose earnest money is forfeited because of non-submission of revised offer, or quoting higher revised rate(s) of any item(s) than their respective original rate quoted already at the time of submission of his bid shall not be allowed to participate in the retendering process of the work.
Applicable for Percentage Rate Tender only	4A	In case of Percentage Rate Tenders, contractor shall fill up the usual printed form, stating at what percentage below/above (in figures as well as in words) the total estimated cost given in Schedule of Quantities at Schedule-A, he will be willing to execute the work. The tender submitted shall be treated as invalid if :- I. The contractor does not quote percentage above/below on the total amount of tender or any section/sub head of the tender. II. The percentage above/below is not quoted in figures & words both on the total amount of tender or any section/sub head of the tender. III. The percentage quoted above/below is different in figures & words on the total amount of tender or any section/sub head of the tender. Tenders, which propose any alteration in the work specified in the said form of invitation to tender, or in the time allowed for carrying out the work, or which contain any other conditions of any sort including conditional rebates, will be summarily rejected.

	4B	In case the lowest tendered amount (estimated cost + amount worked on the basis of percentage above/below) of two or more contractors is same, such lowest contractors will be asked to submit sealed revised offer in the form of letter mentioning percentage above/ below on estimated cost of tender including all sub sections/sub heads as the case may be, but the revised percentage quoted above/below on tendered cost or on each sub section/ sub head should not be higher than the
		percentage quoted at the time of submission of tender. The lowest tender shall be decided on the basis of revised offers. In case any of such contractor refuses to submit revised offer, then it shall be treated as withdrawal of his tender before acceptance and 50% of earnest money shall be forfeited. If the revised tendered amount of two more contractors received in revised offer is again found to be equal, the lowest tender, among such contractors, shall be decided by draw of lots in the presence of Chief General Manager, RTDC & the lowest contractors those have quoted equal amount of their tenders. In case all the lowest contractors those have quoted same tendered amount, refuse to submit revised offers, then tenders are to be recalled after forfeiting 50% of EMD of each contractor. Contractor(s), whose earnest money is forfeited because of non-submission of revised offer, shall not be allowed to participate in the re-tendering process of the work.
	5.	The officer inviting tender or his duly authorized assistant, will open tenders in the presence of any intending contractors who may be present at the time
	6.	RTDC shall have the right of rejecting all or any of the tenders and will not be bound to accept the lowest or any other tender
	7.	The receipt of an accountant or clerk for any money paid by the contractor will not be considered as any acknowledgment or payment to the officer inviting tender and the contractor shall be responsible for seeing that he procures a receipt signed by the officer inviting tender or a duly authorized Cashier.

Applicable for Item Rate Tender only	8.	In the case of Item Rate Tenders, only rates quoted shall be considered. Any tender containing percentage below/above the rates quoted is liable to be rejected. Rates quoted by the contractor in item rate tender in figures and words shall be accurately filled in so that there is no discrepancy in the rates written in figures and words. However, if a discrepancy is found, the rates which correspond with the amount worked out by the contractor shall unless otherwise proved be taken as correct. If the amount of an item is not worked out by the contractor or it does not correspond with the rates written either in figures or in words, then the rates quoted by the contractor in words shall be taken as correct. Where the rates quoted by the contractor in figures and in words tally, but the amount is not worked out correctly, the rates quoted by the contractor will unless otherwise proved be taken as correct and not the amount. In event no rate has been quoted for any item(s), leaving space both in figure(s), word(s), and amount blank, it will be presumed that the contractor has included the cost of this/these item(s) in other items and rate for such item(s) will be considered as zero and work will be required to be executed accordingly.
		However, if a tenderer quotes nil rates against each item in item rate tender, the tender shall be treated as invalid and will not be considered as lowest tenderer and earnest money deposited shall be forfeited.
Applicable for percentage Rate Tender only	9.	In case of Percentage Rate Tenders only percentage quoted shall be considered. Any tender containing item rates is liable to be rejected. Percentage quoted by the contractor in percentage rate tender shall be accurately filled in figures and words, so that there is no discrepancy.
Applicable for Percentage Rate Tender only	10.	In Percentage Rate Tender, the tenderer shall quote percentage below/above (in figures as well as in words) at which he will be willing to execute the work. He shall also work out the total amount of his offer and the same should be written in figures as well as in words in such a way that no interpolation is possible. In case of figures, the word 'Rs.' should be written before the figure of rupees and word 'P' after the decimal figures, e.g. 'Rs. 2.15P and in case of words, the word 'Rupees' should precede and the word 'Paisa' should be written at the end..

	11.	(i) The Contractor, whose tender is accepted, will be required to furnish performance guarantee of 5% (Five Percent) of the tendered amount within the period specified in Special Conditions of Contract. This guarantee shall be in the form of DD (in case guarantee amount is less than Rs. 10,000/-) or Deposit at call receipt of any scheduled bank/Banker's cheque of any scheduled bank/Demand Draft of any scheduled bank/Pay order of any scheduled bank (in case guarantee amount is less than Rs. 1,00,000/-) or Government Securities or Fixed Deposit Receipts or Guarantee Bonds of any Scheduled Bank or the State Bank of India in accordance with the prescribed form. (ii) The person/persons whose tender(s) may be accepted (hereinafter called contractor, shall permit Government at the time of making any payment to him for work done under the contract to deduct such sum @ 5% of the gross amount of each running bill till the sum along with sum already deposited as earnest money ,will amount to security deposit of 5% of the tendered value of the work by way of security deposit unless he /they has/have deposited the amount of security at the rate mentioned above in cash or in the form of fixed deposit receipt or NSC from any post office in Himachal Pradesh. The security shall be deducted @5% (without any limit) from the running bills of the contractor. However, the security amount in excess of Rs.2.00 Lacs can be given in the shape of National Saving Certificate from any Post Office in Himachal Pradesh or fixed deposit receipt duly pledged in favour of Engineer-in-Charge. Recovery of the compensation for delay (clause-2) can be done from the security provided under this clause and from and work being executed/executed by the contractor in the state. Such deduction to be held by Government by way of Security Deposit. Provided always that the Government for this purpose shall be entitled to recover 10 (Ten) percent of the amount of each running bill till the balance of the amount of Security Deposit is released. All compensation or other sums of money payable by the contractor under the terms of this contract may be deducted from or paid by the sale of or a sufficient part of his security deposit or from the interest arising there from or from any sums which may be due to or may become due to the contractor by Government on any account whatsoever and in the event of his Security Deposit being reduced by reason of any such deductions or sale of aforesaid, the contractor shall within 10 days make good in the shape of National Saving certificate/Time Deposit Account/Post Office Saving Account in any of the Post Office in Himachal Pradesh. The security deposit shall be collected from the running bills of the contractor at the rates mentioned above and the Earnest Money if deposited in the shape of National Saving Certificate/Time Deposit Account/ Post Office Saving Account in any of the Post Office in Himachal Pradesh, at the time of tender will be treated part of the security deposit.

		Note: Govt. Securities will include all form and securities mentioned in HPFR Rules except fidelity bond. This will be subject to the observance of the conditions mentioned under this rule against each form of security. **Note :** In case a fixed deposit receipt of any 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 fixed deposit receipt, the loss caused thereby shall fall on the contractor and the contractor shall forthwith on demand during additional security to the Govt. to make good the deficit.
	12.	On acceptance of the tender, the name of the accredited representative(s) of the contractor who would be responsible for taking instructions from the Engineer-in-Charge shall be communicated in writing to the Engineer-in-Charge.
	13.	GST or any other tax applicable in respect of inputs procured by the contractor for this contract shall be payable by the Contractor and Government will not entertain any claim whatsoever in respect of the same. However, component of GST at time of supply of service (as provided in CGST Act 2017) provided by the contract shall be varied if different from that applicable on the last date of receipt of tender including extension if any.
	14.	The contractor shall give a list of RTDC employees related to him.
	15.	The tender for composite work includes, in addition to building work, all other works such as sanitary and water supply installations drainage installation, electrical work, horticulture work, roads and paths etc.
	16.	The contractor shall submit list of works which are in hand (progress) in the following form :-

	Name of Work	Name and particulars where work is being executed	Value of Work	Position of works in progress	Remarks
	(1)	(2)	(3)	(4)	(5)

	17.	The contractor shall comply with the provisions of the Apprentices 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 the contract and RTDC may in his discretion, without prejudice to any other right or remedy available in law, cancel the 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.

2.0 CONDITIONS OF CONTRACT

Definitions	1.	The Contract means the documents forming the tender and acceptance thereof and the formal agreement executed between RTDC and the Contractor, together with the documents referred to therein including these conditions, the specifications, designs, drawings 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 one another.
	2.	In the contract, the following expressions shall, unless the context otherwise requires, have the meanings, hereby respectively assigned to them: - "Client / Employer" shall mean "Ropeways and Rapid Transport System Development Corporation HP Limited", A Government of Himachal Pradesh undertaking- for execution of the Work / Project as mentioned in NIT. i. having their office at RTDC, U.S. Club Shimla-01, Himachal Pradesh India & include their successors & permitted assigns as well as their authorized officer / representatives ii. The "RTDC" shall mean Ropeways and Rapid Transport System Development Corporation HP Limited. iii. The expression **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. iv. The **Site** shall mean the land/or 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. v. The **Bidder /Contractor** shall mean the individual, firm or company, whether incorporated or not, undertaking the works and shall include the legal personal representative of such individual or the persons composing such firm or company, or the successors of such firm or company and the permitted assignees of such individual, firm or

		company who are participating in Bidding process and will Execution the project after award of the works as Contractor. vi. The **Engineer-in-Charge** means the Engineer Officer appointed by RTDC or his duly authorized representative who shall direct, supervise and be incharge of the work for the purpose of this Contract vii. **Accepting Authority** shall mean the authority mentioned in Special Conditions of Contract.
		viii. **Tenderer / Bidder** shall mean the firm/party who intends to participate in this Notice Inviting Tender ix. **Excepted Risk** are risks due to riots (other than those on account of contractor's employees), war (whether declared or not) invasion, act of foreign enemies, hostilities, civil war, rebellion revolution, insurrection, military or usurped power, any acts of Government, damages from aircraft, acts of God, such as earthquake, lightening and unprecedented floods, and other causes over which the contractor has no control and accepted as such by the Accepting Authority or causes solely due to use or occupation by Government of the part of the works in respect of which a certificate of completion has been issued or a cause solely due to Government's faulty design of works. x. **Market Rate** shall be the rate as decided by the Engineer-in- Charge on the basis of the cost of materials and labour at the site where the work is to be executed plus the percentage mentioned in Special Conditions of Contract to cover, all overheads and profits. xi. **Schedule(s)** referred to in these conditions shall mean the relevant schedule(s) annexed to the tender papers or the standard Schedule of Rates of the government mentioned in Special Conditions of Contract hereunder, with the amendments thereto issued upto the date of receipt of the tender. xii. **District Specifications** means the specifications followed by the State Government in the area where the work is to be executed. xiii. The **Contractor/Successful Bidder** shall mean the firm or company whose bid has been accepted by RTDC. xiv. **Consultant** shall mean any consultant nominated by the RTDC xv. **Tendered value** means the value of the entire work as stipulated in the letter of award. xvi. **Date of commencement of work:** The date of commencement of work shall be the date of start as specified in Special Conditions of Contract or the first date of handing over of the site, whichever is later, in accordance with the phasing if any, as indicated in the tender document. xvii. **GST** shall mean Goods and Service Tax- Central, State

		and Interstate
Scope and Performance	3.	Where the context so requires, words imparting the singular only also include the plural and vice versa. Any reference to masculine gender shall whenever required include feminine gender and vice versa.
	4.	Headings and Marginal notes to these General Conditions of Contract shall not be deemed to form part thereof or be taken into consideration in the interpretation or construction thereof or of the contract.
	5.	The contractor shall be furnished, free of cost one certified copy of the contract documents except standard specifications, and such other printed and published documents, together with all drawings as may be forming part of the tender papers. None of these documents shall be used for any purpose other than that of this contract.
Works to be carried out	6.	The work to be carried out under the Contract shall, except as otherwise provided in these conditions, include all labour, materials, tools, plants, equipment and transport which may be required in preparation of and for and in the full and entire execution and completion of the works. The descriptions given in the Schedule of Quantities/ Building Components shall, unless otherwise stated, be held to include wastage on materials, carriage and cartage, carrying and return of empties, hoisting, setting, fitting and fixing in position and all other labours necessary in and for the full and entire execution and completion of the work as aforesaid in accordance with good practice and recognized principles.
Sufficiency of Tender	7.	The Contractor shall be deemed to have satisfied himself before tendering as to the correctness and sufficiency of his tender for the works and of the **Cost** quoted in the Schedule of Quantities/ Building Components, which rates and prices shall, except as otherwise provided, cover all his obligations under the Contract and all matters and things necessary for the proper completion and maintenance of the works.
Discrepancies and Adjustment of Errors	8.	The several documents forming the Contract are to be taken as mutually explanatory of one another, detailed drawings being followed in preference to small scale drawing and figured dimensions in preference to scale and special conditions in preference to General Conditions.
	8.1	In the case of discrepancy between the schedule of Quantities/Building Components, the Specifications and/ or the Drawings, the following order of preference shall be observed:- i. Particular Specification and Special Condition, if any. ii. Drawings. iii. Description of Schedule of Quantities/ Building Components. iv. CPWD Specifications/HPPWD Specifications.

		v. Indian Standard Specifications of B.I.S.
	8.2	If there are varying or conflicting provisions made in any one document forming part of the contract, the Accepting Authority shall be the deciding authority with regard to the intention of the document and his decision shall be final and binding on the contractor.
	8.3	Any error in description, quantity or rate in Schedule of Quantities or any omission therefrom shall not vitiate the Contract or release the Contractor from the execution of the whole or any part of the
		works comprised therein according to drawings and specifications or from any of his obligations under the contract.
Signing of Contract	9.	The successful tenderer/contractor, on acceptance of his tender by the Accepting Authority, shall, within 15 days from the stipulated date of start of the work, sign the contract consisting of:- i. The notice inviting tender, all the documents including drawings, if any, forming the tender as issued at the time of invitation of tender and acceptance thereof together with any correspondence leading thereto. ii. Special Conditions of Contract consisting of: a) Various standard clauses with corrections up to the date stipulated in Special Conditions of Contract along with annexures thereto. b) Safety Code. c) Model Rules for the protection of health, sanitary arrangements for workers employed by RTDC or its contractors. d) Contractor's Labour Regulations. e) List of Acts and omissions for which fines can be imposed. iii. No payment for the work done will be made unless contract is signed by the contractor.

3.0 CLAUSES OF CONTRACT

CLAUSE 1: PERFORMANCE GUARANTEE

i The contractor shall submit an irrevocable **Performance Guarantee of 5% (Five percent) of the tendered amount** in the name of **General Manager, Ropeways and Rapid Transport System Development Corporation HP Limited**, in addition to other deposits mentioned elsewhere in the contract for his proper performance of the contract agreement, (not withstanding and/or without prejudice to any other provisions in the contract) within period specified in Special Conditions of Contract from the date of issue of letter of acceptance. This period can be further extended by the Engineer-in-Charge up to a maximum period as specified in Special Conditions of Contract on written request of the contractor stating the reason for delays in procuring the Performance Guarantee, to the satisfaction of the Engineer-in-Charge. This guarantee shall be in the form of Banker's Cheque of any scheduled bank/Demand Draft of any scheduled

bank/Pay Order of any scheduled bank (in case guarantee amount is less than Rs. 1,00,000/-) or Fixed Deposit Receipts or Guarantee Bonds of any Scheduled Bank or the State Bank of India in accordance with the form annexed hereto. In case a fixed deposit receipt of any Bank is furnished by the contractor to the RTDC as part of the performance guarantee and the Bank is unable to make payment against the said fixed deposit receipt, the loss caused thereby shall fall on the contractor and the contractor shall forthwith on demand furnish additional security to the RTDC to make good the deficit.

i **The Performance Guarantee shall be initially valid up to the stipulated date of completion plus 1 year claim period beyond that**. In case the time for completion of work gets enlarged, the contractor shall get the validity of Performance Guarantee extended to cover such enlarged time for completion of work. After recording of the completion certificate for the work by the competent authority, the performance guarantee shall be returned to the contractor, without any interest. However, in case of contracts involving maintenance of building and services/any other work after construction of same building and services/other work, then 50% of Performance Guarantee shall be retained as Security Deposit. The same shall be returned year wise proportionately.

ii The Engineer-in-Charge shall not make a claim under the performance guarantee except for amounts to which the RTDC is entitled under the contract (not withstanding and/or without prejudice to any other provisions in the contract agreement) in the event of:

a. Failure by the contractor to extend the validity of the Performance Guarantee as described herein above, in which event the Engineer-in-Charge may claim the full amount of the Performance Guarantee.
b. Failure by the contractor to pay RTDC any amount due, either as agreed by the contractor or determined under any of the Clauses/Conditions of the agreement, within 30 days of the service of notice to this effect by Engineer-in-Charge.

iv. In the event of the contract being determined or rescinded under provision of any of the Clause/Condition of the agreement, the performance guarantee shall stand forfeited in full.

v. The Performance Guarantee shall be refunded to the Contractor soon after the completion of works and issuance of the completion certificate.

CLAUSE 1A: RECOVERY OF SECURITY DEPOSIT

The person/persons whose tender(s) may be accepted (hereinafter called contractor) shall permit Government at the time of making any payment to him for work done under the contract to deduct such sum @ 5% of the gross amount of each running bill till the sum along with sum already deposited as earnest money ,will amount to security deposit of 5% of the tendered value of the work by way of security deposit unless he /they has/have deposited the amount of security at the rate mentioned above in cash or in the form of fixed deposit receipt or NSC from any post office in Himachal Pradesh.

The security shall be deducted @5% (without any limit) from the running bills of the contractor. However, the security amount in excess of Rs.2.00 Lacs can be given in the shape of National Saving Certificate from any Post Office in Himachal Pradesh or fixed

deposit receipt duly pledged in favour of Engineer-in-Charge. Recovery of the compensation for delay (clause-2) can be done from the security provided under this clause and from and work being executed/executed by the contractor in the state. Such deduction to be held by Government by way of Security Deposit. Provided always that the Government for this purpose shall be entitled to recover 10 (Ten) percent of the amount of each running bill till the balance of the amount of Security Deposit is released. All compensation or other sums of money payable by the contractor under the terms of this contract may be deducted from or paid by the sale of or a sufficient part of his security deposit or from the interest arising there from or from any sums which may be due to or may become due to the contractor by Government on any account whatsoever and in the event of his Security Deposit being reduced by reason of any such deductions or sale of aforesaid, the contractor shall within 10 days make good in the shape of National Saving certificate/Time Deposit Account/Post Office Saving Account in any of the Post Office in Himachal Pradesh. The security deposit shall be collected from the running bills of the contractor at the rates mentioned above and the Earnest Money if deposited in the shape of National Saving Certificate/Time Deposit Account/ Post Office Saving Account in any of the Post Office in Himachal Pradesh, at the time of tender will be treated part of the security deposit.

Note: Govt. Securities will include all form and securities mentioned in HPFR Rules except fidelity bond. This will be subject to the observance of the conditions mentioned under this rule against each form of security.

Note : In case a fixed deposit receipt of any 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 fixed deposit receipt, the loss caused thereby shall fall on the contractor and the contractor shall forthwith on demand during additional security to the Govt. to make good the deficit.

The Security Deposit shall be released after successful completion of Defect Liability Period. In case of Operation and Maintenance, the contractor has to submit and equivalent amount of Bank Guarantee, valid for a period equal to the period of operation and maintenance, for the release of the Security Deposit.

CLAUSE 2: COMPENSATION FOR DELAY

If the contractor fails to maintain the required progress in terms of clause 5 or to complete the work and clear the site on or before the contract or extended date of completion, he shall, without prejudice to any other right or remedy available under the purview of the Contract on account of such breach, pay as agreed compensation the amount calculated at the rates stipulated below as the authority specified in Special Conditions of Contract (whose decision in writing shall be final and binding) may decide on the amount of tendered value of the work for every completed day/month (as applicable) that the progress remains below that specified in Clause 5 or that the work remains incomplete.

This will also apply to items or group of items for which a separate period of completion has been specified.

i. Compensation for delay of work — @ 1 % per month of delay to be computed on per day basis

Provided always that the total amount of compensation for delay to be paid under this Condition shall not exceed 10% of the Tendered Value of work or of the Tendered Value

of the item or group of items of work for which a separate period of completion is originally given.

The compensation under clause 2 of the agreement at the 1st instance has to be calculated and assessed by the Engineer-in-Charge for delay in execution of work as per time schedule agreed to between the parties, after giving detailed facts of the case. The compensation can be levied by the Engineer-in-Charge and shall be confirmed by the General Manager. The General Manager on further reference, appeal or revision may confirm such compensation or reduce it. The decision of the General Manager arrived at after considering the various mitigating circumstance shall be final. The General Manager is entitled to levy provisional compensation on the recommendation of the Engineer-in-Charge and same can be modified by him if found necessary after the careful consideration of various circumstances and revised progress made by the contractor while making final confirmation of compensation in writing. Provided always that the total amount of compensation for delay to be paid under this condition shall not exceed 10% of the Tendered Value of work or to the Tendered Value of the items or group of items of work for which a separate period of completion is originally given, the amount of compensation may be adjusted or set-off against any sum payable to the contractor under this or any other contract with the Government.

In case, the contractor does not achieve a particular milestone mentioned in Special Conditions of Contract, or the re-scheduled milestone(s) in terms of Clause 5.4, the amount shown against that milestone shall be withheld, to be adjusted against the compensation levied at the final grant of Extension of Time. Withholding of this amount on failure to achieve a milestone, shall be automatic without any notice to the contractor. However, if the contractor catches up with the progress of work on the subsequent milestone(s), the withheld amount shall be released. In case the contractor fails to make up for the delay in subsequent milestone(s), amount mentioned against each milestone missed subsequently also shall be withheld. However, no interest, whatsoever, shall be payable on such withheld amount. **The compensation once conformed by the Chief General Manager is non deferrable and non-arbitral.**

CLAUSE 2A: INCENTIVE FOR EARLY COMPLETION

In the event that the Project Completion date occurs prior to the scheduled completion date, the contractor shall be entitled to receive a payment of bonus equivalent to 0.03 % (zero point zero three percent) for each day by which the project completion date precedes the schedule completion date but subject to a maximum of 5 % (Five percent) of the contract price provided, however that the payment of bonus, if any shall be made only after issue of completion certificate.

CLAUSE 3: WHEN CONTRACT CAN BE DETERMINED

Subject to other provisions contained in this clause, the Engineer-in-Charge may, without prejudice to his any other rights or remedy against the contractor in respect of any delay, inferior workmanship, any claims for damages and/or any other provisions of this contract or otherwise, and whether the date of completion has or has not elapsed, by notice in writing absolutely determine the contract in any of the following cases:

i. 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 an inefficient or otherwise improper or un workman like manner shall omit to comply with the requirement of such notice for a period of seven days thereafter.

ii. If the contractor has, without reasonable cause, suspended the progress of the work or has failed to proceed with the work with due diligence so that in the opinion 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 and continues to do so after a notice in writing of seven days from the Engineer-in-Charge.

iii. If the contractor fails to complete the work within the stipulated date or items of work with individual date of completion, if any stipulated, on or before such date(s) of completion and does not complete them within the period specified in a notice given in writing in that behalf by the Engineer-in-Charge.

iv. If the contractor persistently neglects to carry out his obligations under the contract and/ or commits default in complying with any of the terms and conditions of the contract and does not remedy it or take effective steps to remedy it within 7 days after a notice in writing is given to him in that behalf by the Engineer-in-Charge.

v. If the contractor shall offer or give or agree to give to any person in Govt. service or to any other person on his behalf any gift or consideration of any kind as an inducement or reward for doing or forbearing to do or for having done or forborne to do any act in relation to the obtaining or execution of this or any other contract for Govt.

vi. If the contractor shall enter into a contract with RTDC/Govt in connection with which commission has been paid or agreed to be paid by him or to his knowledge, unless the particulars of any such commission and the terms of payment thereof have been previously disclosed in writing to the Engineer-in-Charge.

vii. If the contractor had secured the contract with RTDC/Govt as a result of wrong tendering or other non-bonafide methods of competitive tendering or commits breach of Integrity Agreement.

viii. If the contractor being an individual, or if a firm, any partner thereof shall at any time be adjudged insolvent or have a receiving order or order for administration of his estate made against him or shall take any proceedings for liquidation or composition (other than a voluntary liquidation for the purpose of amalgamation or reconstruction) under any Insolvency Act for the time being in force or make any conveyance or assignment of his effects or composition or arrangement for the benefit of his creditors or purport so to do, or if any application be made under any Insolvency Act for the time being in force for the sequestration of his estate or if a trust deed be executed by him for benefit of his creditors.

ix. 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 the creditor to appoint a receiver or a manager or which entitle the court to make a winding up order.

x. If the contractor shall suffer an execution being levied on his goods and allow it to be continued for a period of 21 days.

xi. If the contractor assigns, transfers, sublets (engagement of labour on a piece-work basis or of labour with materials not to be incorporated in the work, shall not be deemed to be subletting) or otherwise parts with or attempts to assign, transfer, sublet or otherwise parts with the entire works or any portion thereof without the prior written approval of the Engineer-in-Charge.

xii. If work is not started by the contractor within 1/8th of the stipulated time.

When the contractor has made himself liable for action under any of the cases aforesaid, the Engineer-in-Charge on behalf of the RTDC/Govt. shall have powers:

a) To determine the contract as aforesaid (of which termination notice in writing to the

contractor under the hand of the Engineer-in-Charge shall be conclusive evidence). Upon such determination, the Security Deposit already recovered and Performance Guarantee under the contract shall be liable to be forfeited and shall be absolutely at the disposal of the RTDC/Govt..

b) To employ labour paid by the RTDC and to supply material to carry out the works 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 Chief shall be final and conclusive against the contractors) and crediting him with the value of the work done in all respects in the same manner and at the same rates as if it had been carried out by the contractor, under the terms of his contract. The certificate of the General Manager as to the value of the work done shall be final and conclusive against the contract or provided always the action under the subclause 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 should not be paid to the contractor

c) After giving notice to the contractor to measure up the work of the contractor and to take such whole, or the balance or part thereof, as shall be un-executed out of his hands and to give it to another contractor to complete the work. The contractor, whose contract is determined as above, shall not be allowed to participate in the tendering process for the balance work. In the event of above courses being adopted by the Engineer-in-Charge, the contractor shall have no claim to compensation for any loss sustained by him by reasons of his having purchased or procured any materials or entered into any engagements or made any advances on account or with a view to the execution of the work or the performance of the contract. And in case action is taken under any of the provision aforesaid, the contractor shall not be entitled to recover or be paid any sum for any work thereof or actually performed under this contract unless and until the Engineer- in-Charge has certified in writing the performance of such work and the value payable in respect thereof and he shall only be entitled to be paid the value so certified.

Clause 3A

In case, the work cannot be started due to reasons not within the control of the contractor within 1/8th of the stipulated time for completion of work or one month whichever is higher, either party may close the contract by giving notice to the other party stating the reasons. In such eventuality, the Performance Guarantee of the contractor shall be refunded within 30 days Neither party shall claim any compensation for such eventuality. This clause is not applicable for any breach of the contract by either party.

CLAUSE 4: CONTRACTOR LIABLE TO PAY COMPENSATION EVEN IF ACTION NOT TAKEN UNDER CLAUSE 3

In any case in which any of the powers conferred upon the Engineer-in-Charge by Clause-3 thereof, shall have become exercisable and the same are not exercised, the non-exercise thereof shall not constitute a waiver of any of the conditions hereof and such powers shall notwithstanding be exercisable in the event of any future case of default by the contractor and the liability of the contractor for compensation shall remain unaffected. In the event of the Engineer-in-Charge putting in force all or any of the powers vested in him under the preceding clause he may, if he so desires after giving a notice in writing to the contractor, take possession of (or at the sole discretion of the Engineer-in-Charge which shall be final and binding on the contractor) use as on hire (the amount of the hire money being also in the final determination of the Engineer-in-Charge) all or any tools,

plant, materials and stores, in or upon the works, or the site thereof belonging to the contractor, or procured by the contractor 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 the case of these not being applicable, at current market rates to be certified by the Engineer-in-Charge, whose certificate thereof shall be final, and binding on the contractor, clerk of the works, foreman or other authorized agent to remove such tools, plant, materials, or stores from the premises (within a time to be specified in such notice) in the event of the contractor failing to comply with any such requisition, the Engineer-in-Charge may remove them at the contractor's expense or sell them by auction or private sale on account of the contractor and his risk in all respects and the certificate of the Engineer-in-Charge as to the expenses of any such removal and the amount of the proceeds and expenses of any such sale shall be final and conclusive against the contractor.

CLAUSE 5: TIME AND EXTENSION FOR DELAY

The time allowed for execution of the Works as specified in the Special Conditions of Contract or the extended time in accordance with these conditions shall be the essence of the Contract. The execution of the works shall commence from such time period as mentioned in Special Conditions of Contract or from the date of handing over of the site whichever is later. If the Contractor commits default in commencing the execution of the work as aforesaid, RTDC shall without prejudice to any other right or remedy available in law, be at liberty to forfeit the performance guarantee absolutely.

As soon as possible after the Contract is concluded, the Contractor shall submit a Time and Progress Chart for each mile stone and get it approved by the RTDC. The Chart shall be prepared in direct relation to the time stated in the Contract documents for completion of items of the works. It shall indicate the forecast of the dates of commencement and completion of various trades of sections of the work and may be amended as necessary by agreement between the Engineer-in-Charge and the Contractor within the limitations of time imposed in the Contract documents, and further to ensure good progress during the execution of the work, the contractor shall in all cases in which the time allowed for any work, exceeds one month (save for special jobs for which a separate programme has been agreed upon) complete the work as per mile stones given in Special Conditions of Contract.

PROGRAMME CHART

(i) The programme chart should include the following:

(a) Descriptive note explaining sequence of the various activities.
(b) Network (PERT / CPM / BAR CHART).
(c) Programme for procurement of materials by the contractor.

Programme of procurement of machinery / equipments having adequate capacity, commensurate with the quantum of work to be done within the stipulated period, by the contractor. In addition to above, to achieve the progress of Work as per programme, the contractor must bring at site adequate shuttering material required for cement concrete and R.C.C. works etc. within 15 days from the date of start of work till the completion of RCC work as per requirement of work. The contractor shall submit shuttering schedule adequate to complete structure work within laid down physical milestone.

(ii) If at any time, it appears to the Engineer-in-Charge that the actual progress of work does not conform to the approved programme referred above or after rescheduling of milestones, the contractor shall produce a revised programme within 7 (seven)

days, showing the modifications to the approved programme to ensure timely completion of the work. The modified schedule of programme shall be approved by the Engineer in Charge.

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

If the work(s) be delayed by :-

(i) force majeure, or
(ii) abnormally bad weather, or
(iii) serious loss or damage by fire, or
(iv) civil commotion, local commotion of workmen, strike or lockout, affecting any of the trades employed on the work, or
(v) delay on the part of other contractors or tradesmen engaged by Engineer-in-Charge in executing work not forming part of the Contract, or
(vi) non-availability of stores, which are the responsibility of RTDC to supply or
(vii) non-availability or break down of tools and Plant to be supplied or supplied by RTDC or
(viii) any other cause which, in the absolute discretion of the Engineer-in-Charge is beyond the Contractor's control.

then upon the happening of any such event causing delay, the Contractor shall immediately give notice thereof in writing to the authority as indicated in Special Conditions of Contract but shall nevertheless use constantly his best endeavors to prevent or make good the delay and shall do all that may be reasonably required to the satisfaction of the Engineer-in-Charge to proceed with the works.
The contractor shall have no claim of damages for extension of time granted or rescheduling of milestone/s for events listed in sub clause 5.2

In case the work is hindered, by the Department or for any reason / event, for which the Department is responsible, ,the authority as indicated in Special Conditions of the Contract shall, if justified, give a fair and reasonable extension of time and reschedule the mile stones for completion of work Such extension of time or rescheduling of milestone/s shall be without prejudice to any other right or remedy of the parties in contract or in law; provided further that for concurrent delays under this sub clause and sub clause 5.2 to the extent the delay is covered under sub clause 5.2 the contractor shall be entitled to only extension of time and no damages.

Request for rescheduling of Mile stones and extension of time, to be eligible for consideration, shall be made by the Contractor in writing within fourteen days of the happening of the event causing delay on the prescribed form to the authority as indicated in Special Conditions of Contract. The Contractor may also, if practicable, indicate in such a request the period for which extension is desired.

With every request for rescheduling of milestones, or if at any time the actual progress of work falls behind the approved programme by more than 10% of the stipulated period of completion of contract, the contractor shall produce a revised programme without causing any delay in execution of the work.

5.1 In any such case the authority as indicated in Special Conditions of Contract

may give a fair and reasonable extension of time and reschedule the mile stones for completion of work. Such extension or rescheduling of the milestones shall be communicated to the Contractor by the authority as indicated in Special Conditions of Contract in writing, within 3 months or 4 weeks of the date of receipt of such request respectively. Non application by the contractor for extension of time/ rescheduling of the milestones shall not be a bar for giving a fair and reasonable extension/ rescheduling of the milestones by the authority as indicated in Special Conditions of Contract and this shall be binding on the contractor.

In case the work is delayed by any reasons, in the opinion of the Engineer-in-Charge, by the contractor for reasons beyond the events mentioned in clause 5. and beyond the justified extended date; without prejudice to right to take action under Clause 3, the Engineer-in-Charge may grant extension of time required for completion of work without rescheduling of milestones. The contractor shall be liable for levy of compensation for delay for such extension of time.

CLAUSE 6: MEASUREMENTS OF WORK DONE

Engineer-in-Charge shall, except as otherwise provided, ascertain and determine by measurement, the value in accordance with the contract of work done.

All measurement of all items having financial value shall be entered in Measurement Book and/or level field book so that a complete record is obtained of all works performed under the contract.

All measurements and levels shall be taken jointly by the Engineer-in-Charge or his authorized representative and by the contractor or his authorized representative from time to time during the progress of the work and such measurements shall be signed and dated by the Engineer- in- Charge and the contractor or their representatives in token of their acceptance. If the contractor objects to any of the measurements recorded, a note shall be made to that effect with reason and signed by both the parties. If for any reason the contractor or his authorized representative is not available and the work of recording measurements is suspended by the Engineer-in-Charge or his representative, the Engineer-in-Charge and the RTDC shall not entertain any claim from contractor for any loss or damages on this account. If the contractor or his authorized representative does not remain present at the time of such measurements after the contractor or his authorized representative has been given a notice in writing three (3) days in advance or fails to countersign or to record objection within a week from the date of the measurement, then such measurements recorded in his absence by the Engineer-in-Charge or his representative shall be deemed to be accepted by the Contractor.

The contractor shall, without extra charge, provide all assistance with every appliance, labour and other things necessary for measurements and recording levels.

Except where any general or detailed description of the work expressly shows to the contrary, measurements shall be taken in accordance with the procedure set forth in the specifications notwithstanding any provision in the relevant Standard Method of measurement or any general or local custom. In the case of items which are not covered by specifications, measurements shall be taken in accordance with the relevant standard method of measurement issued by the Bureau of Indian Standards and if for any item no such standard is available, then a mutually agreed method shall be followed.

The contractor shall give, not less than seven days' notice to the Engineer-in-Charge or his authorized representative 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 covered up or placed beyond the reach of measurement and shall not cover up and place beyond reach of measurement any work without consent in writing of the Engineer-in-Charge or his authorized representative in charge of the work who shall within the aforesaid period of seven days inspect the work, and if any work shall be covered up or placed beyond the reach of measurements without such notice having been given or the Engineer-in-Charge's consent being obtained in writing, 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 the materials with which the same was executed.

Engineer-in-Charge or his authorized representative may cause either themselves or through another officer of the RTDC to check the measurements recorded jointly or otherwise as aforesaid and all provisions stipulated herein above shall be applicable to such checking of measurements or levels.

It is also a term of this contract that recording of measurements of any item of work in the measurement book and/or its payment in the interim, on account or final bill shall not be considered as conclusive evidence as to the sufficiency of any work or material to which it relates nor shall it relieve the contractor from liabilities from any over measurement or defects noticed till completion of the defects liability period.

CLAUSE 6A: COMPUTERIZED MEASUREMENT BOOK

Engineer-in-Charge shall, except as otherwise provided, ascertain and determine by measurement the value of work done in accordance with the contract.

All measurements of all items having financial value shall be entered by the contractor and compiled in the shape of the Computerized Measurement Book having pages of A-4 size as per the format of the RTDC so that a complete record is obtained of all the items of works performed under the contract.

All such measurements and levels recorded by the contractor or his authorized representative from time to time, during the progress of the work, shall be got checked by the contractor from the Engineer-in-Charge or his authorized representative as per interval or program fixed in consultation with Engineer-in-Charge or his authorized representative. After the necessary corrections made by the Engineer-in-Charge, the measurement sheets shall be returned to the contractor for incorporating the corrections and for resubmission to the Engineer-in- Charge for the dated signatures by the Engineer-in- Charge and the contractor or their representatives in token of their acceptance.

Whenever bill is due for payment, the contractor would initially submit draft computerized measurement sheets and these measurements would be got checked/test checked from the Engineer-in-Charge and/or his authorized representative. The contractor will, thereafter, incorporate such changes as may be done during these checks/test checks in his draft computerized measurements, and submit to the RTDC a computerized measurement book, duly bound, and with its pages machine numbered. The Engineer-in-Charge and/or his authorized representative would thereafter check this MB, and record the necessary certificates for their checks/test checks.

The final, fair, computerized measurement book given by the contractor, duly bound, with its pages machine numbered, should be 100% correct, and no cutting or over-writing in the measurements would thereafter be allowed. If at all any error is noticed, the contractor shall have to submit a fresh computerized MB with its pages duly machine numbered and bound. The contractor shall submit two spare copies of such computerized MB's for the purpose of reference and records.

The contractor shall also submit to the RTDC separately his computerized Abstract of Cost and the bill based on these measurements, duly bound, and its pages machine numbered along with two spare copies of the bill. Thereafter, this bill will be processed by the Engineer-In-Charge

The contractor shall, without extra charge, provide all assistance with every appliance, labour and other things necessary for checking of measurements/levels by the Engineer-in- Charge or his representative.

Except where any general or detailed description of the work expressly shows to the contrary, measurements shall be taken in accordance with the procedure set forth in the specifications notwithstanding any provision in the relevant Standard Method of measurement or any general or local custom. In the case of items which are not covered by specifications, measurements shall be taken in accordance with the relevant standard method of measurement issued by the Bureau of Indian Standards and if for any item no such standard is available then a mutually agreed method shall be followed.

The contractor shall give not less than seven days' notice to the Engineer-in-Charge or his authorized representative in charge of the work before covering up or otherwise placing beyond the reach of checking and/or test checking the measurement of any work in order that the same may be checked and/or test checked and correct dimensions thereof be taken before the same is covered up or placed beyond the reach of checking and/or test checking measurement and shall not cover up and place beyond reach of measurement any work without consent in writing of the Engineer-in-Charge or his authorized representative in charge of the work who shall within the aforesaid period of seven days inspect the work, and if any work shall be covered up or placed beyond the reach of checking and/or test checking measurements without such notice having been given or the Engineer-in-Charge's consent being obtained in writing 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 the materials with which the same was executed.

Engineer-in-Charge or his authorized representative may cause either themselves or through another officer of the RTDC to check the measurements recorded by contractor and all provisions stipulated herein above shall be applicable to such checking of measurements or levels.

It is also a term of this contract that checking and/or test checking the measurements of any item of work in the measurement book and/or its payment in the interim, on account of final bill shall not be considered as conclusive evidence as to the sufficiency of any work or material to which it relates nor shall it relieve the contractor from liabilities from any over measurement or defects noticed till completion of the defects liability period.

CLAUSE 7: PAYMENT ON INTERMEDIATE CERTIFICATE TO BE REGARD AS ADVANCE

No payment shall be made for work, estimated to cost Rs. Twenty thousand or less till after the whole of the work shall have been completed and certificate of completion given. For works estimated to cost over Rs. Twenty thousand, the interim or running account bills shall be submitted by the contractor for the work executed on the basis of such recorded measurements on the format of the RTDC in triplicate on or before the date of every month fixed for the same by the Engineer-in-Charge. The contractor shall not be entitled to be paid any such interim payment if the gross work done together with net payment/ adjustment of advances for material collected, if any, since the last such payment is less than the amount specified in Special Conditions of Contract, in which case the interim bill shall be prepared on the appointed date of the month after the requisite progress is achieved. Engineer-in-Charge shall arrange to have the bill verified

by taking or causing to be taken, where necessary, the requisite measurements of the work. In the event of the failure of the contractor to submit the bills, Engineer-in-Charge shall prepare or cause to be prepared such bills in which event no claims whatsoever due to delays on payment including that of interest shall be payable to the contractor. Payment on account of amount admissible shall be made by the Engineer-in- Charge certifying the sum to which the contractor is considered entitled by way of interim payment at such rates as decided by the Engineer-in-Charge. The amount admissible shall be paid by 10th working day after the day of presentation of the bill by the Contractor to the Engineer-in-Charge together with the account of the material issued by the RTDC, or dismantled materials, if any. In the case of works outside the headquarters of the Engineer- in-Charge, the period of ten working days will be extended to fifteen working days.

All such interim payments shall be regarded as payment by way of advances against final payment only and shall not preclude the requiring of bad, unsound and imperfect or unskilled work to be rejected, removed, taken away and reconstructed or re-erected. Any certificate given by the Engineer-in-Charge relating to the work done or materials delivered forming part of such payment, may be modified or corrected by any subsequent such certificate(s) or by the final certificate and shall not by itself be conclusive evidence that any work or materials to which it relates is/are in accordance with the contract and specifications. Any such interim payment, or any part thereof shall not in any respect conclude, determine or affect in any way powers of the Engineer-in-Charge under the contract or any of such payments be treated as final settlement and adjustment of accounts or in any way vary or affect the contract.

Pending consideration of extension of date of completion, interim payments shall continue to be made as herein provided without prejudice to the right of the RTDC to take action under the terms of this contract for delay in the completion of work, if the extension of date of completion is not granted by the competent authority.

The Engineer-in-Charge in his sole discretion on the basis of a certificate from the Engineer-In- Charge to the effect that the work has been completed up to the level in question make interim advance payments without detailed measurements for work done (other than foundations, items to be covered under finishing items) up to lintel level (including sunshade etc.) and slab level, for each floor working out at 75% of the assessed value. The advance payments so allowed shall be adjusted in the subsequent interim bill by taking detailed measurements thereof.

CLAUSE 7A

No Running Account Bill shall be paid for the work till the applicable labour licenses, registration with EPFO, ESIC and BOCW Welfare Board, whatever applicable are submitted by the contractor to the Engineer-in-Charge.

CLAUSE 8 : COMPLETION CERTIFICATE AND COMPLETION PLANS

Within ten days of the completion of the work, the contractor shall give notice of such completion to the Engineer-in-Charge and within thirty days of the receipt of such notice, the Engineer-in- Charge shall inspect the work and if there is no defect in the work, shall furnish the contractor with a final certificate of completion, otherwise a provisional certificate of physical completion indicating defects (a) to be rectified by the contractor and/or (b) for which payment will be made at reduced rates, shall be issued. But no final certificate of completion shall be issued, nor shall the work be considered to be complete until the contractor shall have removed from the premises on which the work shall be

executed all scaffolding, surplus materials, rubbish and all huts and sanitary arrangements required for his/their work people on the site in connection with the execution of the works as shall have been erected or constructed by the contractor(s) and cleaned off the dirt from all wood work, doors, windows, walls, floor or other parts of the building, in, upon, or about which the work is to be executed or of which he may have had possession for the purpose of the execution; thereof, and not until the work shall have been measured by the Engineer-in-Charge. If the contractor shall fail to comply with the requirements of this Clause as to removal of scaffolding, surplus materials and rubbish and all huts and sanitary arrangements as aforesaid and cleaning off dirt on or before the date fixed for the completion of work, the Engineer-in-Charge may at the expense of the contractor remove such scaffolding, surplus materials and rubbish etc., and dispose of the same as he thinks fit and clean off such dirt as aforesaid, and the contractor shall have no claim in respect of scaffolding or surplus materials as aforesaid except for any sum actually realized by the sale thereof.

Note: *Ten days will apply in the case of work at the headquarters of the Engineer-in-Charge and thirty days will apply in the case of works at a station other than the headquarters of Engineers-in Charge.*

CLAUSE 8A : CONTRACTOR TO KEEP SITE CLEAN

When the annual repairs and maintenance of works are carried out, the splashes and droppings from white washing, colour washing, painting etc., on walls, floor, windows, etc shall be removed and the surface cleaned simultaneously with the completion of these items of work in the individual rooms, quarters or premises etc. where the work is done: without waiting for the actual completion of all the other items of work in the contract. In case the contractor fails to comply with the requirements of this clause, the Engineer-in-Charge shall have the right to get this work done at the cost of the contractor either Departmentally or through any other agency. Before taking such action, the Engineer-in-Charge shall give ten days notice in writing to the contractor.

CLAUSE 8B : COMPLETION PLANS TO BE SUBMITTED BY THE CONTRACTOR

The contractor shall submit completion plans for Internal and External Civil, Electrical and Mechanical Services within thirty days of the completion of the work.

In case, the contractor fails to submit the completion plan as aforesaid, he shall be liable to pay a sum of 0.1 % (zero point one percent) of Tendered Value or limit prescribed in Special Condition of the Contract whichever is more as may be fixed by the authority as mentioned in Special Condition of the Contract and in this respect the decision of the that authority shall be final and binding on the contractor.The contractor shall submit completion plan for water, sewerage and drainage line plan within thirty days of the completion of the work.

In case, the contractor fails to submit the completion plan as aforesaid, the RTDC will get it done through other agency at his cost and actual expenses incurred plus 1.0% of the value of the work for the same shall be recovered from the contractor.

CLAUSE 9 : PAYMENT OF FINAL BILL

The final bill shall be submitted by the contractor in the same manner as specified in interim bills within one month of the date of the final certificate of completion furnished by the Engineer-in- Charge. No further claims shall be made by the contractor after submission of the final bill and these shall be deemed to have been waived and extinguished. Payments of those items of the bill in respect of which there is no dispute and of items in dispute, for quantities and rates as approved by Engineer-in-Charge, will, as far as possible be made within the period specified hereinunder, the period being reckoned from

the date of receipt of the bill by the Engineer-in- Charge or his authorized Engineer, complete with account of materials issued by the RTDC/Govt and dismantled materials.

a) Tendered value of work is up to Rs. 15 lacs 1 months
b) If the Tendered value of work exceeds Rs. 15 Lacs: 1.5 months

CLAUSE 9A : PAYMENT OF CONTRACTOR'S BILLS TO BANKS

Payment due to the contractor may, if so desired by him be made to his bank, instead of direct to him, provided that the contractor furnishes to the Engineer-in-charge (1) an authorization in the form of a legally valid document such as a power of attorney conferring authority on the bank to receive payment and (2) 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, wherever possible, present his bills duly receipted and discharged through his bankers. Nothing herein contained shall operate to create in favour of the bank any right or equities vis-à-vis the Governor.

CLAUSE 10: MATERIALS SUPPLIED BY GOVERNMENT NOT APPLICABLE

Materials which RTDC/Government will supply are shown in Special Conditions of Contract (SCC) which also stipulates quantum, place of issue and rate(s) to be charged in respect thereof. The contractor shall be bound to procure them from the Engineer-in-Charge.

As soon as the work is awarded, the contractor shall finalise the programme for the completion of work as per clause 5 of this contract and shall give his estimates of materials required on the basis of drawings/or schedule of quantities of the work. The Contractor shall give in writing his requirement to the Engineer-in-Charge which shall be issued to him keeping in view the progress of work as assessed by the Engineer-in-Charge, in accordance with the agreed phased programme of work indicating monthly requirements of various materials. The contractor shall place his indent in writing for issue of such materials at least 7 days in advance of his requirement.

Such materials shall be supplied for the purpose of the contract only and the value of the materials so supplied at the rates specified in the aforesaid schedule shall be set off or deducted, as and when materials are consumed in items of work (including normal wastage) for which payment is being made to the contractor, from any sum then due or which may therefore become due to the contractor under the contract or otherwise or from the security deposit. At the time of submission of bills, the contractor shall certify that balance of materials supplied is available at site in original good condition.

The contractor shall submit along with every running bill (on account or interim bill) material wise reconciliation statements supported by complete calculations reconciling total issue, total consumption and certified balance (diameter/section-wise in the case of steel) and resulting variations and reasons therefore. Engineer-in-Charge shall (whose decision shall be final and binding on the contractor) be within his rights to follow the procedure of recovery in clause 42 at any stage of the work if reconciliation is not found to be satisfactory.

The contractor shall bear the cost of getting the material issued, loading, transporting to site, unloading, storing under cover as required, cutting assembling and joining the several parts together as necessary. Notwithstanding anything to the contrary contained

in any other clause of the contract and (or the CPWA Code) all stores/materials so supplied to the contractor or procured with the assistance of the RTDC shall remain the absolute property of RTDC and the contractor shall be the trustee of the stores/materials, and the said stores/materials shall not be removed/disposed off from the site of the work on any account and shall be at all times open to inspection by the Engineer-in-Charge or his authorized agent. Any such stores/materials remaining unused shall be returned to the Engineer-in- Charge in as good a condition in which they were originally supplied at a place directed by him, at a place of issue or any other place specified by him as he shall require, but in case it is decided not to take back the stores/materials the contractor shall have no claim for compensation on any account of such stores/materials so supplied to him as aforesaid and not used by him or for any wastage in or damage to in such stores/materials.

On being required to return the stores/materials, the contractor shall hand over the stores/ materials on being paid or credited such price as the Engineer-in-Charge shall determine, having due regard to the condition of the stores/materials. The price allowed for credit to the contractor, however, shall be at the prevailing market rate not exceeding the amount charged to him, excluding the storage charge, if any. The decision of the Engineer-in-Charge shall be final and conclusive. In the event of breach of the aforesaid condition, the contractor shall in addition to throwing himself open to account for contravention of the terms of the licenses or permit and/or for criminal breach of trust, be liable to RTDC for all advantages or profits resulting or which in the usual course would have resulted to him by reason of such breach. Provided that the contractor shall in no case be entitled to any compensation or damages on account of any delay in supply or non-supply thereof all or any such materials and stores provided further that the contractor shall be bound to execute the entire work if the materials are supplied by the RTDC within the original scheduled time for completion of the work plus 50% thereof or schedule time plus 6 months whichever is more if the time of completion of work exceeds 12 months, but if a part of the materials only has been supplied within the aforesaid period, then the contractor shall be bound to do so much of the work as may be possible with the materials and stores supplied in the aforesaid period. For the completion of the rest of the work, the contractor shall be entitled to such extension of time as may be determined by the Engineer-in-Charge whose decision in this regard shall be final and binding on the contractor.

The contractor shall see that only the required quantities of materials are got issued. Any such material remaining unused and in perfectly good/original condition at the time of completion or determination of the contract shall be returned to the Engineer-in-Charge at the stores from which it was issued or at a place directed by him by a notice in writing. The contractor shall not be entitled for loading, transporting, unloading and stacking of such unused material except for the extra lead, if any involved, beyond the original place of issue.

The material supplied under clause 10 shall not be construed as "Sales" for determining the sales tax under H.P General Sales Tax Act 1968.

CLAUSE 10A: MATERIALS TO BE PROVIDED BY CONTRACTOR

The contractor shall, at his own expense, provide all materials, required for the works other than those which are stipulated to be supplied by the RTDC/Govt.

The contractor shall, at his own expense and without delay, supply to the Engineer-in-Charge samples of materials to be used on the work and shall get these approved in advance. All such materials to be provided by the Contractor shall be in conformity with

the specifications laid down or referred to in the contract. The contractor shall, if requested by the Engineer-in-Charge furnish proof, to the satisfaction of the Engineer-in-Charge that the materials so comply. The Engineer-in-Charge shall within thirty days of supply of samples or within such further period as he may require intimate to the Contractor in writing whether samples are approved by him or not. If samples are not approved, the Contractor shall forthwith arrange to supply to the Engineer-in-Charge for his approval, fresh samples complying with the specifications laid down in the contract. When materials are required to be tested in accordance with specifications, approval of the Engineer-in-Charge shall be issued after the test results are received.

The Contractor shall at his risk and cost submit the samples of materials to be tested or analyzed and shall not make use of or incorporate in the work any materials represented by the samples until the required tests or analysis have been made and materials finally accepted by the Engineer-in-Charge. The Contractor shall not be eligible for any claim or compensation either arising out of any delay in the work or due to any corrective measures required to be taken on account of and as a result of testing of materials.

The contractor shall, at his risk and cost, make all arrangements and shall provide all facilities as the Engineer-in-Charge may require for collecting, and preparing the required number of samples for such tests at such time and to such place or places as may be directed by the Engineer-in- Charge and bear all charges and cost of testing unless specifically provided for otherwise elsewhere in the contract or specifications. The Engineer-in- Charge or his authorized representative shall at all times have access to the works and to all workshops and places where work is being prepared or from where materials, manufactured articles or machinery are being obtained for the works and the contractor shall afford every facility and every assistance in obtaining the right to such access.

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 at the expense of the contractor, other persons to remove the same without being answerable or accountable for any loss or damage that may happen or arise to such materials. The Engineer-in-Charge shall also have full powers to require other proper materials to be substituted thereof and in case of default, the Engineer-in- Charge may cause the same to be supplied and all costs which may attend such removal and substitution shall be borne by the Contractor.

The contractor shall at his own expense, provide a material testing lab at the site for conducting routine field tests. The lab shall be equipped at least with the testing equipment as specified in Special Conditions of Contract.

Minimum 01 year warranty for Mechanical & Electrical Equipment and other bought out items, at the discretion of RTDC, if supplied directly by the contractor. The standard warranty period offered by the Manufacturer shall be retained, in case the original warranty period is more than one year.

CLAUSE 10B :

(i) SECURED ADVANCE ON NON-PERISHABLE MATERIALS

The contractor, on signing an indenture in the form to be specified by the Engineer-in- Charge, shall be entitled to be paid during the progress of the execution of the work up to 75% of the assessed value of any materials which are in the opinion of the Engineer-in- Charge non-perishable, non-fragile and non-combustible and are

in accordance with the contract and which have been brought on the site in connection therewith and are adequately stored and/or protected against damage by weather or other causes but which have not at the time of advance been incorporated in the works. When materials on account of which an advance has been made under this sub-clause are incorporated in the work, the amount of such advance shall be recovered/ deducted from the next payment made under any of the clause or clauses of this contract.

Such secured advance shall also be payable on other items of perishable nature, fragile and combustible with the approval of the Engineer-in-Charge provided the contractor provides a comprehensive insurance cover for the full cost of such materials. The decision of the Engineer-in-Charge shall be final and binding on the contractor in this matter. No secured advance, shall however, be paid on high-risk materials such as ordinary glass, sand, petrol, diesel etc.

(ii) MOBILISATION ADVANCE

Mobilization advance not exceeding 10% of the tendered value may be given, if requested by the contractor in writing within one month of the order to commence the work. Such advance shall be in two or more installments to be determined by the Engineer-in- Charge at his sole discretion. The first installment of such advance shall be released by the Engineer-in-charge to the contractor on a request made by the contractor to the Engineer-in-Charge in this behalf. The second and subsequent installments shall be released by the Engineer-in-Charge only after the contractor furnishes a proof of the satisfactory utilization of the earlier installment to the entire satisfaction of the Engineer- in-Charge.

Before any installment of advance is released, the contractor shall execute a Bank Guarantee Bond from Scheduled Bank for the amount equal to 110% of the amount of advance and valid for the contract period. This (Bank Guarantee from Scheduled Bank for the amount equal to 110% of the balance amount of advance) shall be kept renewed from time to time to cover the balance amount and likely period of complete recovery. **No Mobilisation Advance Shall be paid for Machinery.**

(iii) INTEREST & RECOVERY

The mobilization advance in (ii) above bear simple interest at the rate of 10 per cent per annum and shall be calculated from the date of payment to the date of recovery, both days inclusive, on the outstanding amount of advance. Recovery of such sums advanced shall be made by the deduction from the contractors bills commencing after first 10% of the gross value of the work is executed and paid, on pro-rata percentage basis to the gross value of the work billed beyond 10% in such a way that the entire advance is recovered by the time 80% of the gross value of the contract is executed and paid, together with interest due on the entire outstanding amount up to the date of recovery of the installment.

CLAUSE 10C : PAYMENT ON ACCOUNT OF INCREASE IN PRICE / WAGES DUE TO STATUTORY ORDER NOT APPLICABLE

If after submission of the tender, the price of any material incorporated in the works (excluding the materials covered under Clause 10CA and not being a material supplied from the Engineer- in- Charge's stores in accordance with Clause 10 thereof) and/or wages of labour increases as a direct result of the coming into force of any fresh law, or statutory rule or order (but not due to any changes of rate in sales tax/VAT, Central/State Excise/Custom Duty) beyond the prices/wages prevailing at the time of the last stipulated date of receipt

of tenders including extensions, if any, for the work during contract period including the justified period extended under the provisions of clause 5 of the contract without any action under clause 2, then the amount of the contract shall accordingly be varied and provided further that any such increase shall be limited to the price/wages prevailing at the time of updated stipulated date of completion considering effect of extra work (extra time to be calculated on prorata basis only as cost of extra work x stipulated period/tendered amount).

If after submission of the tender, the price of any material incorporated in the works (excluding the materials covered under Clause 10CA and not being a material supplied from the Engineer- in- Charge's stores in accordance with Clause 10 thereof) and/or wages of labour as prevailing at the time of last stipulated date of receipt of tender including extensions, if any, is decreased as a direct result of the coming into force of any fresh law or statutory rules or order (but not due to any changes of rate in sales tax/VAT, Central/State Excise/Custom Duty), RTDC shall in respect of materials incorporated in the works (excluding the materials covered under Clause 10CA and not being material supplied from the Engineer-in-Charge's stores in accordance with Clause 10 hereof) and/or labour engaged on the execution of the work after the date of coming into force of such law statutory rule or order be entitled to deduct from the dues of the contractor, such amount as shall be equivalent to the difference between the prices of the materials and/or wages as prevailed at the time of the last stipulated date for receipt of tenders including extensions if any for the work and the prices of materials and/or wages of labour on the coming into force of such law, statutory rule or order. This will be applicable for the contract period including the justified period extended under the provisions of clause 5 of the contract without any action under clause 2.

Engineer-in-Charge may call books of account and other relevant documents from the contractor to satisfy himself about reasonability of increase in prices of materials and wages. The contractor shall, within a reasonable time of his becoming aware of any alteration in the price of any such materials and/or wages of labour, give notice thereof to the Engineer-in-Charge stating that the same is given pursuant to this condition together with all information relating thereto which he may be in position to supply.

For this purpose, the labour component of the work executed during period under consideration shall be the percentage as specified in Special Conditions of Contract, of the value of work done during that period and the increase/decrease in labour shall be considered on the minimum daily wages in rupees of any unskilled adult male mazdoor, fixed under any law, statutory rule or order.

The cost of work for which escalation is applicable (W) is same as cost of work done worked out as indicated in sub-para (ii) of clause 10 CC except the amount of full assessed value of secured Advance.

CLAUSE 10CA : PAYMENT DUE TO VARIATION IN PRICES OF MATERIALS AFTER RECEIPT OF TENDER NOT APPLICABLE

If after submission of the tender, the price of materials specified in Special Conditions of Contract increases/ decreases beyond the base price(s) as indicated in Special Conditions of Contract for the work, then the amount of the contract shall accordingly be varied and provided further that any such variations shall be effected for stipulated period of Contract including the justified period extended under the provisions of Clause 5 of the Contract without any action under Clause 2.

However for work done/during the justified period extended as above, it will be limited to

indices prevailing at the time of updated stipulated date of completion considering the effect of extra work (extra time to be calculated on pro-rata basis only as cost of extra work x stipulated period/tendered cost).

The increase/decrease in prices of cement, steel reinforcement, structural steel and POL shall be determined by the Price indices Economic Advisor to Government of India, Ministry of Commerce and Industry. For other items provided in the Special Conditions of Contract, this shall be determined by the All India Wholesale Price Indices of materials as published by Economic Advisor to Government of India, Ministry of Commerce and Industry. Base price for cement, steel reinforcement, structural steel and POL shall be as issued by the state / Central Govt. from time to time. In case, price index of a particular material is not issued by Ministry of Commerce and Industry, then the price index of nearest similar material as indicated in Special Conditions of Contract shall be followed.

The amount of the contract shall accordingly be varied for all such materials and will be worked out as per the formula given Clause 10CA, Conditions of Contract of HPPWD.

CLAUSE 10CC : PAYMENT DUE TO INCREASE/DECREASE IN PRICES/WAGES (EXCLUDING MATERALS COVERED UNDER CLAUSE 10 CA) AFTER RECEIPT OF TENDER FOR WORKS NOT APPLICABLE

If the prices of materials (not being materials supplied or services rendered at fixed prices by the RTDC in accordance with clause 10 & 34 thereof) and/or wages of labour required for execution of the work increase, the contractor shall be compensated for such increase as per provisions detailed below and the amount of the contract shall accordingly be varied, subject to the condition that that such compensation for escalation in prices and wages shall be available only for the work done during the stipulated period of the contract including the justified period extended under the provisions of clause 5 of the contract without any action under clause 2.

However, for the work done during the justified period extended as above, the compensation as detailed below will be limited to prices/wages prevailing at the time of updated stipulated date of completion considering the effect of extra work (extra time to be calculated on pro-rata basis only as cost of extra work x stipulated period/tendered cost). No such compensation shall be payable for a work for which the stipulated period of completion

is equal to or less than the time as specified in Special Conditions of Contract. Such compensation for escalation in the prices of materials and labour, when due, shall be worked out based on the provisions mentioned in the Clause 10CC of CPWD Conditions of Contract.

CLAUSE 10D : DISMANTLED MATERIAL GOVERNMENT PROPERTY

The contractor shall treat all materials obtained during dismantling of a structure, excavation of the site for a work, etc. as Government property and such materials shall be disposed off to the best advantage of Government according to the instructions in writing issued by the Engineer-in- Charge.

CLAUSE 10E:

(i) Tendered rates are inclusive of all taxes and levies payable under the respective statues(including GST). However, pursuant to the constitution (Forty Six Amendment) Act 1982. If any further tax or levy is imposed by statues, after the date of receipt of tenders, and the contractors thereupon necessarily and properly pays such taxes/levies the contractor shall reimburse the amount so paid provided such payment, if any, is not

in the opinion of Superintending Engineer (whose decision shall be final and binding) attributable to delaying executing of work within the control of the contractor.

(ii) The contractor shall keep necessary books of accounts and other documents for the purpose of this condition as may be necessary and shall allow inspection of the same by a duly authorized representatives of Government and further shall furnish such other information/documents as the Engineer-in-Charge may require.

(iii) The contractor shall within a period of 30 days of imposition of any further tax or levy. Pursuant to the constitution (Forty Six Amendment) Act, 1982 give a written notice thereof to the Engineer-in-Charge that the same is given pursuant to this condition together with all necessary information relating there to

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 workmanlike manner 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 design, drawings and instructions in writing in respect of the work signed by the Engineer- in-Charge and the contractor shall be furnished free of charge one copy of the contract documents together with specifications, designs, drawings and instructions as are not included in the standard specifications specified in Special Conditions of Contract or in any Bureau of Indian Standard or any other, published standard or code or, Schedule of Rates or any other printed publication referred to elsewhere in the contract.

The contractor shall comply with the provisions of the contract and with the care and diligence execute and maintain the works and provide all labour and materials, tools and plants including for measurements and supervision of all works, structural plans and other things of temporary or permanent nature required for such execution and maintenance in so far as the necessity for providing these, is specified or is reasonably inferred from the contract. The Contractor shall take full responsibility for adequacy, suitability and safety of all the works and methods of construction.

At least to 10% of prescribed Tests as per Central Public Works Department Manual/IS Codes of construction materials shall be carried out from the outside approved/NABL recognized Laboratory as may be approved by RTDC without any extra expenditure to RTDC.

The Contractor shall establish a field test laboratory on the site with latest equipment's for carrying out field tests of construction materials and will maintain proper records of all the test results.

CLAUSE 12 : DEVIATIONS / VARIATIONS EXTENT AND PRICING

The Engineer-in-Charge shall have power (i) to make alteration in, additions to or substitutions for the original specifications, drawings, designs and instructions that may appear to him to be necessary or advisable during the progress of the work, and (ii) to omit a part of the works in case of non-availability of a portion of the site or for any other reasons and the contractor shall be bound to carry out the works in accordance with any instructions given to him in writing signed by the Engineer-in-Charge and such alterations, omissions, additions or substitutions shall form part of the contract as if originally provided therein and any altered, additional or substituted work which the contractor may be directed to do in the manner specified above as part of the works, shall be carried out by the contractor on the same conditions in all respects including price on which he agreed to do the main work except as hereafter provided.

The time for completion of the works shall, in the event of any deviations resulting in additional cost over the tendered value sum being ordered, be extended, if requested by the contractor, as follows:

(i) In the proportion which the additional cost of the altered, additional or substituted work, bears to the original tendered value plus

(ii) 25% of the time calculated in (i) above or such further additional time as may be considered reasonable by the Engineer-in-Charge.

EXTRA AND SUBSTITUTED ITEMS

(i) In case of any change in approved drawings given by the Department and forming part of the Contract, if there are any deviation in the items the contractor may within fifteen days of receipt of order from Engineer in Charge claim the rates, supported by proper analysis for the items the Engineer-in-Charge shall within prescribed time limit of receipt of the claims supported by analysis, after giving consideration to the analysis of the rates submitted by the contractor, determine the rates on the basis of the market rates of both of extra items or original and substituted items as the case may be (as per invoice, vouchers from the manufacturers or suppliers submitted by the agency and duly verified by Engineer in Charge or his representative and the contractor shall be paid in accordance with the rates so determined.

The prescribed time limit for finalizing rates for Extra Item(s), Substitute Item(s) and Deviated Quantities of contract items is within 45 days after submission of proposal by the contractor without observation of the Engineer-in-Charge.

(ii) In case there is change/ modification in drawings given by the contractor after the approval by the Engineer -in- Charge due to functional or site requirements the contractor shall carry out the changes including extra items, substitute items, deviations as per direction of Engineer in Charge for which nothing extra shall be payable to the contractor on account of same, provided the additional cost of such work is up to 1 % (one percent) of the accepted tendered amount and worked out on market rate basis for the variation costing above 1 % (one percent),payment shall be made to the contractor as per method given in (i) above.

CLAUSE 13 : NO COMPENSATION FOR ALTERATION IN THE RESTRICTION OF WORK TO BE CARRIED OUT.

If at any time after the commencement of the work the Governor of Himachal Pradesh shall for any reason what so ever not require the whole work or part 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 payment of 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 have been carried out, neither shall he have any claim for compensation by reason of an alterations having been made in the original specifications, drawings, designs and instructions which shall involve any curtailment of the work as originally contemplated. Provided that the contractor shall be paid the charges on the cartage only of materials actually and bona fide brought to the site of the work by the contractor and rendered surplus as a result of the abandonment or curtailment of the work or any portion thereof and then taken back by the contractor, provide 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 of at local current rates whichever may be less. In the case of such stress, having been issued from Government stores, supervision charges and storage charges shall be

refunded in addition to the issue rate of the material. In the case of such stores having been issued from Government stores and returned by contractor to Government stores, credit shall be given to him by Engineer- in-Charge at rates not exceeding those at which they were originally issued to him after taking into consideration any deduction for claims on account of the contractors and in this respect the custody of the contractor and in this respect the decision of the Engineer-in-charge shall be final.

CLAUSE 14 : CARRYING OUT PART WORK AT RISK & COST OF CONTRACTOR

If contractor:

(i) At any time makes default during currency of work or does not execute any part of the work with due diligence and continues to do so even after a notice in writing of 7 days in this respect from the Engineer-in-Charge; or

(ii) Commits default in complying with any of the terms and conditions of the contract and does not remedy it or takes effective steps to remedy it within 7 days even after a notice in writing is given in that behalf by the Engineer-in-Charge; or

Fails to complete the work(s) or items of work with individual dates of completion, on or before the date(s) so determined, and does not complete them within the period specified in the notice given in writing in that behalf by the Engineer-in-Charge. The Engineer- in-Charge without invoking action under clause 3 may, without prejudice to any other right or remedy against the contractor which have either accrued or accrue thereafter to RTDC, by a notice in writing to take the part work / part incomplete work of any item(s) out of his hands and shall have powers to:

(a) Take possession of the site and any materials, constructional plant, implements, stores, etc., thereon; and/or

(b) Carry out the part work / part incomplete work of any item(s) by any means at the risk and cost of the contractor.

The Engineer-in-Charge shall determine the amount, if any, is recoverable from the contractor for completion of the part work/ part incomplete work of any item(s) taken out of his hands and execute at the risk and cost of the contractor, the liability of contractor on account of loss or damage suffered by RTDC because of action under this clause shall not exceed 10% of the tendered value of the work.

In determining the amount, credit shall be given to the contractor with the value of work done in all respect in the same manner and at the same rate as if it had been carried out by the original contractor under the terms of his contract, the value of contractor's materials taken over and incorporated in the work and use of plant and machinery belonging to the contractor. The certificate of the Engineer-in-Charge as to the value of work done shall be final and conclusive against the contractor provided always that action under this clause shall only be taken after giving notice in writing to the contractor. Provided also that if the expenses incurred by the RTDC are less than the amount payable to the contractor at his agreement rates, the difference shall not be payable to the contractor.

Any excess expenditure incurred or to be incurred by RTDC in completing the part work/ part incomplete work of any item(s) or the excess loss of damages suffered or may be suffered by RTDC as aforesaid after allowing such credit shall without prejudice to any other right or remedy available to RTDC in law or per as agreement be recovered from any money due to the contractor on any account, and if such money is insufficient, the contractor shall be called upon in writing and shall be liable to pay the same within 30 days.

If the contractor fails to pay the required sum within the aforesaid period of 30 days, the Engineer-in-Charge shall have the right to sell any or all of the contractors' unused materials, constructional plant, implements, temporary building at site etc. and adjust the proceeds of sale thereof towards the dues recoverable from the contractor under the contract and if thereafter there remains any balance outstanding, it shall be recovered in accordance with the provisions of the contract.

In the event of above course 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 advance on any account or with a view to the execution of the work or the performance of the contract.

CLAUSE 15 : SUSPENSION OF WORK

(i) The contractor shall, on receipt of the order in writing of the Engineer-in-Charge, (whose decision shall be final and binding on the contractor) suspend the progress of the works or any part thereof for such time and in such manner as the Engineer-in-Charge may consider necessary so as not to cause any damage or injury to the work already done or endanger the safety thereof for any of the following reasons:

(a) on account of any default on the part of the contractor or;

(b) for proper execution of the works or part thereof for reasons other than the default of the contractor; or

(c) for safety of the works or part thereof.

The contractor shall, during such suspension, properly protect and secure the works to the extent necessary and carry out the instructions given in that behalf by the Engineer- in-Charge.

(ii) If the suspension is ordered for reasons (b) and (c) in sub-para (i) above:

(a) the contractor shall be entitled to an extension of time equal to the period of every such suspension PLUS 25%, for completion of the item or group of items of work for which a separate period of completion is specified in the contract and of which the suspended work forms a part, and;

(b) If the total period of all such suspensions in respect of an item or group of items or work for which a separate period of completion is specified in the contract exceeds thirty days, the contractor shall, in addition, be entitled to such compensation as the Engineer-in- Charge may consider reasonable in respect of salaries and/or wages paid by the contractor to his employees and labour at site, remaining idle during the period of suspension, adding thereto 2% to cover indirect expenses of the contractor provided the contractor submits his claim supported by details to the Engineer-in- Charge within fifteen days of the expiry of the period of 30 days.

(iii) If the works or part thereof is suspended on the orders of the Engineer-in-Charge for more than three months at a time, except when suspension is ordered for reason (a) in subpara

(i) above, the contractor may after receipt of such order serve a written notice on the Engineer-in-Charge requiring permission within fifteen days from receipt by the Engineer- in-Charge of the said notice, to proceed with the work or part thereof in regard to which progress has been suspended and if such permission is not granted within that time, the contractor, if he intends to treat the suspension, where

it affects only a part of the works as an omission of such part by RTDC/Govt. or where it affects whole of the works, as an abandonment of the works by RTDC/Govt., shall within ten days of expiry of such period of 15 days give notice in writing of his intention to the Engineer-in-Charge. In the event of the contractor treating the suspension as an abandonment of the contract by RTDC, he shall have no claim to payment of any compensation on account of any profit or advantage which he might have derived from the execution of the work in full but which he could not derive in consequence of the abandonment. He shall, however, be entitled to such compensation, as the Engineer-in-Charge may consider reasonable, in respect of salaries and/or wages paid by him to his employees and labour at site, remaining idle in consequence adding to the total thereof 2% to cover indirect expenses of the contractor provided the contractor submits his claim supported by details to the Engineer-in-Charge within 30 days of the expiry of the period of 3 months.

CLAUSE 16 : ACTION IN CASE WORK NOT DONE AS PER SPECIFICATIONS

All works under or in course of execution or executed in pursuance of the contract, shall at all times be open and accessible to the inspection and supervision of the Engineer-In-charge, his authorized subordinates in charge of the work and all the superior officers, officer of the Quality Assurance Unit of the RTDC/Govt. or any organization engaged by the Government for Quality Assurance and of the Chief Technical Examiner's Office, and the contractor shall, at all times, during the usual working hours and at all other times at which reasonable notice of the visit of such officers has 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 that 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.

If it shall appear to the Engineer-in-charge or his authorized subordinates incharge of the work or to the Chief General Manager in charge of Quality Assurance or his subordinate officers or the officers of the organization engaged by the RTDC/Govt. for Quality Assurance or to the Chief Technical Examiner or his subordinate officers, that any work has been executed with unsound, imperfect, or unskillful workmanship, or with materials or articles provided by him for the execution of the work which are unsound or of a quality inferior to that contracted or otherwise not in accordance with the contract, the contractor shall, on demand in writing which shall be made within twelve months (six months in the case of work costing Rs. 10 Lac and below except road work) of the completion of the work from the Engineer-in-Charge specifying the work, materials or articles complained of notwithstanding that the same may have been passed, certified and paid for forthwith rectify, or remove and reconstruct the work so specified in whole or in part, as the case may require or as the case may be, remove the materials or articles so specified and provide other proper and suitable materials or articles at his own charge and cost. In the event of the failing to do so within a period specified by the Engineer-in- Charge in his demand aforesaid, then the contractor shall be liable to pay compensation at the same rate as under clause 2 of the contract (for non-completion of the work in time) for this default.

In such case the Engineer-in-Charge may not accept the item of work at the rates applicable under the contract but may accept such items at reduced rates as the authority specified in Special Conditions of Contract may consider reasonable during the preparation of on account bills or final bill if the item is so acceptable without detriment to the safety and utility of the item and the structure or he may reject the work outright without any payment

and/or get it and other connected and incidental items rectified, or removed and re-executed at the risk and cost of the contractor. Decision of the Engineer-in-Charge to be conveyed in writing in respect of the same will be final and binding on the contractor.

CLAUSE 16A: ACTION AND COMPENSATION IN CASE OF BAD WORK

All works under or in course of execution or executed in pursuance of the contract, shall at all times be open and accessible to the inspection and supervision of the Engineer-in charge, his authorized subordinates in charge of the work and all the superior officers, officer of the Quality Assurance Unit of the Department or any organization engaged by the Department for Quality Assurance and of the Chief Technical Examiner's Office, and the contractor shall, at all times, during the usual working hours and at all other times at which reasonable notice of the visit of such officers has 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 that 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.

If the revised tendered amount (worked out on the basis of quoted rate of individual items) If it shall appear to the Engineer-in-charge or his authorized subordinates in charge of the work or to the Chief Engineer in charge of Quality Assurance or his subordinate officers or the officers of the organization engaged by the Department for Quality Assurance or to the Chief Technical Examiner or his subordinate officers, that any work has been executed with unsound, imperfect, or unskillful workmanship, or with materials or articles provided by him for the execution of the work which are unsound or of a quality inferior to that contracted or otherwise not in accordance with the contract, the contractor shall, on demand in writing which shall be made within twelve months (six months in the case of work costing Rs. 10 Lac and below except road work) of the completion of the work from the Engineer-in-Charge specifying the work, materials or articles complained of notwithstanding that the same may have been passed, certified and paid for forthwith rectify, or remove and reconstruct the work so specified in whole or in part, as the case may require or as the case may be, remove the materials or articles so specified and provide other proper and suitable materials or articles at his own charge and cost. In the event of the failing to do so within a period specified by the Engineer-in- Charge in his demand aforesaid, then the contractor shall be liable to pay compensation at the same rate as under clause 2 of the contract (for non-completion of the work in time) for this default.

In such case the Engineer-in-Charge may not accept the item of work at the rates applicable under the contract but may accept such items at reduced rates as the authority specified in Special Condition of the Contract may consider reasonable during the preparation of on account bills or final bill if the item is so acceptable without detriment to the safety and utility of the item and the structure or he may reject the work outright without any payment and/or get it and other connected and incidental items rectified, or removed and re-executed at the risk and cost of the contractor. Decision of the Engineer-in-Charge to be conveyed in writing in respect of the same will be final and binding on the contractor.

CLAUSE 17 : CONTRACTOR LIABLE FOR DAMAGES, DEFECTS DURING DEFECT LIABILITY PERIOD

If the contractor or his working people or servants shall break, deface, injure or destroy any part of building in which they may be working, or any building, road, road kerb, fence, enclosure, water pipe, cables, drains, electric or telephone post or wires, trees, grass or

grassland, or cultivated ground contiguous to the premises on which the work or any part is being executed, or if any damage shall happen to the work while in progress, from any cause whatever or if any defect, shrinkage or other faults appear in the work within twelve months (six months in the case of work costing Rs. Ten lacs and below except road work) after a certificate final or otherwise of its completion shall have been given by the Engineer-in- Charge as aforesaid arising out of defect or improper materials or workmanship the contractor shall upon receipt of a notice in writing on that behalf make the same good at his own expense or in default the Engineer-in-Charge cause the same to be made good by other workmen and deduct the expense from any sums that may be due 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. The security deposit of the contractor shall not be refunded before the expiry of twelve months (six months in the case of work costing Rs. Ten lacs and below except road work) after the issue of the certificate final or otherwise, of completion of work, or till the final bill has been prepared and passed whichever is later.

Provided that in the case of road work, if in the opinion of the Engineer-in-Charge, half of the security deposit is sufficient, to meet all liabilities of the contractor under this contract, half of the security deposit will be refundable after six months and the remaining half after twelve months of the issue of the said certificate of completion or till the final bill has been prepared and passed whichever is later.

The defects liability period will be one year from the date of completion of development and construction works. During this period the Contractor will get the defects rectified without any cost to RTDC/Govt. For the item of water proofing roof treatment the Contractor will give guarantee bond for ten years. Similarly for other items, like electrical/mechanical equipment which have guarantee/warranty period beyond one year, wherever applicable as per manufacturer recommendations, will also be given guarantee bond by the Contractor to RTDC/Govt..

In case of Maintenance and Operation works of E&M services, the security deposit deducted from contractors shall be refunded within one month from the date of final payment or within one month from the date of completion of the maintenance contract whichever is earlier.

CLAUSE 18 : CONTRACTOR SUPPLY TOOLS & PLANTS ETC.

The contractor shall provide at his own cost all materials (except such special materials, if any, as may in accordance with the contract be supplied from the Engineer-in-Charge's stores), machinery, tools & plants as specified in Special Conditions of Contract. In addition to this, appliances, implements, other plants, ladders, cordage, tackle, scaffolding and temporary works required for the proper execution of the work, whether original, altered or substituted and whether included in the specifications 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 therefore to and from the work. The contractor shall also supply without charge the requisite number of persons with the means and materials, necessary for the purpose of setting out works, and counting, weighing and assisting the measurement for 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 this contract or otherwise and/or from his security deposit or the proceeds of sale thereof, or of a sufficient portions thereof.

CLAUSE 18A : RECOVERY OF COMPENSATION PAID TO WORKMEN

In every case in which by virtue of the provisions sub-section (1) of Section 12, of the Workmen's Compensation Act, 1923, Government is obliged to pay compensation to a workman employed by the contractor, in execution of the works, Government will recover from the contractor, the amount of the compensation so paid; and, without prejudice to the rights of the Government under sub-section (2) of Section 12, of the said Act, Government/RTDC shall be at liberty to recover such amount or any part thereof by deducting it from the security deposit or from any sum due by RTDC/Govt. to the contractor whether under this contract or otherwise. RTDC shall not be bound to contest any claim made against it under sub-section (1) of Section 12, of the said Act, except on the written request of the contractor and upon his giving to RTDC full security for all costs for which RTDC might become liable in consequence of contesting such claim.

CLAUSE 18B : ENSURING PAYMENT AND AMENITIES TO WORKERS, IF CONTRACTOR FAILS

In every case in which by virtue of the provision of the contract labor (Regulation and Abolition) Act, 1970 and of the Contract Labour Regulation and Abolition) H.P. Rules, 1974 Government is obliged to pay any amounts of wages to a workman employed by the contractor in execution of the work or to incur any expenditure in providing welfare and health amenities required to be provided under the above said Act and the Rules, under Clause 19 H or under Rules framed by Government from time to time for the protection of health and sanitary arrangements for workers, employed by Contractors. Government will recover from the contractor the amount of wages so paid or the amount of expenditure so incurred; and with under, Section 20, sub-section
(2) and Section 21, sub section (4) of the Contract Labour Regulation and Ebullition) Act 1970, Government shall be at liberty to recover such amount or any part thereof deducting it from security deposits or from any sum due by Govt. to the contractor whether under this agreement or otherwise Government shall not be bound to contest any claim made against it under section 20, sub-section (1) and Section 21, Sub-section(4) of the said act except on the written request of the contractor and upon his giving to the Government full security for all cost for which Govt. might become liable in consisting such claim.

CLAUSE 19 : LABOUR LAWS TO BE COMPLIED BY CONTRACTOR

The contractor shall obtain a valid licence under the Contractor Labour (R & A) Act, 1970 and the Contractor Labour (Regulation and Abolition) H.P.Rules, 1974 before commencement of the work and continue to have a valid licence until the completion of work.

CLAUSE 19A

No labourer below the age of eighteen years shall be employed on the work. No amount by way of commission or otherwise is deducted or recovered by the Jamadar the wages of work man.

CLAUSE 19B : PAYMENT OF WAGES

(a) The contractor shall pay not less than fair wages to labourers engaged by him on the work, as per fair wages fixed by the Government from time to time as indicated below :- Fair wages shall be applicable as notified by the H.P. Govt. and applicable on the date of opening of the tender. The rates notified by H.P Govt are shown in Special Condition of Contract (SCC).

(b) The contractor shall, notwithstanding the provisions of any contract to the contrary, cause to be paid fair wage to labour indirectly engaged on the work, including any

labour engaged by his sub-contractors in connection with the said work, as if the labour had been immediately employed by him.

(c) In respect of all labour directly or indirectly employed in the works for performance of the contractor's part of this agreement the contractor shall comply with or cause to be complied with the Labour Regulations made by Government from time to time in regard to payment of wages, wage period, deductions from wages, recovery of wages not paid and deductions unauthorized made, maintenance of wage books or wage slip, publication of scale of wages and other terms of employment, inspection and submission of periodical return and all other matters of a like nature of as per the provision of the contract Labour (Regulation and Abolition) Act 1970 and the Contract Labour (Regulation and abolition)
H.P. Rules 1974 wherever applicable.

(d) The Engineer-in-Charge concerned shall have the right to deduct from the moneys due to the contractor any sum required or estimated to be required for making good the loss suffered by a worker or workers by reason of non-fulfilment of the conditions of the contract for the benefit of the workers, non-payment of wages or of deductions made from his or their wages which are not justified by their terms of the contract or non- observance of the Regulations.

(e) The contractor shall comply with the previous of the Payment of Wages Act, 1936, Minimum wages Act 1936, Minimum wages Act, 1948, Employees Liability Act, 1938, Workmen's Compensation Act 2403, Industrial Disputes Act, 1947, Maternity Benefits Act, 1961 Interstate Migrant Workmen (Regulation of Employment and condition of Service)Act 1979.

(f) The contractor shall comply with the provisions of the Payment of Wages Act, 1936, Minimum Wages Act, 1948, Employees Liability Act, 1938, Workmen's Compensation Act, 1923, Industrial Disputes Act, 1947, Maternity Benefits Act, 1961, and the Contractor's Labour (Regulation and Abolition) Act 1970, or the modifications thereof or any other laws relating thereto and the rules made thereunder from time to time.

(g) The contractor shall indemnify and keep indemnified RTDC against payments to be made under and for the observance of the laws aforesaid and Labour Regulations without prejudice to his right to claim indemnity from his sub-contractors.

(h) The laws aforesaid shall be deemed to be a part of this contract and any breach thereof shall be deemed to be a breach of this contract.

(i) Under the provision of the Minimum Wages Act, 1948, Pradesh Administration Minimum Wages Rules 1978 the contractor is bound to allow or cause to be allowed to the labourers directly employed in the work one day's rest for six days in the continuous work and pay wages at the same rate as for duty in the event of default the Engineer-in-Charge shall have the right to deduct the sum or sums not paid on account of wages for weekly holidays to any labourers and pay the same to the persons entitled thereto from any money due to the contractor by the General Manager or Manager concerned.

(j) Whatever is the minimum wage for the time being, or if the wage payable is higher than such wage, such wage shall be paid by the contractor to the workmen directly without the intervention of Jamadar and that Jamadar shall not be entitled to deduct or recover any amount from the minimum wage payable to the workmen as and by way of commission or otherwise.

(k) The contractor shall ensure that no amount by way of commission or otherwise is deducted or recovered by the Jamadar from the wage of workmen.

CLAUSE 19C

In respect of all labour directly or indirectly employed in the work for the performance of the contractor's part of this contract, the contractor shall at his own expense arrange for the safety provisions as per Safety Code framed from time to time and shall at his own expense provide for all facilities in connection therewith. In case the contractor fails to make arrangement and provide necessary facilities as aforesaid, he shall be liable to pay a penalty of Rs.200/- for each default and in addition, the Engineer-in- Charge shall be at liberty to make arrangement and provide facilities as aforesaid and recover the costs incurred in that behalf from the contractor.

CLAUSE 19 D

The contractor shall submit by the 4th and 19th of every month, to the Engineer-in-Charge, a true statement showing in respect of the second half of the preceding month and the first half of the current month respectively:-

(1) The number of labourers employed by him on the work,
(2) Their working yours,
(3) The wages paid to them,
(4) The accidents that occurred during the said fortnight showing the circumstances under which they happened and the extent of damage and injury caused by them, and
(5) The number of female workers who have been allowed maternity benefit according to Clause 19F and the amount paid to them.

Failing which the contractor shall be liable to pay to RTDC/Govt, a sum not exceeding Rs.500/- for each default or materially incorrect statement. The decision of the Engineer-In-Charge shall be final in deducting from any bill due to the contractor; the amount levied as fine and be binding on the contractor.

CLAUSE 19 E

In respect of all labour directly or indirectly employed in the works for the performance of the contractor's part of this contract, the contractor shall comply with or cause to be complied with all the rules framed by Government from time to time for the protection of health and sanitary arrangements for workers employed by the RTDC and its contractors.

CLAUSE 19 F

Leave and pay during leave shall be regulated as follows:-

1. Leave :
   (i) in the case of delivery - maternity leave not exceeding 8 weeks, 4 weeks up to and including the day of delivery and 4 weeks following that day,
   (ii) in the case of miscarriage - upto 3 weeks from the date of miscarriage.

2. Pay :
   (i) in the case of delivery - leave pay during maternity leave will be at the rate of the women's average daily earnings, calculated on total wages earned on the days when full time work was done during a period of three months immediately preceding the date on which she gives notice that she expects to be confined or at the rate of Rupee one only a day whichever is greater.
   (ii) in the case of miscarriage - leave pay at the rate of average daily earning calculated on the total wages earned on the days when full time work was done during a period of three months immediately preceding the date of such miscarriage.

3. Conditions for the grant of Maternity Leave:

No maternity leave benefit shall be admissible to a woman unless she has been employed for a total period of not less than six months immediately preceding the

date on which she proceeds on leave.

4. The contractor shall maintain a register of Maternity (Benefit) in the Prescribed Form as shown in appendix -I and II, and the same shall be kept at the place of work.

CLAUSE 19 G

In the event of the contractor(s) committing a default or breach of any of the provisions of the Himachal Pradesh P.W.D. Department Contractor's Labour Regulations and Model Rules for the protection of health and sanitary arrangements for the workers as amended from time to time or furnishing any information or submitting or filing any statement under the provisions of the above Regulations and Rules which is materially incorrect, he/they shall without prejudice to any other liability to pay to the Government a sum not exceeding Rs.500 for every default, breach or furnishing, making, submitting, filing such materially incorrect statements and in the event of the contractor(s) defaulting continuously in this respect, the penalty may be enhanced to Rs.500 per day each day of default subject to a maximum of 5 percent of the tendered cost of the work. The decision of the Engineer-in-Charge shall be final and binding on the parties .Should it appear to the Engineer-in-Charge that contractor(s) is/are not properly observing and complying with the provision of the P.W.D. Department Contractor Labour Regulations and Model Rules and the provision of the Contract Labour (Regulation and Abolition) Act, 1970 and Contract Labour (R & A) H.P. Rules, 1974 for the protection of health and sanitary arrangement for work people employed by the Contractor(s) (hereinafter referred as "the said rules") the Engineer-in-Charge shall have power to give notice in writing to the Contractor(s) requiring that the said rules be complied with and the amenities prescribed herein be provided to the work people within a reasonable time to be specified in the notice. If the Contractor(s) shall fail within the period specified in the notice to comply with and observe the said rules and to provide the amenities to the work people as aforesaid, the Engineer-in-Charge shall have the powers to provide the amenities herein before mentioned according to approved standards and at the cost of the contractor(s). The contractor(s) shall erect, make and maintain at his/their own expense and to approved standards all necessary huts and sanitary arrangements required for his/their work-people on the site in connection with the execution of the works and if the same shall not have been erected or constructed, according t approved standards, the Engineer-in- Charge shall have power to give notice in writing to the Contractors(s) requiring that the said huts and sanitary arrangements be remodeled and/or reconstructed according to approved standards and if the contractor(s) shall fail to remodel or reconstruct such huts and sanitary arrangements according to approved standard within the period specified in the notice, the Engineer-in-Charge shall have the power to remodel reconstruct such
huts and sanitary arrangements according to approved standard at the cost of the contractor(s).

CLAUSE 19 H

The contractor(s) shall at his/their own cost provide his/their labour with a sufficient number of huts (hereinafter referred to as the camp) of the following specifications on a suitable plot of land to be approved by the Engineer-in-Charge.

(i) (a) The minimum height of each hut at the eaves level shall be 2.10m (7 ft.) and the floor area to be provided will be at the rate of 2.7 sq.m. (30 sq.ft.) for each member of the worker's family staying with the labourer.

(b) The contractor(s) shall in addition construct suitable cooking places having a minimum area of 1.80m x 1.50m (6'x5') adjacent to the hut for each family.

(c) The contractor(s) shall also construct temporary latrines and urinals for the use of the labourers each on the scale of not less than four per each one hundred

of the total strength, separate latrines and urinals being provided for women.

(d) The contractor(s) shall construct sufficient number of bathing and washing places, one unit for every 25 persons residing in the camp. These bathing and washing places shall be suitably screened.

(ii) (a) All the huts shall have walls of sun-dried or burnt-bricks laid in mud mortar or other suitable local materials as may be approved by the Engineer-in-Charge. In case of sun- dried bricks, the walls should be plastered with mud gobri on both sides. The floor may be kutcha but plastered with mud gobri and shall be at least 15 cm (6") above the surrounding ground. The roofs shall be laid with thatch or any other materials as may be approved by the Engineer-in-Charge and the contractor shall ensure that throughout the period of their occupation, the roofs remain water-tight.

(b) The contractor(s) shall provide each hut with proper ventilation.

(c) All doors, windows, and ventilators shall be provided with suitable leaves for security purposes.

(d) There shall be kept an open space of at least 7.2m (8 yards) between the rows of huts which may be reduced to 6m (20 ft.) according to the availability of site with the approval of the Engineer-in-Charge. Back to back construction will be allowed

(iii) **Water Supply** - The contractor(s) shall provide adequate supply of water for the use of labourers. The provisions shall not be less than two gallons of pure and wholesome water per head per day for drinking purposes and three gallons of clean water per head per day for bathing and washing purposes. Where piped water supply is available, supply shall be at stand posts and where the supply is from wells or river, tanks which may be of metal or masonry, shall be provided. The contractor(s) shall also at his/ their own cost make arrangements for laying pipe lines for water supply to his/ their labour camp from the existing mains wherever available, and shall pay all fees and charges therefore.

(iv) The site selected for the camp shall be high ground, removed from jungle.

(v) **Disposal of Excreta** - The contractor(s) shall make necessary arrangements for the disposal of excreta from the latrines by trenching or incineration which shall be according to the requirements laid down by the Local Health Authorities. If trenching or incineration is not allowed, the contractor(s) shall make arrangements for the removal of the excreta through the Municipal Committee/authority and inform it about the number of labourers employed so that arrangements may be made by such Committee/authority for the removal of the excreta. All charges on this account shall be borne by the contractor and paid direct by him to the Municipality/authority. The contractor shall provide one sweeper for every eight seats in case of dry system.

(vi) **Drainage** - The contractor(s) shall provide efficient arrangements for draining away sullage water so as to keep the camp neat and tidy.

(vii) The contractor(s) shall make necessary arrangements for keeping the camp area sufficiently lighted to avoid accidents to the workers.

(viii) **Sanitation -** The contractor(s) shall make arrangements for conservancy and sanitation in the labour camps according to the rules of the Local Public Health and Medical Authorities.

CLAUSE 19 I

The Engineer-in-Charge may require the contractor to dismiss or remove from the site of the work any person or persons in the contractors' employ upon the work who may be incompetent or misconduct himself and the contractor shall forthwith comply with such

requirements. In respect of maintenance/repair or renovation works etc. where the labour have an easy access to the individual houses, the contractor shall issue identity cards to the labourers, whether temporary or permanent and he shall be responsible for any untoward action on the part of such labour. AE/JE will display a list of contractors working in the colony/Blocks on the notice board in the colony and also at the service centre, to apprise the residents about the same.

CLAUSE 19J

It shall be the responsibility of the contractor to see that the building under construction is not occupied by any body unauthorizedly during construction, and is handed over to the Engineer- in-Charge with vacant possession of complete building. If such building though completed is occupied illegally, then the Engineer-in-Charge shall have the option to refuse to accept the said building/buildings in that position. Any delay in acceptance on this account will be treated as the delay in completion and for such delay, a levy upto 5% of tendered value of work may be imposed by the RTDC whose decision shall be final both with regard to the justification and quantum and be binding on the contractor.

However, RTDC/Govt, through a notice, may require the contractor to remove the illegal occupation any time on or before construction and delivery.

CLAUSE 19K : Employment of Skilled / Semi Skilled Workers

The contractor shall, at all stages of work, deploy skilled/semi skilled tradesmen who are qualified and possess certificate in particular trade from Industrial Training Institute/National Institute of construction Management and Research (NICMAR)/ National Academy of Construction, CIDC or any similar reputed and recognized Institute managed/ certified by State/Central Government. The number of such qualified tradesmen shall not be less than 20% of total skilled/semi skilled workers required in each trade at any stage of work. The contractor shall submit number of man days required in respect of each trade, its scheduling and the list of qualified tradesmen along with requisite certificate from recognized Institute to Engineer in charge for approval. Notwithstanding such approval, if the tradesmen are found to have inadequate skill to execute the work of respective trade, the contractor shall substitute such tradesmen within two days of written notice from Engineer-in-Charge. Failure on the part of contractor to obtain approval of Engineer-in-Charge or failure to deploy qualified tradesmen will attract a compensation to be paid by contractor at the rate of Rs. 100 per such tradesman per day. Decision of Engineer in Charge as to whether particular tradesman possesses requisite skill and amount of compensation in case of default shall be final and binding.

The contractor shall arrange on site training as per National Skill Development Corporation (NSDC) norms for at least 30% of the unskilled workers engaged in the project in coordination with the CPWD Regional Training Institute & National Skill Development Corporation (NSDC) for certification at the level of skilled/semi skilled tradesmen. The cost of such training as stated above shall be born by the Government. The necessary space and workers shall be provided by the contractor and no claim what so ever shall be entertained.

CLAUSE 19L: DEDUCTION OF CESS AS PER PROVISION OF BUILDING AND OTHER CONSTRUCTION WORKER'S WELFARE CESS ACT,1996 & HIMACHAL PRADESH BUILDING AND OTHER CONSTRUCTION WORKERS RULES,2008

The department will deduct cess of 1% from each running bill from the gross amount of work done by the contractor.

CLAUSE 20 : MINIMUM WAGES ACT TO BE COMPLIED WITH

The contractor shall comply with all the provisions of the Minimum Wages Act, 1948, and Contract Labour (Regulation and Abolition) Act, 1970, amended from time to time and rules framed thereunder and other labour laws affecting contract labour that may be brought into force from time to time.

CLAUSE 21 : WORK NOT TO BE SUBLET. ACTION IN CASE OF INSOLVENCY

The contract shall not be assigned or sublet without the written approval of the Engineer-in Charge. And if the contractor shall assign or sublet his contract, or attempt to do so, or become insolvent or commence any insolvency proceedings or make any composition with his creditors or attempt to do so, or if any bribe, gratuity, gift, loan, perquisite, 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 agent 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 Engineer-in-Charge on behalf of the Government shall have power to adopt the course specified in Clause 3 hereof in the interest of Government and in the event of such course being adopted, the consequences specified in the said Clause 3 shall ensue.

CLAUSE 22

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 23 : CHANGES IN FIRM'S CONSTITUTION TO BE INTIMATED

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 Proprietor Firm, such approval as aforesaid shall likewise be obtained before the contractor enters into any partnership agreement where under the partnership firm would have the right to carry out the works hereby 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 21 hereof and the same action may be taken, and the same consequences shall ensue as provided in the said Clause 21.

CLAUSE 24 : LIFE CYCLE COST

The contractor shall be responsible for safety, quality and soundness of the buildings including structural elements beyond maintenance period. The contractor shall have obligation to rectify such defects minimum up to 5 (five) years from the date of completion of work. The defects have to be rectified within a reasonable time not exceeding forty-five days after issue of notice by Engineer- in- Charge. If contractor does not take corrective action within 45 days, then action for debarring of the agency shall be taken by the appropriate authority.

CLAUSE 25 : SETTLEMENT OF DISPUTES & ARBITRATION

Except where otherwise provided in the contract, all questions and disputes relating to the meaning of the specifications, designs, drawings and instructions here-in-fore mentioned and as to the quality of workmanship of materials used on the work or as to any other question, claim, right, matter or thing whatsoever, in any way arising out of or relating to the contract designs, drawings, specifications, estimates, instructions, orders

or these conditions or otherwise concerning the works or the execution or failure to execute the same whether arising during the progress of the works or after the completion or abandonment thereof shall be referred to the sole arbitration of the person appointed by the Chief General Manager, R.T.D.C. HP. It will be no objection to any such appointment that the arbitrator so appointed is a Government Servant, that he had to deal with the matters to which the contract relates, and that in the course of his duties as Government Servant he had expressed views on all or any matters in disputed of difference. The arbitrator to whom the matter is originally referred being transferred or vacating his office or being unable to act for any reason to Chief General Manager ,R.T.D.C. HP, at the time of such transfer vacation of office or inability to act shall appoint another person to act as arbitrator in accordance with the terms of the contract. Such person shall be entitled to proceed with the reference from the stage at which it was left by his predecessor. It is also a term of this contract that no person other than a person appointed by the Chief General Manager, R.T.D.C. HP should act as arbitrator and, if for any reason, that is not possible, the matter is not to be referred to arbitration at all. In all cases where the amount of the claim in dispute is Rs.50,000 (Rupees fifty thousand) and above, the arbitrator shall give reasons for the award. Subject as aforesaid the provision of Arbitration Act, 1996 or any statutory modification or re-enactment thereof and the rules made there under and for the time being in force shall apply to the arbitration proceedings under this clause .It is also a term of the contract that the party invoking arbitration shall specify the dispute or disputes to be referred to arbitration under this clause together with the amount or amounts claimed in respect of each such disputes. It is also a term of the contract that if the contractor(s) do/does not make any demand for arbitration in respect of any claim(s) in writing within 90 days of receiving the information form the Government, that the bills are ready for payment. The claim of the contractor (s) will be deemed to have been waived and absolutely barred and the Government shall be discharged and released of all liabilities under the contract in respect of these claims. The arbitrator(s) may time to time with consent of parties enlarge the time, for making and publishing the award.

CLAUSE 26 : CONTRACTOR INDEMNIFY GOVERNMENT AGAINST PATENT RIGHTS

The contractor shall fully indemnify the Governor of Himachal Pradesh against any action, claim or proceeding relating to infringements 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 immediately notified, 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 Himachal Pradesh 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 27 : LUMPSUM PROVISIONS IN TENDER

When the estimate on which a tender is made includes lump sum in respect of parts of the work, the contractor shall be entitled to payment in respect of the items of work involved or the part of the work in question at the same rates as are payable under this contract for such items, or if the part of the work in question is not, in the opinion of the Engineer-in-Charge payable 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 against the contractor with regard to any sum or sums payable to him under the provisions of the clause.

CLAUSE 28 : ACTION WHERE NO SPECIFICATIONS ARE SPECIFIED

In the case of any class of work for which there is no such specifications as referred to in Clause 11, such work shall be carried out in accordance with the Bureau of Indian Standards Specifications. In case there are no such specifications in Bureau of Indian Standards, the work shall be carried out as per manufacturers' specifications, if not available then as per District Specifications. In case there are no such specifications as required above, the work shall be carried out in all respects in accordance with the instructions and requirements of the Engineer- in-Charge.

CLAUSE 29 : WITHOLDING AND LIEN IN RESPECT OF SUM DUE FROM CONTRACTOR

(1) Whenever any claim or claims for payment of a sum of money arises out of or under the contract , against the contractor ,the Engineer-in-Charge or the Government shall be entitled to withhold and also have a lien to retain such sum or sums in whole or in part from security, if deposited by the contractor and for the purpose aforesaid ,the Engineer-in-charge or the government shall be entitled to withhold the security deposit, if any ,furnished as he case may be and also have lien over same pending finalization or adjudication of any such claim . In the event of the security being insufficient or if no security has been taken from the contractor, the Engineer-in-charge or the Government shall be entitled to withhold and have a lien to retain to the extent of such claimed amount or amounts referred, from any sum or sums found payable or which may at any time thereafter become payable to the contractor under the same contract or any other contract with Engineer-in-charge of the Govt or any contracting person through Engineer-in-charge pending finalization of adjudication of any such claim. Should this sum be not sufficient to cover the full amount recoverable, the contractor shall pay to Government, on demand the balance remaining due shall be recoverable by way of arrears of land revenue.

It is agreed to term of the contract that sum of money or moneys so withheld or retained under the lien referred to above by Engineer-in-charge or the Government will be kept withheld or retained as such by the Engineer-in-charge or the Government till the claim arising out or under the contract is determined by the arbitrator (if the contract is governed by arbitration clause by the competent court as the case may be and the contractor will have no claim for the interest or damages whatsoever on any account in respect of such withholding or retention under the lien referred to above and duly notified as such to the contractor. For the purpose of this clause, where the contractor is a partnership firm or a limited company , the Engineer-in-Charge or the Government shall be entitled to withhold and also have a lien to retain towards such claimed amount or amounts in whole or in part from any sum found payable to any partner/limited company as the case may be, whether in his individual capacity or otherwise.

(2) Government shall have the right to cause in audit and technical examination of the works and the final bills of the contractor including all supporting vouchers, abstract etc., to be made 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 be have been executed, the contractor shall be liable to refund the amount of overpayment and it shall be lawful for Government to recover the same from him in the manner prescribed in sub-clause (1) of this clause 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 Government to the contractor. Provided that Government shall not be entitled to recover any sum overpaid, not the contractor shall be entitled to payment of any sum paid short where such payment has been agreed upon between the General Manager on the one hand and the contractor on the other under any term of the contract permitting payment for works after assessment by the General Manager.

CLAUSE 29A : LIEN IN RESPECT OF CLAIMS IN OTHER CONTRACTS

Any sum of money due and payment to the contractor (including the same security deposit returnable to him under the contract may be withheld or retained by way or lien by the Engineer- in-Charge or the Government or any other contracting person or persons through Engineer-in- Charge against any claim of the Engineer-in-Charge of Government or such other person or persons. In respect of payment of a sum of money arising out of or under any other contract made by the contractor with the Engineer-in-Charge or the Government or with such other person or persons. It is agreed term of will be kept with held or returned as such by the Engineer-in- Charge or the Government the contract that the sum of money so withheld or retained under this clause by the Engineer-in-Charge or the Government or till his claim arising out of in the same contract or any other contract is either mutually settled or determined by arbitrator (if the contract is governed by arbitration clause) or by the competent authority as the case may be and that the contractor shall have no claim for interest or damage whatsoever on this account on any other ground in respect of any sum of money withhold or retained under the clause and duty notified as such to the contractor.

CLAUSE 30 : EMPLOYMENT OF COAL MINING OR CONTROLLED AREA LABOUR NOT PERMISSIBLE NOT APPLICABLE

The contractor shall not employ coal mining or controlled area labour falling under any category whatsoever in or on connection with the work or recruit –labour from area within a radius of 20 miles of the controlled area. Subject as above the contractor shall employ imported by labour only i.e. depot imported labour or labour imported by contractors from areas, from which import is permitted. Where ceiling price for imported labour has been fixed by State or Regional Labour Committees not more than that ceiling price shall be paid to the labour by the contractor. The contractor shall immediately remove any labourer who may be pointed out by the Engineer-in- Charge is being a coal mining or controlled area labourer failure to do so shall render the contractor liable to pay to the Government. A sum calculated at the rate of Rs.10 per day labour the certificate of the Engineer-in-Charge about the number of coal mining or controlled area labour and the number of days for which they work shall be final and binding upon all parties to this contract. It is declared and agreed between the parties that the aforesaid stipulation in this clause is one in which the public are interested within the meaning if the exception of section 74 of Indian Contract 1872.

CLAUSE 31 : WATER FOR WORKS

The contractor(s) shall make his/their own arrangements for water required for the work and nothing extra will be paid for the same. This will be subject to the following conditions.

(i) That the water used by the contractor(s) shall be fit for construction purposes to the satisfaction of the Engineer-in-Charge.

(ii) The Engineer-in-Charge shall make alternative arrangements for supply of water at the risk and cost of contractor(s) if the arrangements made by the contractor(s) for procurement of water are in the opinion of the Engineer-in- Charge, unsatisfactory.

CLAUSE 32 : ALTERNATE WATER ARRANGEMENTS

(i) Where there is no piped water supply arrangement and the water is taken by the contractor from the wells or hand pump constructed by the Government, no charge shall be recovered from the contractor on that account. The contractor shall, however, draw water at such hours of the day that it does not interfere with the normal use for which the hand pumps and wells are intended. He will also be responsible for all damage and abnormal repairs arising out of his use, the cost of which shall be recoverable from him. The Engineer-in-Charge shall be the final authority to determine the cost recoverable from the contractor on this account and his decision shall be binding on the contractor.

(ii) The contractor shall be allowed to construct temporary wells in the proposed land for Construction for taking water for construction purposes only after he has got permission of the Engineer-in- Charge in writing. No charges shall be recovered from the contractor on this account, but the contractor shall be required to provide necessary safety arrangements to avoid any accidents or damage to adjacent buildings, roads and service lines. He shall be responsible for any accidents or damage caused due to construction and subsequent maintenance of the wells and shall restore the ground to its original condition after the wells are dismantled on completion of the work.

CLAUSE 33 : EMPLOYMENT OF TECHNICAL STAFF AND EMPLOYEES

Contractors Superintendence, Supervision, Technical Staff & Employees

(i) The contractor shall provide all necessary superintendence during execution of the work and all along thereafter as may be necessary for proper fulfilling of the obligations under the contract.

The contractor shall immediately after receiving letter of acceptance of the tender and before commencement of the work, intimate in writing to the Engineer-in-Charge, the name(s), qualifications, experience, age, address(s) and other particulars along with certificates, of the principal technical representative to be in charge of the work and other technical representative(s) who will be supervising the work. Minimum requirement of such technical representative(s) and their qualifications and experience shall not be lower than specified in Special Conditions of Contract. The Engineer-in-Charge shall within 3 days of receipt of such communication intimate in writing his approval or otherwise of such a representative(s) to the contractor. Any such approval may at any time be withdrawn and in case of such withdrawal, the contractor shall appoint another such representative(s) according to the provisions of this clause. Decision of the tender accepting authority shall be final and binding on the contractor in this respect. Such a principal technical representative and other technical representative(s) shall be appointed by the contractor soon after receipt of the approval from Engineer-in-charge and shall be available at site before start of work.

All the provisions applicable to the principal technical representative under the Clause will also be applicable to other technical representative(s) The principal technical representative and other technical representative(s) shall be present at the site of work for supervision at all times when any construction activity is in progress and also present himself/themselves, as required, to the Engineer-in-Charge and/or his designated representative to take instructions. Instructions given to the principal technical representative or other technical representative(s) shall be deemed to have the same force as if these have been given to the contractor. The principal technical representative and other technical

representative(s) shall be actually available at site fully during all stages of execution of work, during recording/checking/test checking of measurements of works and whenever so required by the Engineer-in-Charge and shall also note down instructions conveyed by the Engineer-in- Charge or his designated representative(s) in the site order book and shall affix his/their signature in token of noting down the instructions and in token of acceptance of measurements/ checked measurements/ test checked measurements. The representative(s) shall not look after any other work. Substitutes, duly approved by Engineer-in-Charge of the work in similar manner as aforesaid shall be provided in event of absence of any of the representative(s) by more than two days.

If the Engineer-in-Charge, whose decision in this respect is final and binding on the contractor, is convinced that no such technical representative(s) is/are effectively appointed or is/are effectively attending or fulfilling the provision of this clause, a recovery (nonrefundable) shall be effected from the contractor as specified in Special Conditions of Contract and the decision of the Engineer-In-Charge as recorded in the site order book and measurement recorded checked/test checked in Measurement Books shall be final and binding on the contractor. Further if the contractor fails to appoint suitable technical Principal technical representative and/or other technical representative(s) and if such appointed persons are not effectively present or are absent by more than two days without duly approved substitute or do not discharge their responsibilities satisfactorily, the Engineer-in-Charge shall have full powers to suspend the execution of the work until such date as suitable other technical representative(s) is/are appointed and the contractor shall be held responsible for the delay so caused to the work. The contractor shall submit a certificate of employment of the technical representative(s) (in the form of copy of Form-16 or CPF deduction issued to the Engineers employed by him) along with every on account bill final bill and shall produce evidence if at any time so required by the Engineer-in-Charge.

(ii) The contractor shall provide and employ on the site only such technical assistants as are skilled and experienced in their respective fields and such foremen and supervisory staff as are competent to give proper supervision to the work. The contractor shall provide and employ skilled, semiskilled and unskilled labour as is necessary for proper and timely execution of the work.
The Engineer-in-Charge shall be at liberty to object to and require the contractor to remove from the works any person who in his opinion misconducts himself, or is incompetent or negligent in the performance of his duties or whose employment is otherwise considered by the Engineer-in-Charge to be undesirable. Such person shall not be employed again at works site without the written permission of the Engineer-in-Charge and the persons so removed shall be replaced as soon as possible by competent substitutes.

CLAUSE 34: LEVY / TAXES PAYABLE BY CONTRACTOR

(i) GST, Building and other Construction Workers Welfare Cess or any other tax, levy or Cess in respect of input for or output by this contract shall be payable by the contractor and Government shall not entertain any claim whatsoever in this respect.

(ii) The contractor will produce a certified copy from the Industries Department that the royalty has been paid by him on account of excavation of stone and sand from other than P.W.D, roads or alternatively recovery of the material excavated and utilized in the construction as per the billed quantities shall be recovered by the

Department. Other wise the royalty at prevalent rate shall be deducted on the material consumed in the work.

(iii) The contractor shall deposit royalty and obtain necessary permit for supply of the red bajri, stone, kankar, etc. from local authorities.

If pursuant to or under any law, notification or order any royalty, cess or the like becomes payable by the RTDC and does not any time become payable by the contractor to the State Government, Local authorities in respect of any material used by the contractor in the works, then in such a case, it shall be lawful to the RTDC and it will have the right and be entitled to recover the amount paid in the circumstances as aforesaid from dues of the contractor

CLAUSE 35 : CONDITIONS FOR REIMBURSEMENT OF LEVY/TAXES IF LEVIED AFTER RECIEPT OF TENDERS

(i) All tendered cost shall be inclusive of all taxes and levies (except GST) payable under respective statutes. However, if any further tax or levy or cess is imposed by Statute, after the last stipulated date for the receipt of tender including extensions if any and the contractor thereupon necessarily and properly pays such taxes/levies/cess, the contractor shall be reimbursed the amount so paid, provided such payments, if any, is not, in the opinion of the Chief General Manager(RTDC) (Whose decision shall be final and binding) attributable to delay in execution of work within the control of the contractor.

(ii) The contractor shall keep necessary books of accounts and other documents for the purpose of this condition as may be necessary and shall allow inspection of the same by a duly authorized representative of the Government and/or the Engineer-in-Charge and shall also furnish such other information/document as the Engineer-in-Charge may require from time to time.

(iii) The contractor shall within a period of 30 days of imposition of any further tax or levy. Pursuant to the constitution (Forty Six Amendment) Act, 1982 give a written notice thereof to the Engineer-in-Charge that the same is given pursuant to this condition together with all necessary information relating there to.

(iv) In pursuant to or under any law such notification or order any royalty. Cost fee or the like becomes payable to the government of Himachal Pradesh and does not at any time becomes payable by the contractor, to the State Government. Local authorities in respect of any material used by the contractor in the work, then in such cases it shall be lawful for the Government of Himachal Pradesh and it will have right and be entitled to recover the amount paid in the circumstances as aforesaid, from the dues of the contractor.

CLAUSE 36 : TERMINATION OF CONTRACT ON DEATH OF CONTRACTOR

Without prejudice to any of the rights or remedies under this contract, if the contractor dies, the Executive Engineer on behalf of the Governor of Himachal Pradesh shall have the option of terminating the contract without compensation to the contractor.

CLAUSE 37: IF RELATIVE WORKING IN RTDC THEN THE CONTRACTOR NOT ALLOWED TO TENDER

The contractor shall not be permitted to tender for works in RTDC(responsible for award and execution of contract) in which his near relative is posted as Divisional Accountant or as an officer in any capacity between grades of Superintending Engineer

and Junior Engineer (both inclusive). He shall also intimate the name of persons who are working with him in any capacity or are subsequently employed by him and who are near relatives of any Gazetted Officer in RTDC. Any breach of this condition by the contractor would render him liable to be removed from the approved list of the contractors of this department.

Note :- By the terms relatives; is meant wife, husband, parents and grand parents, children and grand children, brothers and sisters, uncles and cousins and their corresponding-in-laws.

CLAUSE 38: NO GAZETTED ENGINEER TO WORK AS CONTRACTOR WITHIN ONE YEAR OF RETIREMENT

No engineer of gazetted rank or other gazetted officer employed in engineering or administrative duties in an engineering department of the Government of India shall work as a contractor or employee of a contractor for a period of one year after his retirement from government service without the previous permission of Government of India in writing. This contract is liable to be cancelled if either the contractor or any of his employees is found at any time to be such a person who had not obtained the permission of Government of India as aforesaid, before submission of the tender or engagement in the contractor's service, as the case may be.

CLAUSE 39 : THEORITICAL QUANTITY OF MATERIALS & RECOVERY FOR MATERIAL ISSUED

(i) After the completion of the work the theoretical quantity of cement to be used in the work shall be calculated on the basis of P.W.D. Department statement showing quantity of cement to be used in different items of work provided in the H.P. Schedule of rates or in case of non schedule items, it shall be calculated on the basis of standard formula laid down by Superintending Engineer of the concerned Circle. Over this theoretical quantity of cement shall be allowed a variation up to 5% plus/minus for works the tendered cost of the work not more than Rs.2 lacs; up to 4% plus/minus for works the tendered cost of the work is more than Rs.2 lacs up to Rs.5lacs and up to 3% plus/minus for works the tendered cost of the work is above 5 lacs. The difference in quantity of cement actually issued to the contractor and the theoretical quantity including authorize variations, if not returned by the contractor, shall be recovered at twice the issue rate including storage charges, without prejudice to the provision of the relevant conditions regarding return of materials governing the contract. In the event of it being discovered that the quantity of cement used is less than the quantity ascertained as herein before provided (allowing variations on the minus side as stipulated above) the cost of the quantity of cement not so used shall be recovered from the contractor on the basis of stipulated issue rate including storage charges and cartage to site. The provision of the foregoing sub-clause shall apply in the case of steel reinforcement of structural steel sections, except that the theoretical quantity of steel shall be taken as the quantity required as per design or as authorized by the Engineer-in-charge, including authorized laps- pages, plus 5% wastage due to cutting into pieces. Over this theoretical quantity, plus 5% and minus 4% shall be allowed as variation due to wastage being more or less. After the completion of the work, the actual quantity of cables (other than under- ground cables) wires, conduits/G.I. pipes, G.I./M.S. sheets used in the various items of work shall be calculated on the basis of the measurements recorded in the Measurement Book for purpose of payment and for assessing the consumption of materials used in works. Over this quantity a variation of 5 percent plus half be allowed for wastage of materials during execution in case of

cables (other than underground cables), Wires, conduit pipes/G.I. pipes and 10 percent plus in case of G.I./M.S sheets. The difference in quantity of materials actually issued to the contractor and the quantity recorded in the Measurement Book including the authorized variation as stated above if not returned by the contractor shall be recovered at twice the issue rate including storage charges and cartage to site without prejudice to the provisions of the relevant conditions regarding return of materials governing the contract. the cost of the quantity of cement not so used shall be recovered from the contractor on the basis of stipulated issue rate including storage charges and cartage to site.

(ii) The provision of the foregoing sub-clause shall apply in the case of steel reinforcement of structural steel sections, except that the theoretical quantity of steel shall be taken as the quantity required as per design or as authorized by the Engineer-in-charge, including authorized laps- pages, plus 5% wastage due to cutting into pieces. Over this theoretical quantity, plus 5% and minus 4% shall be allowed as variation due to wastage being more or less.

(iii) After the completion of the work, the actual quantity of cables (other than under-ground cables) wires, conduits/G.I. pipes, G.I./M.S. sheets used in the various items of work shall be calculated on the basis of the measurements recorded in the Measurement Book for purpose of payment and for assessing the consumption of materials used in works. Over this quantity a variation of 5 percent plus half be allowed for wastage of materials during execution in case of cables (other than underground cables), Wires, conduit pipes/G.I. pipes and 10 percent plus in case of G.I./M.S sheets. The difference in quantity of materials actually issued to the contractor and the quantity recorded in the Measurement Book including the authorized variation as stated above if not returned by the contractor shall be recovered at twice the issue rate including storage charges and cartage to site without prejudice to the provisions of the relevant conditions regarding return of materials governing the contract.

(iv) The provisions made above are without prejudice the right of the Government to take action against the contractor under the condition of the contract for not doing the work according to the prescribed specification.

(v) After the completion of the work, theoretical quantity of bitumen to be used on work shall be calculated on the basis of P.W.D. Department's statement showing quantities of bitumen to be used in different items of work provided in the H.P. Schedule of Rates or in respect of agreement which do not provide for or authorized application of H.P. Schedule of Rates the theoretical quantity of bitumen to be used in works shall be calculated on the basis of standard formula as laid down by Superintending Engineer of the concerned circle. Over the said theoretical quantity of bitumen, a variation up to plus (excess) 2 ½ percent shall be allowed. The agreements which provide for free supply of bitumen, the value or price of the difference in the quantity of bitumen actually issued to the contractor and the theoretical quantity including the above mentioned authorized variation if not returned by the contractor shall be recovered at twice the issue rate of Rs…… per M.T. i/c storage charges without prejudice to the relevant conditions in the agreements regarding return of materials. In the event of it being discovered the quantity of bitumen used by the contractor is less than the quantity calculated in the manner aforesaid, there shall be no recovery for less use of bitumen (no variation on the lower side shall be allowed). The cost of the quantity of bitumen not so used shall be recovered from the contractor on the basis of stipulated issue rate included storage charge thereof up to site. The agreement which provides for supply of bitumen at a fixed rate, the value or price of the difference in the quantity of bitumen actually issued to the contractor and the theoretical quantity including the above mentioned authorized variation, if not returned by the contractor, shall be

recovered at twice the issue rate of bitumen plus cartage to site including storage charges thereof without prejudice to the relevant conditions in the agreement regarding return of materials governing the contract. In the event of it being discovered that the quantity of bitumen used by the contractor is less than the quantity of bitumen calculated in the manner aforesaid (no variation on the lower side shall be allowed (the cost of the quantity of bitumen not so used shall be recovered from the contractor on the basis of stipulated issue rate including storage charges and cartage thereof up to site. This is without prejudice to declaration of substandard nature of the work done.

CLAUSE 40 : COMPENSATION DURING WARLIKE SITUATION

Pertaining to damage to works in consequence of hostilities of war like operations. The work (whether fully constructed or not) and all materials, machine, tools and plants, scaffolding, temporary building and other things connected there with shall be at risk of the contractor until the work has been delivered to the Engineer-in-Charge and a certificate from him to that effect obtained. In the event of the work or any materials properly brought to the site for incorporation in the work being damage or destroyed in consequence of hostilities or war like operations, the contractor shall, when ordered in writing by the Engineer-in-Charge remove any debits from the site, collect and properly stack or remove in store all serviceable materials salvaged from the damaged work and shall be paid at the contract rates in accordance with provisions of this agreement for the work of clearing the site of debris, stacking or removal of serviceable material and for the reconstruction of all works ordered by the Engineer-in-Charge such payments being in addition to compensation up to the value of the work, originally executed before being damaged or destroyed and not paid for. In case of works damaged or destroyed but not already measured and paid for the compensation shall be addressed by the Executive Engineer up to Rs.5000/- and by the Superintending Engineer concerned for a higher amount. The contractor shall be paid for the damage/destruction suffered and for the restoring the material at the rates based on the analysis of rates tendered for n accordance with the provisions of this agreement. The certificate of the Engineer-in-Charge regarding the quality and quantity of material and purpose for which they were collected shall be final and binding on all parties to this contract.

Provided always that no compensation shall be payable for any loss in consequence of hostilities or war like operation (a) unless the contractor had taken all such precautions against Air Raid as are deemed necessarily by the A.R.P. Officers of the Engineer-in-Charge, (b) for any materials, etc. not on the site of the work or for any tools and plant, machinery, scaffolding temporary building and other thing not intended for the work. In the event of the contactor having to carry out reconstruction as aforesaid, he shall be allowed which extension of time for its completion as is considered reasonable by the General Manager.

CLAUSE 41 : APPRENTICES ACT PROVISIONS TO BE COMPLIED WITH

The contractor shall comply with the provisions of the Apprentices 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 the contract and the RTDC may, in his discretion, cancel the 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 42 : RELEASE OF SECURITY DEPOSIT AFTER LABOUR CLEARANCE

Release of Security Deposit of the work shall not be refunded till the contractor produces

a clearance deposit after labour certificate from the Labour Officer. As soon as the work is virtually complete the contractor shall apply for the clearance certificate to the Labour Officer under intimation to the Engineer-in-Charge. The Engineer-in-Charge, on receipt of the said communication, shall write to the Labour Officer to intimate if any complaint is pending against the contractor in respect of the work. If no complaint is pending, on record till after 3 months after completion of the work and/or no communication is received from the Labour Officer to this effect till six months after the date of completion, it will be deemed to have received the clearance certificate and the Security Deposit will be released if otherwise due.

CLAUSE43: INSURANCE

1. Requirements

Before commencing execution of works, unless stated otherwise in the special conditions of contract, it shall be obligatory for the contractor to obtain at his own cost stipulated insurance cover under the following requirements:

a) Contractor's all risk and Third Party Cover.
b) Liability under the workmen's compensation Act, 1923, Minimum Wages Act, 1948 and Contract Labour (Regulation and Abolition) Act, 1970.
c) Accidents to staff, Engineers, Supervisors and others who are not governed by workmen's compensation Act.
d) Damage to material, machinery and works due to fire theft etc.
e) Any other risk to be covered by insurance as may be specified by the employer in the special conditions of contract.

2. Policy in Joint Names of Contractor and Employer

The policy referred to under sub-clause 46(1) above shall be obtained in the joint names of the contractor and the employer and shall inter-alia provide coverage against the following, arising out of or in connection with execution of works, their maintenance and performance of the contract.

a) Loss of life or injury involving public, employee of the contractor, or that of employer and Engineer, labour etc.
b) Injury, loss or damage to the works or property belonging to public, government bodies, local authorities, utility organizations, contractors, employer or others.

3. Currency of Policy

The policies shall remain in force throughout the period of execution of the works and till the expiry of the defect liability period. The contractor shall, whenever called upon, produce to the engineer or his representative the various insurance policies obtained by him as also the rates of premia and the premia paid by him to ensure that the polices indeed continue to be in force. If the contractor fails to effect or keep in force or provide adequate cover in the insurance policies mentioned in the sub clause 46(1) or any other insurance he might be required to effect under the contract, then in such cases, the employer may effect and keep in force any such insurance or further insurance and the cost and expenses incurred by him in this regard shall be deductible from payments due to the contractor or from the contractor's performance security.

CLAUSE 44: CONDITIONS SPECIFIC TO GREEN BUILDINGS PRACTICESCLAUSE

The contractor shall strictly adhere to the following conditions as part of his contractual obligations:

1. SITE

The contractor shall ensure that adequate measures are taken for the prevention of erosion of the top soil during the construction phase. The contractor shall implement the Erosion and Sedimentation Control Plan (ESCP) provided to him by the Engineer-in-charge as part of the larger Construction Management Plan (CMP). The contractor shall obtain the Erosion and Sedimentation Control Plan (ESCP) Guidelines from the Engineer-in- charge and then prepare “working plan” for the following month’s activities as a CAD drawing showing the construction management, staging & ESCP. At no time soil should be allowed to erode away from the site and sediments should be trapped where necessary.

The contractor shall ensure that all the top soil excavated during construction works is neatly stacked and is not mixed with other excavated earth. The contractors shall take the clearance of the architects / Engineer-in-charge before any excavation. Top soil should be stripped to a depth of 20 cm (centimetres) from the areas to be disturbed, for example proposed area for buildings, roads, paved areas, external services and area required for construction activities etc. It shall be stockpiled to a maximum height of 40 cm in designated areas, covered or stabilised with temporary seeding for erosion prevention and shall be reapplied to site during plantation of the proposed vegetation. Top soil shall be separated from subsoil, debris and stones larger than 50 mm (millimetre) diameter. The stored top soil may be used as finished grade for planting areas.

The contractor shall carry out the recommendations of the soil test report for improving the soil under the guidance of the Engineer-in-charge who would also advise on the timing of application of fertilizers and warn about excessive nutrient levels.

The contactor shall carry out post-construction placement of topsoil or other suitable plant material over disturbed lands to provide suitable soil medium for vegetative growth. Prior to spreading the topsoil, the sub-grade shall be loosened to a depth of 50mm to permit bonding. Topsoil shall be spread uniformly at a minimum compacted depth of 50mm on grade 1:3 or steeper slopes, a minimum depth of 100mm on shallower slopes. A depth of 300mm is preferred on relatively flatter land.

The Contractor should follow the construction plan as proposed by the Engineer-in- charge to minimize the site disturbance such as soil pollution due to spilling. Use staging and spill prevention and control plan to restrict the spilling of the contaminating material on site. Protect top soil from erosion by collection storage and reapplication of top soil, constructing sediment basin, contour trenching, mulching etc.

No excavated earth shall be removed from the campus unless suggested otherwise by Engineer-in-charge. All subsoil shall be reused in backfilling/landscape, etc as per the instructions of the Engineer-in-charge

The contractor shall not change the natural gradient of the ground unless specifically instructed by the architects / landscape consultant. This shall cover all natural features like water bodies, drainage gullies, slopes, mounds, depressions, rocky outcrops, etc. Existing drainage patterns through or into any preservation area shall not be modified unless specifically directed by the Engineer-in-charge.

The contractor shall not carry out any work which results in the blockage of natural drainage.

The contractor shall ensure that existing grades of soil shall be maintained around existing vegetation and lowering or raising the levels around the vegetation is not allowed unless specifically directed by the Engineer-in-charge

Contractor shall reduce pollution and land development impacts from automobiles use during construction.
Overloading of trucks is unlawful and creates and erosion and sedimentation problems, especially when loose materials like stone dust, excavated earth, sand etc. are moved. Proper covering must take place. No overloading shall be permitted.

2. CONSTRUCTION PHASE AND WORKER FACILITIES

The contractor shall specify and limit construction activity in preplanned/ designated areas and shall start construction work after securing the approval for the same from the Engineer-in-charge. This shall include areas of construction, storage of materials, and material and personnel movement.
Preserve and Protect Landscape during Construction

a) The contractor shall ensure that no trees, existing or otherwise, shall be harmed and damage to roots should be prevented during trenching, placing backfill, driving or parking heavy equipment, dumping of trash, oil, paint, and other materials detrimental to plant health. These activities should be restricted to the areas outside of the canopy of the tree, or, from a safe distance from the tree/plant by means of barricading. Trees will not be used for support; their trunks shall not be damaged by cutting and carving or by nailing posters, advertisements or other material. Lighting of fires or carrying out heat or gas emitting construction activity within the ground, covered by canopy of the tree is not to be permitted.

b) The contractor shall take steps to protect trees or saplings identified for preservation within the construction site using tree guards of approved specification.

c) The contractor shall conserve existing natural areas and restore damaged areas to provide habitat and promote biodiversity. Contractor should limit all construction activity within the specified area as per the Construction Management Plan (CMP) proposed by the Engineer-in-charge. All the existing trees should be preserved, if not possible than compensate the loss by re-planting trees in the proportion of 1:3.

d) The contractor shall avoid cut and fill in the root zones, through delineating and fencing the drip line (the spread limit of a canopy projected on the ground) of all the trees or group of trees. Separate the zones of movement of heavy equipment, parking, or excessive foot traffic from the fenced plant protection zones.

e) The contractor shall ensure that maintenance activities shall be performed as needed to ensure that the vegetation remains healthy. The preserved vegetated area shall be inspected by the Engineer-in-charge at regular intervals so that they remain undisturbed. The date of inspection, type of maintenance or restorative action followed shall be recorded in the logbook.

Contractor shall be required to develop and implement a waste management plan, quantifying material diversion goals. He shall establish goals for diversion from disposal in landfills and incinerators and adopt a construction waste management plan to achieve these goals. A project-vide policy of “Nothing leaves the Site” should be followed. In such a case when strictly followed, care would automatically be taken in ordering and timing of materials such that excess doesn’t become “waste”.

The Contractor's ingenuity is especially called towards meeting this prerequisite/ credit (GRIHA). Consider recycling cardboard, metal, brick, acoustical tile, concrete, plastic, clean wood, glass, gypsum wallboard, carpet and insulation. Designate a specific area(s) on the construction site for segregated or commingled collection of recyclable material, and track recycling efforts throughout the construction process. Identify construction haulers and recyclers to handle the designated materials. Note that diversion may include donation of materials to charitable organizations and salvage of materials on-site.

Contractor shall collect all construction waste generated on site. Segregate these wastes based on their utility and examine means of sending such waste to manufacturing units which use them as raw material or other site which require it for specific purpose. Typical construction debris could be broken bricks, steel bars, broken tiles, spilled concrete and mortar etc.

The contractor shall provide clean drinking water for all workers

The contractor shall provide the minimum level of sanitation and safety facilities for the workers at site. The contractor shall ensure cleanliness of workplace with regard to the disposal of waste and effluent; provide clean drinking water and latrines and urinals as per applicable standard. Adequate toilet facilities shall be provided for the workman within easy access of their place of work. The total no. to be provided shall not be less than 1 per 30 employs in any one shift. Toilet facilities shall be provided from the start of building operations, connection to a sewer shall be made as soon as practicable. Every toilet shall be so constructed that the occupant is sheltered from view and protected from the weather and falling objects. Toilet facilities shall be maintained in a sanitary condition. A sufficient quantity of disinfectant shall be provided. Natural or artificial illumination shall be provided.

The contractor shall ensure that air pollution due to dust/generators is kept to a minimum, preventing any adverse effects on the workers and other people in and around the site. The contractor shall ensure proper screening, covering stockpiles, covering brick and loads of dusty materials, wheel-washing facility, gravel pit, and water spraying. Contractor shall ensure the following activities to prevent air pollution during construction:

- Clear vegetation only from areas where work will start right away
- Vegetate / mulch areas where vehicles do not ply.
- Apply gravel / landscaping rock to the areas where mulching / paving is impractical
- Identify roads on-site that would be used for vehicular traffic. Upgrade vehicular roads (if these are unpaved) by increasing the surface strength by improving particle size, shape and mineral types that make up the surface & base. Add surface gravel to reduce source of dust emission. Limit amount of fine particles (smaller than 0.075mm) to 10 – 20%
- Water spray, through a simple hose for small projects, to keep dust under control. Fine mists should be used to control fine particulate. However, this should be done with care so as not to waste water. Heavy watering can also create mud, which when tracked onto paved public roadways, must be promptly removed. Also, there must be an adequate supply of clean water nearby to ensure that spray nozzles don't get plugged. Water spraying can

be done on:

a) Any dusty materials before transferring, loading and unloading

b) Area where demolition work is being carried out

c) Any un-paved main haul road

d) Areas where excavation or earth moving activities are to be carried out

- The contractor shall ensure that the speed of vehicles within the site is limited to 10 km/hr.
- All material storages should be adequately covered and contained so that they are not exposed to situations where winds on site could lead to dust / particulate emissions.
- Spills of dirt or dusty materials will be cleaned up promptly so the spilled material does not become a source of fugitive dust and also to prevent of seepage of pollutant laden water into the ground aquifers. When cleaning up the spill, ensure that the clean-up process does not generate additional dust. Similarly, spilled concrete slurries or liquid wastes should be contained / cleaned up immediately before they can infiltrate into the soil / ground or runoff in nearby areas
- Provide hoardings of not less than 3m high along the site boundary, next to a road or other public area
- Provide dust screens, sheeting or netting to scaffold along the perimeter of the building Cover stockpiles of dusty material with impervious sheeting
- Cover dusty load on vehicles by impervious sheeting before they leave the site

Contractor shall be required to provide an easily accessible area that serves the entire building and is dedicated to the separation, collection and storage of materials for recycling including (at a minimum) paper, corrugated cardboard, glass, plastics, and metals. He shall coordinate the size and functionality of the recycling areas with the anticipated collections services for glass, plastic, office paper, newspaper, cardboard, and organic wastes to maximize the effectiveness of the dedicated areas. Consider employing cardboard balers, aluminium can crushers, recycling chutes, and collection bins at individual workstations to further enhance the recycling program.
The contractor shall ensure that no construction leach ate (Ex: cement slurry), is allowed to percolate into the ground. Adequate precautions are to be taken to safeguard against this including, reduction of wasteful curing processes, collection, basic filtering and reuse. The contractor shall follow requisite measures for collecting drainage water run-off from construction areas and material storage sites and diverting water flow away from such polluted areas. Temporary drainage channels, perimeter dike/swale, etc. shall be constructed to carry the pollutant-laden water directly to the treatment device or facility (municipal sewer line).

Staging (dividing a construction area into two or more areas to minimize the area of soil that will be exposed at any given time) should be done to separate undisturbed land from land disturbed by construction activity and material storage.

The contractor shall Comply with the safety procedures, norms and guidelines (as applicable) as outlined in the document Part 7 _Constructional practices and safety, 2005, National Building code of India, Bureau of Indian Standards. A copy of all

pertinent regulations and notices concerning accidents, injury and first-aid shall be prominently exhibited at the work site. Depending upon the scope & nature of work, a person qualified in first-aid shall be available at work site to render and direct first-aid to causalities. A telephone may be provided to first-aid assistant with telephone numbers of the hospitals displayed. Complete reports of all accidents and action taken thereon shall be forwarded to the competent authorities.

The contractor shall ensure the following activities for construction workers safety, among other measures:

- Guarding all parts of dangerous machinery.
- Precautionary signs for working on machinery
- Maintaining hoists and lifts, lifting machines, chains, ropes, and other lifting tackles in good condition.
- Durable and reusable formwork systems to replace timber formwork and ensure that formwork where used is properly maintained.
- Ensuring that walking surfaces or boards at height are of sound construction and are provided with safety rails or belts.
- Provide protective equipment; helmets etc.
- Provide measures to prevent fires. Fire extinguishers and buckets of sand to be provided in the fire-prone area and elsewhere.
- Provide sufficient and suitable light for working during night time.

Adopt additional best practices, prescribed norms in construction industry.

The storage of material shall be as per standard good practices as specified in Part 7, Section 2 – Storage, Stacking and Handling practices, NBC 2005 and shall be to the satisfaction of the Engineer-in-charge to ensure minimum wastage and to prevent any misuse, damage, inconvenience or accident. Watch and ward of the Contractor's materials shall be his own responsibility. There should be a proper planning of the layout for stacking and storage of different materials, components and equipments with proper access and proper manoeuvrability of the vehicles carrying the materials. While planning the layout, the requirements of various materials, components and equipments at different stages of construction shall be considered. The Owner shall not take any responsibility on any account.
The contractor shall provide for adequate number of garbage bins around the construction site and the workers facilities and will be responsible for the proper utilisation of these bins for any solid waste generated during the construction. The contractor shall ensure that the site and the workers facilities are kept litter free. Separate bins should be provided for plastic, glass, metal, biological and paper waste and labelled in both Hindi and English.

The contractor shall prepare and submit 'Spill prevention and control plans' before the start of construction, clearly stating measures to stop the source of the spill, to contain the spill, to dispose the contaminated material and hazardous wastes, and stating designation of personnel trained to prevent and control spills. Hazardous wastes include pesticides, paints, cleaners, and petroleum products.

Contractor shall collect the relevant material certificates for materials with high recycled (both post-industrial and post-consumer) content, including materials for structural use like TMT steel rolled with high percentage of recycled steel, and RMC mix with fly-ash etc. (see appendix)

Contractor shall collect the relevant material certificates for rapidly renewable materials such as bamboo, wool, cotton insulation, agrifiber, linoleum, wheat

board, strawboard and cork.

Contractor shall adopt an IAQ (Indoor Air Quality) management plan to protect the system during construction, control pollutant sources, and interrupt pathways for contamination. He shall sequence installation of materials to avoid contamination of absorptive materials such as insulation, carpeting, ceiling tile, and gypsum wallboard. He shall also protect stored on-site or installed absorptive materials from moisture damage.
The contractor shall ensure that a flush out of all internal spaces is conducted prior to and over. This shall comprise an opening of all doors and windows for 14 days to vent out any toxic fumes due to paints, varnishes, polishes, etc.

Contractor shall make efforts to reduce the quantity of indoor air contaminants that are odorous or potentially irritating harmful to the comfort and well-being of installer and building occupants. Contractor shall ensure that the VOC (Volatile Organic Compounds) content of paints, coatings and primers used must not exceed the VOC content limits mentioned below:
Paints
Non-flat - 150
g/L Flat (Mat) -
50 g/L
Anti corrosive/ anti rust - 250
g/L Coatings
Clear wood
finishes Varnish -
350 g/L Lacquer -
550 g/L
Floor coatings - 100
g/L Stains - 250 g/L
Sealers
Waterproofing sealer - 250
g/L Sanding sealer - 275
g/L
Other sealers - 200 g/L
The VOC (Volatile Organic Compounds) content of adhesives and sealants used must be less than VOC content limits mentioned:

Architectural Applications VOC Limit(g/l less
water) Indoor Carpet adhesives - 50
Carpet Pad Adhesives - 50
Wood Flooring Adhesive -
100 Rubber Floor
Adhesives - 60 Sub Floor
Adhesives - 50 Ceramic
Tile Adhesives - 65
VCT and Asphalt Tile adhesives
- 50 Dry Wall and Panel
Adhesives - 50 Structural
Glazing Adhesives - 100
Multipurpose Construction Adhesives - 70
Substrate Specific Application VOC Limit (g/l less
water) Metal to Metal - 30

Plastic Foams - 50
Porous material (except wood) -
50 Wood - 30
Fiber Glass – 80

Wherever required, Contractor shall meet and carry out documentation of all activities on site, supplementation of information, and submittals in accordance with GRIHA program standards and guidelines. Towards meeting the aforementioned building environmental rating standard(s) expert assistance shall be provided to him up on request.

a) Water Use during Construction

Contractor should spray curing water on concrete structure and shall not allow free flow of water. After liberal curing on the first day, all the verticals surfaces of concrete structures should be painted with curing chemical to save water nothing extra shall be paid. Concrete structures should be kept covered with thick cloth/gunny bags and water should be sprayed on them. Contractor shall do water ponding on all sunken slabs using cement and sand mortar.

The Contractor shall remove from site all rubbish and debris generated by the Works and keep Works clean and tidy throughout the Contract Period. All the serviceable and nonservice able (malba) material shall be segregated and stored separately. The malba obtained during construction shall be collected in well-formed heaps at properly selected places, keeping in a view safe condition for workmen in the area. Materials which are likely to cause dust nuisance or undue environmental pollution in any other way, shall be removed from the site at the earliest and till then they shall be suitable covered. Glass & steel should be dumped or buried separately to prevent injury. The work of removal of debris should be carried out during day. In case of poor visibility artificial light may be provided.

a) MATERIALS & FIXTURES FOR THE PROJECT

The contractor shall endeavour to source most of the materials for construction at this project within a distance of 800 km radius from the project site. Contractor shall collect the relevant material certificates to prove the same

i) Any material that is to be sourced from outside the prescribed radius shall be done after securing the necessary approval from the Engineer-in-charge.

j) All cement used at site for reinforced concrete, precast members, mortar, plaster, building blocks, etc shall be PPC (Ordinary Portland Cement). The PPC must meet the requirements of IS 1489: 1991. (Minimum 25% replacement of cement with fly ash in PPC (Portland Pozzolona Cement) by weight of the cement used in the overall RC for meeting the equivalent strength requirements).

k) As a measure to reduce wastage and water consumption during construction, the contractor shall source or set up the infrastructure for a small scale ready mix concrete, all concreting works at site shall utilise only batch mix concrete.

l) The contractor has to comply as per MoEF issued notification 8.0.763(E) dated 14th Sept.1999 containing directive for greater fly ash utilization, where it stipulates that ii. Every construction agency engaged in the construction of buildings within a radius of 50 km radius of a Thermal Power Plant, have to use of 100% fly ash based bricks/blocks in their construction. Any brick/block containing more than 25% fly ash is designated as fly ash brick/block. As per GRIHA credits, bricks / blocks should contain more than 40% fly ash.

m) The contractor shall ensure that sand from approved source is used in place of sand in an all concreting works unless specifically instructed otherwise by the Engineer-in-charge.
n) Timber and aluminum use should be minimised in the project. If used, timber shall constitute of reclaimed timber and aluminum shall constitute recycled content. The source of such reclaimed timber shall be approved by the Engineer-in-charge.
o) The contractor shall ensure that nontoxic anti-termite and other pest control is strictly used.
p) The contractor shall ensure that all paints, polishes, adhesives and sealants used both internally and externally, on any surface, shall be Low VOC products. The contractor shall get prior approval from the Engineer-in-charge before the application of any such material.
q) All plumbing and sanitary fixtures installed shall be as per the requirement of the of the GRIHA and shall adhere to the minimum LPM and LPF mentioned.
r) The contractor shall employ 100% zero ODP (ozone depletion potential) insulation; HCFC hydro-chlorofluorocarbon)/ and CFC (chlorofluorocarbon) free HVAC and refrigeration equipment's and/halon-free fire suppression and fire extinguishing systems.
s) The contractor shall ensure that all composite wood products/agro-fibre products used for cabinet work, etc do not contain any added urea formaldehyde resin.

CONSTRUCTION WASTE

a) Contractor shall ensure that wastage of construction material is kept to a maximum of 3%.
b) All construction debris generated during construction shall be carefully segregated and stored in a demarcated waste yard. Clear, identifiable areas shall be provided for each waste type. Employ measures to segregate the waste on site into inert, chemical, or hazardous wastes.
c) All construction debris shall be used for road preparation, back filling, etc, as per the instructions of the Engineer-in-charge, with necessary activities of sorting, crushing, etc.
d) No construction debris shall be taken away from the site, without the prior approval of the Engineer-in-charge.
e) The contractor shall recycle the unused chemical/hazardous wastes such as oil, paint, batteries, and asbestos
f) If and when construction debris is taken out of the site, after prior permissions from the Project Manager, then the contractor shall ensure the safe disposal of all wastes and will only dispose of any such construction waste in approved dumping sites.
g) Inert waste to be disposed off by Municipal Corporation/ local bodies at landfill sites.

Documentation

a) The contractor shall, during the entire tenure of the construction phase, submit the following records to the Engineer-in-charge on a monthly basis:
    i) Water consumption in litres
    ii) Electricity consumption in 'kwh' units
    iii) Diesel consumption in litres
    iv) Quantum of waste generated at site and the segregated waste types divided into inert, chemical and hazardous wastes.
    v) Digital photo documentation to demonstrate compliance of safety guidelines as specified here.
b) The contractor shall, during the entire tenure of the construction phase, submit the

following records to the Engineer-in-charge on a weekly basis:

i) Quantities of material brought into the site, including the material issued to the contractor by the client.

ii) Quantities of construction debris (if at all) taken out of the site

iii) Digital photographs of the works at site, the workers facilities, the waste and other material storage yards, pre-fabrication and block making works, etc as guided by the Engineer-in-charge.

c) The contractor shall submit one document after construction of the buildings, a brief description along with photographic records to show that other areas have not been disrupted during construction. The document should also include brief explanation and photographic records to show erosion and sedimentation control measures adopted. (Document CAD drawing showing site plan details of existing vegetation, existing buildings, existing slopes and site drainage pattern, staging and spill prevention measures, erosion and sedimentation control measures and measures adopted for top soil preservation during construction

d) The contractor shall submit to the Engineer-in-charge after construction of the buildings, a detailed as built quantification of the following:

i) Total materials used,
ii) Total top soil stacked and total reused
iii) Total earth excavated,
iv) Total waste generated,
v) Total waste reused,
vi) Total water used,
vii) Total electricity, and
viii) Total diesel consumed.

e) The contractor shall submit to the Engineer-in-charge, before the start of construction, a site plan along with a narrative to demarcate areas on site from which top soil has to be gathered, designate area where it will be stored, measures adopted for top soil preservation and indicate areas where it will be reapplied after construction is complete.

f) The contractor shall submit to the Engineer-in-charge, a detailed narrative (not more than 250 words) on provision for safe drinking water and sanitation facility for construction workers and site personnel.

g) Provide supporting document from the manufacturer of the cement specifying the fly-ash content in PPC used in reinforced concrete.

h) Provide supporting document from the manufacturer of the pre-cast building blocks specifying the fly ash content of the blocks used in an infill wall system.

i) The contractor shall, at the end of construction of the buildings, submit to the Engineer- in-charge, submit following information, for all material brought to site for construction purposes, including manufacturer's certifications, verifying information, and test data, where Specifications sections require data relating to environmental issues including but not limited to:

Source of products: Supplier details and location of the supplier and brand name.

ii) Project Recyclability: Submit information to assist Owner and Contractor in recycling materials involved in shipping, handling, and delivery, and for temporary materials necessary for installation of products.

iii) Recycled Content: Submit information regarding product post industrial recycled and post consumer recycled content. Use the "Recycled Content Certification Form", to be provided by the Commissioning Authority appointed for the Project.

iv) Product Recyclability: Submit information regarding product and product's component's recyclability including potential sources accepting recyclable materials.

v) Clean tech: Provide pollution clearance certificates from all manufacturers of materials

vi) Indoor Air quality and Environmental Issues: Submit following certificates:

a) Certifications from manufacturers of Low VOC paints, adhesives, sealant and polishes used at this particular project site.

b) Certification from manufacturers of composite wood products/agro fibre products on the absence of added urea formaldehyde resin in the products supplied to them to this particular site.

c) Submit environmental and pollution clearance certificates for all diesel generators installed as part of this project.

j) Provide total support to the Engineer-in-charge appointed by the owner in completing all Green Building Rating related formalities, including signing of forms, providing signed letters in the contractor's letterhead.

EQUIPMENT

a) To ensure energy efficiency during and post construction all pumps, motors and engines used during construction or installed, shall be subject to approval and as per the specifications of the architects.

b) All lighting installed by the contractor around the site and at the labour quarters during construction shall be CFL/LED bulbs of the appropriate illumination levels. This condition is a must, unless specifically prescribed.

The contractor is expected to go through all other conditions of the GRIHA rating stipulations, which can be provided to him by the architects.

Failure to adhere to any of the above mentioned items, without necessary clearances from the architects and the Engineer-in-charge, shall be deemed as a violation of contract and the contractor shall be held liable for penalty as determined by the architects.

CLAUSE 45: PAYMENT

1. Payment Schedule

The Payment Schedule includes a schedule setting out each Milestone Event to be achieved in a month for the Works.

2. Contractor's Application for Payment

From the date of issue of the Notice to Proceed, on the 5th (fifth) Business Day of any month, the Contractor may submit a Request for Payment, to RTDC Representative in respect of the preceding month.

Within each Request for Payment the Contractor shall show separately:

(i) the amounts which the Contractor claims to be payable as the cost of the Works completed during that month; and
(ii) The cumulative amount of all prior payments made by RTDC; and
(iii) any amounts to which the Contractor considers are due and payable to it in accordance with the provisions of the Contract.

The Contractor's Request for Payment shall:

(i) be prepared on forms in the form and in a number advised by RTDC Representative; and
(ii) contain confirmation of the relevant Milestone Events which, in the opinion of the Contractor have been achieved in that month which applies to each such Milestone Event; and
(iii) be accompanied by:
  (a) Copy of relevant records of measurement of works, jointly taken and signed by both the parties;
  (b) A status report describing in such detail as may reasonably request, the percentage of any uncompleted Milestone Event for the month in question and the work to be undertaken by the Contractor prior to the next Request for Payment;
  (c) Certification by RTDC Representative confirming that the Milestone Events referred to in the Request for Payment have been achieved.
  (d) Confirmation by the Contractor of any amounts due and owing from the Contractor to RTDC pursuant to the Contract;
  (e) The Contractor's certification that the quality of all completed Works accords with the requirements of the Contract;
  (f) The Contractor's certification that each obligation, item of cost or expense mentioned in that Request for Payment has not been the basis of any previous payment.
  (g) The Contractor's certification that it has reviewed all financial and budget data contained in the Request for Payment;
  (h) The Contractor's certification that the quality of all completed Works accords with the requirements of the Contract;
  (i) The Contractor's certification that each obligation, item of cost or expense mentioned in that Request for Payment has not been the basis of any previous payment; and
  (j) The Contractor's certification that each Subcontractor who performed part of the Works which was included in the immediately preceding Certificates of Payment was paid all amounts then due to it for such Works
  (k) The Contractor providing evidence of the validity of the Contractor's Insurances.

3. Certificates of Payment

Within [14 (fourteen)] Business Days of receipt of the Contractor's Request for Payment under Clause 45(2) [Contractor's Application for Payment], RTDC and RTDC Representative shall review such request and, shall issue to the Contractor, a Certificate of Payment certifying what amounts RTDC shall pay. Each Certificate of Payment shall be for an amount which in the opinion of RTDC, is the basis of the Request for Payment and pursuant to the Contract, is properly due to the Contractor (the "Gross Certifiable Amount") less (i) the cumulative amounts of payments previously certified as due to the Contractor, (ii)

any deduction on account of recovery of Advance Payment, and (iii) Retention Amount.

In the event that the Contractor fails to achieve any Milestone Event specified in the Payment Schedule, the Contractor shall not be entitled to the payment value attributable to that Milestone Event until the relevant Milestone Event has been achieved. When the relevant Milestone Event is achieved, the Contractor may include the payment value attributable to the Milestone Event in the next Request for Payment.

No sum shall be included in the Certificate of Payment in respect of Materials yet to be incorporated into the Permanent Works unless the RTDC Representative is satisfied that:

(i) such Materials have been properly acquired and properly and not prematurely delivered to the Project Site;

(ii) such Materials have been properly stored on the Project Site and fully protected against loss, damage or deterioration;

(iii) the Contractor's records of the requisitions, orders, receipts and use of any Materials are kept in a form approved by the RTDC Representative, and such records are available for inspection by the RTDC Representative; and

(iv) The Contractor has submitted a proper statement of the cost of acquiring the Materials together with such documents as may be required for evidencing such cost.

Without prejudice to any other rights of RTDC to withhold payment to the Contractor, RTDC may withhold from any payment due to the Contractor such amount as RTDC deems reasonably necessary or appropriate:

(i) if in the opinion of the RTDC Representative the progress of the Works at the time of the Request for Payment is behind the progress of the Works as set out in the Programme; and/or

(ii) to protect it from any losses, expenses, costs or liability because of any one or more of the following reasons:

(a) defects and deficiencies in any Works, whether or not payment has been made;

(b) unsatisfactory performance of the Contract;

(c) the filing of third party claims relating to the Works or any of its commitment parts for which the Contractor is liable;

(d) the Contractor's failure to make payments to Subcontractors;

(e) failure by the Contractor to provide or procure replacement Performance Security in accordance with the Contract;

(f) failure by the Contract to provide evidence of insurance coverage in accordance with the Contract;

(g) reasonable evidence that Completion will not occur by the Time for Completion;

(h) any overpayments made by RTDC with respect to a previous payment;

(i) failure by the Contractor to submit a properly updated monthly Programme; and

(j) failure by the Contractor to provide satisfactory evidence that the costs of all labour and Materials and other obligations arising out of the Contract have been fully satisfied and discharged by the Contractor and/or to otherwise fail to submit adequate supporting documentation for any Request for Payment.

Any Provisional Sum Works shall only be executed in whole or part upon the RTDC Representative's instruction. If the RTDC Representative issues no such instruction, the Provisional Sum Works shall not form part of the Works and the Contractor shall not be entitled to payment for it. The Contractor shall be deemed to have allowed the necessary time and resources to enable design and Execution of the Provisional Sum Works in so far as the scope and nature of the Provisional Sum Works was reasonably foreseeable.

The Contractor shall be entitled only to such amount in respect of the Provisional Sum Works as the RTDC Representative determines in accordance with this Clause 45(3). The RTDC Representative shall notify the Contractor of any such determination. The RTDC Representative shall have the authority to issue instructions to the Contractor for every Provisional Sum Works for which the Contractor shall be entitled to a part of the Provisional Sum as determined by the RTDC Representative.

The Contractor shall produce to the RTDC Representative all quotations, vouchers, invoices, accounts or receipts in connection with the expenditure in respect of the Provisional Sum Works, except where the Provisional Sum Works is valued in accordance with the item wise rates quoted by the Contractor in its bid submitted to the Employer.

In respect of every Provisional Sum the RTDC Representative shall have authority to issue instructions for the execution of work or for the supply of goods, materials, Plant Sums or services by the Contractor, in which case the Contractor shall be entitled to an amount equal to the value thereof determined in accordance with Clause 45(3).

4. Payment

RTDC Limited shall pay the amount certified in a Certificate of Payment less the amount paid earlier in accordance with Clause 45(3) [Certificate of Payment], no later than [10 (ten)] Business Days from the date of such Certificate of Payment.

4.0 CONTRACTORS LABOUR REGULATIONS

(1) Short Title - These regulations may be called the Himachal Pradesh Public Works Department, Contractor Labour Regulations.

(2) Definitions :-In these regulations, unless otherwise expressed or indicated the following works and expression shall have the meaning hereby assigned to them respectively, that is to say:

(i) 'LABOUR' means workers employed by Himachal P.W.D. Department contractor directly or indirectly through a sub contractor or other persons or by an agent on his behalf on a payment not exceeding Rs. 400 per month and will not include supervisory staff like Junior Engineer etc.

(ii) 'FAIR WAGES' means wages whether for time or piece work notified at the time of inviting tenders for the work and where such wages have not been so notified, the wages prescribed by the Himachal P.W.D. Department for wages the District in which the work is done. (It will be notified/prescribed by the Himachal P.W.D. Department in consultation with the officer of the Industrial Relation Machinery located in the respective areas and will not be less than the minimum rates of wages fixed by the Government for that class of employee engaged on the same type of work in the same area).

(iii) 'CONTRACTOR' shall include every person whether a sub-contractor or head-man or agent, employing labour on the work taken on contract.

(iv) 'WAGES' shall have the same meaning as defined in the Payment of Wages Act and includes time and piece rate wages.

(3) Working Hours:-

(i) Normally working hours of an adult employee should not exceed 9 hours a day, and in case of a child 4 1/2 hours a day. The working day shall be so arranged that is inclusive of interval for rest, if any, it shall not spread over more than 12 hours on any day.

(ii) When an adult worker is made to work for more than 9 hours on any day or for more than 48 hours in any week, he shall be paid overtime of the extra hours put in by him at double the ordinary rate of wages. Children shall not be made to work extra hours.

(iii) Every worker shall be given a paid weekly holiday normally on Sunday.

(iv) In accordance with the provision, Minimum Wages Control Rules, 1978 as amended from time to time irrespective of whether such workers are to be governed by the Minimum Wages Act, 1948 or not.

(4) Display of notice regarding wages etc.:- The contractor shall before he commences his work on contract, display and correctly maintain and continue to display and correctly maintain in aclean and legible condition in conspicuous places on the work notices in English and in the local Indian Language spoken by the majority of the workers, giving the rate of wages, should have been certified by the Executive Engineer, the Superintending Engineer, the Chief Engineer or Regulation Labour Commissioner, as fair wages and the hours of work for which such wages are earned, and

(ii) Send a copy of such notices to the Certifying officer. The Labour Advisory Board has decided that certain clauses may be contract Labour Regulation appearing in P.W.D. Department from 7&8. Accordingly it has been decided that the following amendments may be made in the said forms under the rules mentioned against them:-

(5) Payment of wages:-

(i) The contractor shall fix the wages periods in respect of which the wages shall be payable.
(ii) No wages period shall exceed one month.

(iii) Wages of every worker employed on the contract shall be paid (a) in case of establishments in which wage period is one week within 3 days from the end of the wage period and (b) in case of other establishments before the expiry of the 7th day or 10th day from the end of the wages period accordingly as the number of workers employed in such establishments does not exceed 1,000 or exceeds 1,000.

(iv) Where the employment of any worker is terminated by or on behalf of the contractor, the wages earned by him shall be paid before the expiry of the day succeeding thereon on which his employment is terminated.

(v) All payment of wages shall be made on a working day except when the work is completed before the expiry, of the wages period, in which case final payment shall be made within 48 hours of the last working day at work site and during the working time.

(vi) Wages due to every worker shall be paid to him direct. All wages shall be paid in current coin or currency or in both.

(6) Fines and deductions which may be made from wages:-

(i) The wages of a worker shall be paid to him without any deduction of any kind except the following:-

(a) Fines.

(b) Deductions for absence from Duty *i.e. from the place or places where by the terms of his employment he is required to work. The amount of deduction shall be in proportion to the period for which he was absent.*

(c) Deductions for damage *to or loss of goods especially entrusted to the employed person for custody, or for loss of money or any other deduction which he is required to account where such damage or loss is directly attributable to his neglect or default.*

(d) Deduction for recovery *of advances or for adjustment of over payment of wages, advances granted shall be entered in register.*

(e) Any other deduction *which the Himachal Pradesh Government may from time to time allow.*

(ii) No fine should be imposed on any worker same in respect of such acts and omission on his part as have been approved of by the Chief Labour Commissioner or any other person authorised by the Himachal Pradesh Government.

(iii) No fine shall be imposed on any worker and no deduction for damage or loss shall be made from his wages until he worker has been given an opportunity of

showing cause against such fines or deductions.

(iv) The total amount of fine which may be imposed in any one wage period on a worker shall not exceed an amount equal to three paise in a rupee of the total wages, payable to him in respect of that wage period.

(v) No fine imposed on any worker shall be recovered from him by installment or after the expiry of sixty days from the date on which it was imposed.

(vi) Every fine shall be deemed to have been imposed on the day of the act or omission in respect of which it was imposed.

(7) LABOUR RECORDS

i) The contractor shall maintain a **Register of persons employed** on work on contract in Form XIII of the CL (R&S) Central Rule 1971 (Enclosed)

ii) The contractor shall maintain a **Muster Roll** register in respect of all workmen employed by him on the work under Contract in Form XVI of the CL (R&A) Rules 1971 (Enclosed).

iii) The contractor shall maintain **Wage Register** in respect of all workmen employed by him on the work under contract in Form XVII of the CL (R&A) Rules 1971 (Enclosed).

iv) **Register of accident**:-The contractor shall maintain a register of accidents in such form as may be convenient at the work place but the same shall include the following particulars :

a) Full particulars of the labourers who met with accident.

b) Rate of Wages.

c) Sex

d) Age

e) Nature of accident and cause of accident.

f) Time and date of accident.

g) Date and time when admitted in Hospital.

h) Date of discharge from the Hospital.

i) Period of treatment and result of treatment.

j) Percentage of loss of earning capacity and disability as assessed by Medical Officer.

k) Claim required to be paid under Workmen's compensation Act.

l) Date of payment of compensation.

m) Amount paid with details of the person to whom the same was paid.

n) Authority by whom the compensation was assessed.

o) Remarks.

v) The contractor shall maintain a **Register of Fines** in the Form XII of the CL

(R&A) Rules 1971 (Enclosed) The contractor shall display in a good condition and in a conspicuous place of work the approved list of acts and omissions for which fines can be imposed (Enclosed)

vi) The contractor shall maintain a **Register of deductions for damage or loss** in Form XX of the CL (R&A) Rules 1971 (Enclosed)

vii) The contractor shall maintain a **Register of Advances** in Form XIII of the CL (R&A) Rules 1971 (Enclosed)

viii) The contractor shall maintain a **Register of overtime** in Form XXII of the CL (R&A) Rules 1971 (Enclosed)

(8) ATTENDANCE CARD-CUM-WAGE SLIP

i) The contractor shall issue an **Attendance card-cum-wage** slip to each workman employed by him in the specimen form at (Appendix-VII)
ii) The card shall be valid for each wage period
iii) The contractor shall mark the attendance of each workman on the card twice each day, once at the commencement of the day and again after the rest interval before he actually starts work.
iv) The card shall remain in possession of the worker during the wage period under reference.
v) The contractor shall complete the wage slip portion on the reverse of the card at least a day prior to the disbursement of wages in respect of the wage period under reference.
vi) The contractor shall obtain the signature or thumb impression of the worker on the wage slip at the time of disbursement of wages and retain the card with himself

(9) EMPLOYMENT CARD

The contractor shall issue an **Employment card** in Form XIV of the CL (R&A) Central Rules 1971 to each worker within the days of the employment of the worker (Appendix-VIII)

(10) SERVICE CERTIFICATE

On termination of employment for any reason whatsoever the Contractor shall issue to the workman whose services have been terminated, a **Service certificate** in Form XV of the CL (R&A) Central Rules 1971

(11) Preservation of Register :- The wages book, the wage slips, the register of unpaid wages, the register of accidents, the register of fine, deductions required to be maintained under these regulations shall be preserved for 36 months after the date of the last date entry made in them and shall be made available for inspection by the Engineer-in-Charge, Labour Welfare Officer or any officer authorised by the Himachal Pradesh Government in this behalf.

(12) Power of Labour Welfare Officer:- To make investigation or inquiry the Welfare Officer or other persons authorised by Himachal Pradesh Government on their behalf shall have power to make inquiries with a view to ascertaining enforcing and due and proper observance of the fair wages clause and provisions of these regulations. He shall investigate into any complaint regarding the default made by the contractor or Subcontractor in regard to sub provision.

(13) Report of Labour Welfare Officer :- The Labour Welfare Officer or other persons suthorised as aforesaid shall submit a report of result of his investigation or inquiry to the Executive Engineer concerned indicating the extent, if any, to which the default has committed with a notice that necessary deductions from the contract's bill be made and the wages and other dues be paid to the labourers concerned in case an appeal is made by the after the Regional Labour Commissioner has given his decision on such appeal. The Executive Engineer shall arrange payments to the labourers concerned within 45 days from the receipt of the report of the Labour Welfare Officer or the Regional Labour Commissioner as the case may be.

(14) Appeal against the decision of the Labour Welfare Officer:- Any person aggrieved by the decision and recommendations of the Labour Welfare Officer or other person so authorised may appeal against such decision to the Regional Labour Commissioner concerned within 30 days from the date of decision, forwarding simultaneously a copy of his appeal to the Executive Engineer concerned but subject to such appeal, the decision of the officer shall be final and binding upon the contractor.

(15) Prohibition regarding representation through lawyer:-

(i) A workmen shall be entitled to be represented in any investigation or enquiry under these regulations by:

(a) An officer of a registered trade union of which he is member.

(b) An officer of federation of trade unions to which the trade union referred to in clause (a) is affiliated.

(c) Where the worker is not a member of any registered trade union, by an officer of registered

union, connected with or by any other workman, employed in the Industry in which the worker is employed.

(ii) **An employer shall be entitled to be represented in any** investigation or an inquiry under these regulation by:

(a) An officer of a association of employer of which he is member.

(b) An officer of federation of association employers to which the association referred to in clause(a) is affiliated.

(c) Where the employer is not a member of any association of employer, by an officer of association or employer, connected with or by any other employer, engaged in the Industry in which the employer is engaged.

(iii) **No party** shall be entitled to be represented by a legal practitioner in any investigation or inquiry under these regulations.

(16) Inspection of books and slips:- The contractor shall allow inspection of the wage book and the slips, the register of unpaid wages, the register of accident and the register of lines and deductions to any of his workers or to his agent at convenient time and place after the notice is received or to the Labour Welfare Officer or any other person, authorised by the Himachal Pradesh Government on his behalf.

(17) Submission of returns:- The contractor shall periodical returns as may be specified from time to time.

(18) Amendments :- The H.P. Government may, from time to time, add to or amend and on any question as to the application, Interpretation or effect of those regulation the decision of the Chief Labour Commissioner or Deputy Chief Labour Commissioner to the Himachal Pradesh Government or any other Person authorised by Himachal Pradesh Government in the behalf shall be final.

APPENDIX I

MATERNITY BENEFITS (Clause 19 F)

Name and address of the contractor.....

Name and location of the work.....

Name of the employee	Father's/ husband's	Nature of Employment	Period of actual employment	Date on which notice of confinement given name
1.	2.	3.	4.	5.

Date on which maternity leave commenced and ended

Date of delivery miscarriage	Commenced	Ended	Commenced	Ended
6.	7.	8.	9.	10.

Leave pay paid to the employee

In case of miscarriage | In case of delivery | Remarks

Rate of leave pay	Amount paid	Rate of leave pay	Amount paid	
11.	12.	13.	14.	15.

APPENDIX-II

SPECIMEN FORM OF THE REGISTER, REGARDING MATERNITYBENEFIT ADMISSIBLE TO THE CONTRACTOR'S LABOUR

Name and address of the contractor.....
Name and location of the work.....

1. Name of the woman and her husband’s name.
2. Designation.
3. . Date of appointment.
4. Date with months and years in which she is employed.
5. Date of discharge/dismissal, if any.
6. Date of production of certificates in respect of pregnancy.
7. Date on which the woman informs about the expected delivery.
8. Date of delivery/miscarriage/death
9. Date of production of certificate in respect of delivery/miscarriage.
10. Date with the amount of maternity/death benefit paid in advance of expected delivery.
11. Date with amount of subsequent payment of maternity benefit.
12. Name of the person nominated by the woman to receive the payment of the maternity benefit after her death.
13. If the woman dies, the date of her death, the name of the person to whom maternity benefit amount was paid, the month thereof and the date of payment.
14. Signature of the contractor authenticating entries in the register.
15. Remarks column for the use of Inspecting Officer.

Appendix 'III'

Labour Board

Name of work ……..

Name of Contractor ……..

Address of Contractor ……..

Name and address of C.P. W.D. Division ……..

Name of C.P.W.D. Labour Officer ……..

Address of C.P.W.D. Labour Officer……..

Name of Labour Enforcement Officer ……..

Address of Labour Enforcement Officer……..

Sl. No.	Category	Minimum wage fixed	Actual wage paid	Number present	Remarks

Weekly holiday ……..

Wage period ……..

Date of payment of wages ……..

Working hours ……..

Rest interval ……..

Appendix 'IV'

Register of Workmen Employed by Contractor

Name and address of contractor……
Name and address of establishment under which contract is carried on……
Nature and location of work……
Name and address of Principal Employer……

Sl. No	Name and Surname of workman	Age and Sex	Father's/Husband's name	Nature of employment/ designation	Permanent home address of the workman (Village and Tehsil, Taluk and District)	Local address	Date of commence- ment of employment	Signature or thumb impression of the workman	Date of termination of employment	Reasons for terminations	Remarks
1	2	3	4	5	6	7	8	9	10	11	12

Appendix 'V'

Form XVI (See Rule 78(2)(a)) Muster Roll

Name and address of the contractor.....

Name and address of establishment under which contract is carried on.....

Nature and location of work .....

Name and address of Principal Employer For the Month of Fortnight

Sl. No.	Name of Workman	Sex	Father's/Husband 's name	Dates					Remarks
1.	2.	3.	4.	5.					6.
				1.	2.	3.	4.	5.	

Appendix 'VI'

Form XVII (See Rule 78(2)(a))

Register of Wages

Name and address of the contractor.....

Name and address of establishment under which contract is carried on .....

Nature and location of work .....

Name and address of Principal Employer Wages period Monthly/ Fortnight

Sl. No.	Name of Workman	Serial No. in the register of workman	Designation nature of work done	No. of days worked	Units of work done	Daily rate of wages/piece rate	Amount of wages earned					Deduction if any (indicate nature)	Net amount paid	Signature or thumb impression of the workman	Initial of contractor or his representative
							Basic wages	Dearness allowances	overtime	Other cash payments (indicate nature)	Total				
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.

Appendix 'VII'

WAGE CARD

Name and address of contractor …… Date of Issue……

Name and location of work ……..Designation …….

Name of workman ……Month/Fortnight……..

Rate of Wages …….

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Morning																														Rate
Evening																														Amount
Initial																														

Received from ……the sum of Rs..... on account of my wages

The Wage Card is valid for one month from the date of issue Signature

19/Form-XIX

[See rule 78(2)(b)]

WAGES SLIP

Name and address of contractor…….

Name and Father's/Husband's name of workman ……..

Nature and location of work …….

For the Week/Fortnight/Month ending ……..

1. No. of days worked ……..

2. No. of units worked in case of piece rate workers……..

3. Rate of daily wages/piece rate …….

4. Amount of overtime wages…….

5. Gross wages payable ……..

6. Deduction, if any ……..

7. Net amount of wages paid…….

Initials of the contractor or his representative

Appendix 'IX'

Form –XIV [See rule 76]

EMPLOYMENT CARD

Name and address of contractor…….

Name and address of establishment under which contract is carried on……..

Name of work and location of work……..

Name and address of Principal Employer…….

1. Name of the workman……..

2. Sl. No. in the register of workman employed……

3. Nature of employment/designation…….

4. Wage rate (with particulars of unit in case of piece work)…….

5. Wage period. ……..

6. Tenure of employment……..

. Remarks. ……..

Signature of contractor

Appendix 'X'

Form-XV (See Rule 77)

Service Certificate

Name and address of contractor
……

Nature and location of work
……
…….

Name and address of
workman……
….

Age or date of birth .....

Identification marks .....

Father's/Husband's name
……..

Name and address of establishment in under which contract is carried on……

Name and address of Principal
Employer……..

Sl.No.	Total Period for which employed		Nature of work	Rate of wages	Remarks.
	From	To	done	(with particulars of unit in case of piece work)	
1	2	3	4	5	6

Signature

Appendix 'XI'

LIST OF ACTS AND OMISSONS FOR WHICH FINES CAN BE IMPOSED

In accordance with rules7 (v) of the CPED Contractor's labour Regulations to be displayed prominently at the site of work both in English and local Language.

1. Willful insubordination or disobedience, whether alone or in combination with other.

2. Theft fraud or dishonesty in connection with the contractors beside a business or property of RTDC.

3. Taking or giving bribes or any illegal gratifications.

4. Habitual late attendance.
5. Drunkenness lighting, riotous or disorderly or indifference behavior.

6. Habitual negligence.

7. Smoking near or around the area where combustible or other materials are locked.

8. Habitual indiscipline.

9. Causing damage to work in the progress or to property of the RTDC or of the contractor.

10. Sleeping on duty.

11. Malingering on duty.

12. Giving of false information regarding name, age father's name etc.

13. Habitual loss of wage cards supplied by the employers.

14. Unauthorized use of employer's property of manufacturing or making of unauthorized particles at the work place.
15. Bad workmanship in construction and maintenance by skilled workers which is not approved by the Department and for which the contractors are compelled to undertake rectifications.
16. Making false complaints and/or misleading statements.

17. Engaging on trade within the premises of the establishments.

18. Any unauthorized divulgence of business affairs of the employees.

19. Collection or canvassing for the collection of any money within the premises of an establishment unless authorized by the employer.

20. Holding meeting inside the premises without previous sanction of the employers.

21. Threatening or intimidating any workman or employer during the working hours within the premises.

Appendix 'XII'

Form-XII (See Rule 78(2) (d))

Register of Fines

Name and address of contractor
……

Name and address of establishment in under which contract is carried on…….

Nature and location of work
……..

Name and address of Principal Employer……..

Sl. No.	Name of workman	Father's/ Husband's name	Designation/ nature of employment	Act/ Omission for which Fine Imposed.	Date Of Offence	Whether workman showed cause against fine.	Name of Person in whose presence employee's	Wage period and wages payable.	Amount of fine imposed.	Date on which fine realized.	Remarks
1	2	3	4	5	6	7	8	9	10	11	12

Appendix 'XIII'

See Rule 78(2) (d))

Register of Deduction for Damage or Loss

Name and address of contractor……..

Name and address of establishment in under which contract is carried on……

Nature and location of work ……..

Name and address of Principal Employer…….

Sl. No.	Name of work man	Father's/ Husband name.	Designation /nature of employment.	Particulars of damage or loss.	Date of damage or loss.	Whether Work man showed cause against deduction.	Name of person in whose presence employee's explanation was heard	Amount of deduction imposed.	No.of installments.	Date of recovery.	Remarking.
										First Installment	Last installment.

Appendix 'XIV'

Form-XXII (See Rule 78(2)(d))

Register of Advances

Name and address of contractor……

Name and address of establishment in under which contract is carried on……

Nature and location of work……

Name and address of Principal Employer……

Sl. No.	Name of workman	Father's / Husband name.	Designation/ nature of employment.	Wage Period and wages payable.	Date and amount of advance given.	Purpose(s)or which advance made.	Number of installments by which advance to be repaid.	Date and amount of each installment	Date and which last installment was repaid.	Remarks.
1	2	3	4	5	6	7	8	9	10	11

Register of Overtime

Name and address of contractor……..

Name and address of establishment in under which contract is carried on…….

Nature and location of work……

Name and address of Principal Employer……..

Sl.No.	Name of Workman	Father's/ Husband's Name	Sex	Designation/ Nature of Employment	Date on which overtime worked.	Total Overtime worked	Normal rate of wages	Overtime earning	Overtime earning	Rate on which overtime paid	Remarks

SPECIAL CONDITIONS OF CONTRACT
(SECTON – IV)

INDEX

1 SPECIAL CONDITION OF CONTRACT
2 ADDITIONAL CONDITION

1.0 SPECIAL CONDITIONS OF CONTRACT

The Special Condition of Contract (SCC) shall be followed by the Contractor in addition to the General Condition of Contract (GCC) of tender document. The following General Condition of Contract of this tender are modified/added as detailed below. In case of any discrepancy between GCC and SCC, the SCC will succeed over GCC.

Clause No.	Description	Applicability/Modified/ Added
GENERAL RULES AND DIRECTIONS		
4	Any person-------process of the work	**Modified as**
		First two paragraphs "Any person ------as rupee one"Not Applicable
		Rest all "In case------ process of the work" Applicable.
8	Schedule of Materials to be issued to the Contractor	Not Applicable
10	In the case------ executed Accordingly	Not Applicable
11	In the case ……rejected	Not Applicable
19	List of works from	Not Applicable
DEFINITIONS		
2(iii)	Work / Project Means: **As Mentioned in NIT**	
2(iv)	Site / Location Means **As Mentioned in NIT**	
2 (vi & Vii)	Engineer-In-Charge - General Manager, RTDC Accepting Authority- Chief General Manager, RTDC Project Management Consultant : Space Ace	
2 (x)	Market Rate Percentage on cost of materials and labour to cover all overheads and profits	15%
2(xi)	Standard Schedule of Rates Schedule of Rates (Civil) Schedule of Rates (Electrical)	HPSR 2020/DSR 2018
2(xvi)	Date of Commencement of work	15 days after date of award of Work
CLAUSES OF CONTRACT		
Clause 1	Performance Guarantee i. Performance Guarantee. ii. Time allowed for submission of Performance Guarantee from the date of issue of letter of acceptance.	**Applicable** 5% of Tendered Value 15 days

	iii. Validity of Performance Guarantee	The Performance Guarantee shall be initially valid up to the stipulated date of completion plus 1 year claim period beyond that.
Clause 1A	Security Deposit	5% of Tendered Value
	Release of security Deposit	Security deposit could be released after completion of defect liability period subject to submission of a Bank Guarantee of equal amount which shall be released after completion of Operation and Maintenance period.
Clause 2	Compensation for Delay	Applicable 1.50% of the cost of Balance work per week. (Maximum up to 10% of the Contract price)
Clause 2A	Incentive for Early Completion	Applicable as per clause 2A
Clause 5	Time and Extension for Delay	Applicable
	Number of days from the date of issue of letter of acceptance for reckoning date of start	15 days
	Stipulated time of completion of project	As Mentioned in NIT
Clause 6	Measurements of Work Done	Applicable
Clause 6A	Computerized Measurement Book	Applicable
Clause 7	Payment on Intermediate Certificate to be Regarded as advance	ii. Minimum Value of the work done should be 15% of the Contract Value for woks of contract value less than Rs. 60 Lacs iii. Minimum Value of the work done should be 10% of the Contract Value for woks of contract value more than Rs. 60 Lacs
Clause 10	Materials Supplied by RTDC	Not Applicable
Clause 10A	Materials to be Provided by Contractor List of Testing Equipment to be provided by the Contractor at site lab 1. Cube Testing Machine along with sufficient numbers of cube moulds	Applicable

	2. Set of Sieves for testing of Coarse & fine aggregate along with shaker 3. Slump Cone 4. Vernier Calliper, Screw Gauge, Wire gauge 5. Weighing Balance with weights 6. Rebound Hammer 7. For testing of Design Mix Concrete at site, necessary testing equipment and facility (as per BIS) shall be made available by Contractor as and when required by Engineer-In- Charge or his authorized representative and nothing extra shall be paid on account of this. (Note: The listed equipment / instruments will be installed at his own cost by Contractor in laboratory room which to be constructed by the Contractor at his own cost).	
Clause 10 B(i)	Secured Advance on Non- Perishable Materials	Applicable Recovery of Secured Advance: Recovery shall be made by the deduction from the contractors bills commencing after first 10% of the gross value of the work is executed and paid, on pro-rata percentage basis to the gross value of the work billed beyond 10% in such a way that the entire advance is recovered by the time 80% of the gross value of the contract is executed and paid.
Clause 10 B(ii)	Mobilization Advance	Applicable 10% of the tendered value on submission of Bank Guarantee Bond from Scheduled Bank for the amount equal to 110% of the amount of advance and valid for the contract period.
Clause 10 B(iii)	Plant Machinery & Shuttering Material Advance	Not Applicable
Clause 10 B(iv)	Recovery of Mobilization advance	Applicable Added - 10% interest per annum for the period in case of non-

		return of mobilization advance after stipulated due date.
Clause 10 C	Payment on Account of Increase in Price / Wages due to Statutory Order	Not Applicable
Clause 10 CA	Payment due to Variation in Prices of Materials after Receipt of Tender	Not Applicable
Clause 10 CC	Payment due to Increase / Decrease in Prices / Wages (Excluding Materials covered under Clause 10 CA) after Receipt of Tender for Works	Not Applicable
Clause 11	Works to be Executed in Accordance with specifications, Drawings, Orders Etc. Specifications to be followed for execution of work	The following is added: All works are to be executed in accordance with the specifications, all drawings, details of items etc. given with this tender document and vetted design/drawing by RTDC & duly approved by IIT/NIT. In case specification of any item is not clear, CPWD Specifications 2009 Vol. I to II with upto date correction slips issued on the last date of submission of tender for Civil work is applicable.
Clause 12A	Deviations / Variations/Extra Item Extent and Pricing	Not Applicable "In the case of extra item(s) (items that are completely new and not in the scope of works as per tender condition and non-scheduled item within latest DSR/HPSR), the contractor shall submit proper analysis on the basis of the market rates as per the direction of Engineer-in –charge and shall be paid in accordance with rate approved by RTDC plus applicable Goods and Service Tax (GST).
Clause 15A	Compensation in case delay supply of material	Not Applicable
Clause 16	Competent Authority	Chief General Manager
Clause 17	Contractor liable for Damages, Defects during Defect Liability Period	Applicable

	Defect Liability Period	Added/Modified: One year from the date of successful completion of each component of the project in all respect
Clause 18	List of Mandatory Machinery Tools & Plants to be deployed by Contractor at site	1. Concrete Mixture: 1 No 2. Vibrator: 2 No 3. Cube Testing Machine: 1 number 4. All other machinery for requirement of successful and timely completion of project.
Clause 19B	Fair Wages	Fair Wages shall be as applicable as notified by the H.P. Government and which is applicable on the date of opening of tender. All those engaged on Daily Wages basis/part time basis in the Scheduled Tribal areas of the State shall be allowed 25% enhancement on the revised daily wages as per Finance Department's Office Memorandum No. FIN (PR) B(7)- 1/95-II dated 17/04/1998.
Clause 27	Lumsum Provisions in Tender	Not Applicable
Clause 30	Employment of coal mining or Controlled area labour not permissible	Not Applicable
Clause 32	Alternate water arrangements	Not Applicable
Clause 37		In case the contractor fails to submit the royalty form on the aggregates/ stone/sand/bajri then royalty shall be deducted @ Rs……. per cum of material consumed at work: 1. Stone per cum: Rs. 90.00 2. Aggregate per cum: Rs. 76.00 3. Sand per cum: Rs. 64.00
Clause 40	Compensation During War Like Situation	Not Applicable
Clause 44	Conditions Specific to Green Buildings Practices	As Green Building Norm
Clause 45 (Sr.no 3 & 4)	Sr. No. 3: Certificates of Payment and Sr. No. 4: Payment	Not Applicable

2.0 ADDITIONAL CONDITIONS

1. The Contractor shall be responsible for consequential effects arising out during the inspection done by the Chief Technical Examiner Cell, Central Vigilance Commission or Project Management Group (PMG) constituted by the RTDC or construction site visiting team of RTDC or by the Building Works Committee or third party authorized by RTDC or any statuary committee or by any duly authorized representative of RTDC, during the progress or any time after the construction and development of project up to the defect liability period, and will take appropriate action for rectification of defective work and modifications as suggested by the above teams/ group/ individual. Rectification of defective works or replacement of sub-standard materials or articles or modifications, as pointed out by the Chief Technical Cell, Central Vigilance Commission, Project Management Group (PMG) constituted by RTDC or authorized representative of RTDC or third party authorized by RTDC or any statuary committee, will be carried out or replaced/ modified by the Contractor at his own risk and cost.
2. **Handing Over of the Project:** Contractor will hand over the project to Owner /Client after successful completion of each component of the project in all respect and complete satisfaction of Engineer-In-charge. Contractor shall also provide necessary Completion Certificate/NOC from all local Government/ Statuary Authorities including Fire, Forest, Electrical, Environment, Lift, DG Set, Complete inventory list, duly signed as-build drawings, required before handing over the project to the client. The defect liability period will be one year after such handing over. Completion certificate for the work will only be issued to the contractor after complete handing over of the project to RTDC.
3. The payment of final bill will be made after successful completion and handing over of the works to RTDC.
4. The contractor shall deploy the resources at site to start the construction after clearance from the RTDC. No claim shall be entertained for idle labour, idle machinery, idle technical / non-technical staff, idle T&P if any, due to delay in start of the works.
5. If any dispute/ hindrance may arise during construction due to any reason whatsoever, the contractor is not liable for any financial claim or damages due to such circumstances.
6. All mass Reinforced Cement Concrete work shall be design mix concrete of specified grade and initial design mix shall be carried out from the Govt. approved Laboratory/NABL accredited lab/ NIT/IIT.
7. The Contractor shall render all help and assistance in documenting the total sequence of this project by way of photography, slides, etc. nothing extra shall be payable to the agency on this account.
8. Quoted amount by contractor shall be firm and fixed for entire contract period as well as extended period for completion of the works. No escalation shall be applicable on this contract.
9. Quoted amount by the contractor shall be all inclusive and shall apply to all heights lifts, leads and depths of the building and nothing extra shall be payable on this account.
10. The contractor shall make his own arrangements for obtaining electric connection and water Connection/arrangement (if required). The water charges and electricity charges as charged by Regional Sports Authority of H.P. center/State government agency/department incharge and Local Authorities will be paid by the Contractor. No dispute in this regard shall be entertained.

11. The contractor shall deploy the resources at site to start the construction after clearance from the Owner of the project and subsequent written approval from RTDC. No claim shall be entertained for idle labour, idle machinery, idle technical / non- technical staff, idle T&P if any, due to delay in start of the works.

12. The Contractor shall dispose of all the dismantled materials, debris, garbage, waste outside of the campus of the works at his own cost and provide clear and clean site at the time of handing over the works

13. Some restrictions may be imposed by the security staff etc. on the working and for movement for labour materials etc. The contractor shall be bound to follow all such restrictions / instructions and nothing extra shall be payable on this account.

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

15. The contractor shall provide at his own cost suitable weighing, surveying and leveling and measuring arrangements as may be necessary at site for checking. All such equipment shall be got calibrated in advance from laboratory, approved by the Engineer-in-Charge. Nothing extra shall be payable on this account.

16. The contractor shall comply with proper and legal orders and directions of the local or public authority or municipality and abide by their rule and regulations and pay all fees and charges which he may be liable.

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

18. Any cement slurry added over base surface (or) for continuation of concreting for better bond is deemed to have been in-built in the items and nothing extra shall be payable (or) extra cement considered in consumption on this account.

19. The contractor shall have to make approaches road to the site, if so required and keep them in good condition for transportation of labour and materials as well as inspection of works by the Engineer-in-charge. Nothing extra shall be paid on this account.

20. The terms machine batched, machine mixed and machine vibrated concrete used elsewhere in agreement shall mean the concrete produced in concrete batching and mixing plant and if necessary transported by transit concrete mixers, placed in position by the concrete pumps, tower crane and vibrated by surface vibrator /needle vibrator
/ plate vibrator, as the case may be to achieve required strength and durability.

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

before final acceptance. Substandard materials shall not be accepted.

22. The construction joints shall be provided in predetermined locations only as decided by Engineer in charge. The cost of shuttering for these construction joints shall be included in item of Concrete work / RCC work and nothing extra shall be payable on this account to the contractor.

23. The gradation of fine sand to be used in plaster work, shall be strictly as per Table 3.1 (clause 3.1.3) of CPWD Specification 2009 Vol.-I conforming to IS 1542-1977. The plastered surface shall be fairly smooth without any undulation of any kind for applying paint/white wash.

24. No chase cutting/dismantling of plaster/RCC/CC shall be allowed, so contractor has to execute the electrical work accordingly.

25. The contractor shall invariably prepare the samples of finishing items i.e. flooring of different types, external & internal finishing i/c colour scheme of paint, tiles in dado, flooring in platforms & staircase, water supply & sanitary fittings and any other item as per direction of Engineer-in-charge. The contractor shall proceed with further finishing items only after getting the samples of these items approved in writing from Engineer- in-charge.

26. Royalty at the prevalent rates shall be payable by the contractor on all the boulders, metals, shingle, sand and bajri etc. collected by him for the execution of the work, direct to the Revenue authority or authorized agent of the state Government concerned or Central Government. No such claim of Contractor on royalty shall be entertained by the RTDC.

27. The contractor or his authorized representative shall associate in collection, preparation, forwarding and testing of such samples. In case, he or his authorized representative is not present or does not associate himself, the results or such tests and consequences thereon shall be binding on the contractor.

28. The material shall conform to the quality and make as per attached list in Annexure IX. However for the items not appearing in the list preference shall be given to those articles which bear ISI certification marks. In case articles bearing ISI certification marks are not available the quality of sample brought by the Contractor shall be judged by the standard laid down in the relevant ISI specification/CPWD specification. All materials and articles brought by the contractor to the site for use shall conform to the samples approved, which shall be preserved till the completion of the work. However, such articles which bear ISI mark but stand banned by CPWD will not be used. Notwithstanding the case of materials of "Preferred Make" as given provisions of Clause 10A of the General Conditions of Contract for Central PWD works shall be applicable on the materials of "Preferred Make" also.

29. It must be ensure that all materials to be used in work bear BIS certification mark. In cases where BIS certification system is available for a particular material/product but not even a single producer has so far approached BIS for certification the material can be used subject to the condition that it should confirm to CPWD specification and relevant BIS codes. In such case written approval of the Engineer-In-Charge may be obtained before use of such material in the work.

30. The final approval of the brand to be used shall be as per the direction of Engineer-in-

Charge. The brand used shall be one of the brands in case specified in the list of preferred make / materials.

31. In case of non-availability of material of the brands specified in the list of approved materials an equivalent brand may be used after getting written approval of RTDC giving details to indicate that the brand proposed to be used is equivalent to the brands mentioned in the agreement.

32. Special conditions for Cement

The contractor shall procure 43 grade Ordinary Portland Cement (conforming to IS : 8112), Portland pozzolona cement (confirming to IS : 1489 : Part –I) as required in the work, from reputed manufacturers of cement as per the list of approved makes or from any other reputed cement manufacturer, having a production capacity not less than one million tones per annum as approved by RTDC. The tenderers may also submit a list of names of cement manufacturers which they propose to use in the work. The tender accepting authority reserves right to accept or reject name(s) of cement manufacture(s) which the tenderer proposes to use in the work. No change in the tendered rates will be accepted if the tender accepting authority does not accept the list of cement manufactures, given by the tenderer, fully or partially. The cement brought to the site for execution of work shall be in bags bearing manufacturer's name & ISI marking. Weight of cement in each bag shall be 50 kg. Samples of cement arranged by the contactor shall be taken by the Engineer- in-Charge and got tested in accordance with provisions of relevant BIS codes. In case the test results indicate that the cement arranged by the contractor does not conform to the relevant BIS codes, the same shall stand rejected and it shall be removed from the site by the contractor at his own cost within 7 days of written order from the Engineer-in-Charge to do so.

33. Special Conditions for Steel:-

The contractor shall procure Steel of Fe500/Fe500D/Fe550/Fe550D grade (the grade to procured is to be specified) from primary steel producers as per the list of approved makes or any other producer as approved by RTDC who are using iron ore as the basic raw material / input and having crude steel capacity of 2.0 Million tonnes per annum and above. The Structural Steel shall be procured and used as per the relevant latest IS Codes for the Steel Structures.

34. Removal of rejected/sub-standard materials.

The following procedure shall be followed for the removal of rejected/sub-standard materials from the site of work:

(i) Whenever any material brought by the contractor to the site of work is rejected, entry thereof should invariably be made in the Site Order Book under the signature of the Engineer-In-Charge, giving the approximate quantity of such materials.

(ii) As soon as the material is removed, a certificate to that effect shall be recorded by the Engineer-In-Charge against the original entry, giving, the date of removal and mode of removal, i.e., whether by truck, carts, or by manual labour. If the removal is by truck, the registration number of the truck should be recorded.

(iii) When it is not possible for the Engineer-In-Charge to be present at the site of work at the time of actual removal of the rejected/sub-standard materials from the site, the required certificate should be recorded by the Authorized Representative of RTDC, and the Engineer-In-Charge should countersign the

certificate recorded by the Authorized Representative.

35. In case of works where a ready mix concrete (RMC) is stipulated to be used from an approved source/manufacturer, cement register need not be maintained. However, the computerized dispatch slips that are sent with each dispatch of RMC shall be kept as record.

36. If the work is carried out in more than one shift or during night, no claim on this account shall be entertained. The contractor has to take permission from the police & local authorities etc. if required for work during night hours. No claim / hindrance on this account shall be considered if work is not allowed during night time. The requisite supervision shall be made available by the RTDC along with necessary issue of material under joint custody.

37. Contractor should hand over the warranty of the specialized items to the RTDC.

38. Contractor shall submit all the Guarantee/ Warranty bond for the water proofing and Anti- Termite Treatment works with 10 years of service warranty

39. The contractor is required to deploy resources as per availability of site. However no claim will be entertained for idle labour, idle machinery, idle technical/no-technical staff, idle T&P etc.

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

PROFORMA: ANNEXURES
(SECTON – V)

1	**ANNEXURE- I**:	FORMAT FOR GUARANTEE BONDS / AFFIDAVIT FOR REMOVAL OF DEFECTS
2	**ANNEXURE- II**:	FORMAT FOR GUARANTEE BOND FOR WATER PROOFING TREATMENT
3	**ANNEXURE-III:**	FORMAT FOR PERFORMANCE SECURITY/ GUARANTEE
4	**ANNEXURE-IV:**	FORMAT FOR ADVANCE PAYMENT BANK GUARANTEE
5	**ANNEXURE-V**:	FORMAT FOR BANK GUARANTEE (SECURITY DEPOSIT)
6	**ANNEXURE-VI**:	SAFETY CODES
7	**ANNEXURE-VII**:	MODEL RULES FOR THE PROTECTION OF HEALTH AND SANITARY ARRANGEMENTS

ANNEXURE – I
GUARANTEE TO BE EXECUTED BY THE CONTRACTOR FOR REMOVAL OF DEFECTS

The agreement made this_____day of_____two thousand and _____ Between _____

GUARANTOR of the one part) and RTDC (Herein after called Execution Agency) on other part.

WHEREAS THIS agreement is supplementary to a contract. (Herein after called the Contract) dated_and made between the GUARANTOR OF THE ONE PART AND the RTDC (Herein after called Execution Agency) on the other part, whereby the contractor interalia, under look to render the work in the said contract recited structurally stable workmanship & use of sound materials and completely water and leak proof.

AND WHEREAS THE GUARANTOR agreed to give a guarantee to the effect that the said work will remain structurally stable and guarantee against faulty workmanship, finishing, manufacturing defects of materials and leakages (for 5 years from Water Proofing Treatment) etc.

NOW THE GUARANTOR hereby guarantee that work executed by him will remain structurally stable, after the expiry of maintenance period prescribed in the contract for the minimum life of ten years, to be reckoned from the date after the expiry of maintenance period prescribed in the contract.

The decision of the Engineer-in-charge with regard to nature and cause of defects shall be final. During the period of guarantee the guarantor shall make good all defects to the satisfaction of the Engineer in charge calling upon him to rectify the defects, failing which the work shall be got done by the RTDC by some other contractor at the guarantor's cost and risk. The decision of the Engineer in charge as to the cost payable by the Guarantor shall be final and binding.

That if the guarantor fails to make good all the defects, commits breach thereunder then the guarantor will indemnify the Principal and his successor against all loss, damage cost expense or otherwise which may be incurred by him by reason of any default on the part of the GUARANTOR in performance and observance of this supplementary agreement. As to the amount of loss and / or damage and / or cost incurred by the RTDC the decision of the Engineer- in-charge will be final and binding on the parties.

IN WITHNES WHEREOF those presents have been executed by the obligator _____ and_____by for and on behalf of the RTDC LIMITED on the day, month and year first above written.

Signed sealed and delivered by OBLIGATOR in presence of :
1. _____
2. _____

SIGNED FOR AND ON BEHALF OF THE RTDC LIMITED BY_____in the presence of:
1. _____
2. _____

ANNEXURE – II
GUARANTEE BOND TO BE EXECUTED BY THE CONTRACTOR FOR WATER PROOFING TREATMENT FOR BASEMENT / TERRACE / TOILETS

The agreement made this _____ day of _____ two thousand and _____ between _____ S/o _____ (hereinafter called the GUARANTOR of the one part) and RTDC (Herein after called Execution Agency) on the other part.

WHEREAS THIS agreement is supplementary to a contract. (Herein after called the Contract) dated _____ and made between the GUARANTOR OF THE ONE PART AND RTDC (Herein after called Execution Agency) on the other part, whereby the contractor interalia, under look to render the work in the said contract recited structurally stable workmanship & use of sound materials and completely water and leak proof.

AND WHEREAS THE GUARANTOR agreed to give a guarantee to the effect that the said work will remain structurally stable and guarantee against faulty workmanship, finishing, manufacturing defects of materials and leakages (for 5 years from Water Proofing Treatment) etc.

NOW THE GUARANTOR hereby guarantees that water proofing treatment given by him will tender the structures completely leak-proof and the minimum life of such water proofing treatment shall be ten years to be reckoned from the date after the maintenance prescribed in the contract. Provided that the guarantor will not be responsible for leakage caused by earthquake or structural defects or misuse of roof or alteration and or such purpose:

(a) Misuse of roof shall mean any operation which will damage water proofing treatment, like chopping of fire wood and things of the same nature which might cause damage to the roof.

(b) Alteration shall mean construction of an additional storey or a part of the roof or construction adjoining to existing roof whereby water proofing treatment is removed in part.

(c) The decision of the Engineer-in-Charge with regard to cause of leakage shall be final.

During this period of guarantee the guarantor shall make good all defects and in case of any defect being found, tender the building water roof to the satisfaction of the Engineer-in- Charge at his cost and shall commence the work for such rectification within seven days from the date of issue of the notice from the Engineer-in-Charge calling upon him to rectify the defects failing which the work shall be got done by the department by some other contractor at the GUARANTOR's cost and risk. The decision of the Engineer-in-Charge as to the cost, payable by the Guarantor shall be final and binding.

That if Guarantor fails to execute the water proofing or commits breach thereunder then the Guarantor will indemnify the Principal and his successors against all loss, damage, cost expense or otherwise which may be incurred by him by reason of any default on the part of the GUARANTOR in performance and observance of this supplementary agreement. As to the amount of loss and damage and/or cost incurred by the government on the decision of the Engineer-in-Charge will be final and binding on the parties.

IN WITHNES WHEREOF those presents have been executed by the obligator _____ and _____ by for and on behalf of RTDC on the day, month and year first above written.

Signed sealed and delivered by OBLIGATOR in presence of:

1. _____
2. _____

SIGNED FOR AND ON BEHALF OF THE RTDC LIMITED BY _____ in the presence of:1. _____ 2. _____

ANNEXURE – III
FORM OF PERFORMANCE GUARANTEE

Ropeways and Rapid Transport System Development Corporation limited. US CLUB, Shimla
Himachal Pradesh

Whereas the Ropeways and Rapid Transport System Development Corporation limited, having its Registered Office at US Club, Shimla (hereinafter called "RTDC" which expression shall include its successors and assigns) having awarded a work order/contract / supply order No. dated (hereinafter called the contract) to M/s. ....
(hereinafter called the contractor / supplier) at a total price of Rs .....subject to the terms and conditions contained in the contract.

WHEREAS, the terms and conditions of the contract require the contractor to furnish a bank guarantee for
Rs.... (Rupees….) being ..... % of the total value of the contract for proper execution and due fulfillment of the terms and conditions contained in the contract.

We, the Bank, (hereinafter called the "Bank") do hereby unconditionally and irrevocably undertake to pay to RTDC immediately on demand in writing and without protest/or demur all moneys payable by the contractor/supplier to RTDC in connection with the execution/supply of and performance of the works/equipment, inclusive of any loss, damages, charges, expenses and costs caused to or suffered by or which would be caused to or suffered by RTDC by reason of any breach by the contractor/supplier of any of the terms and conditions contained in the contract as specified in the notice of demand made by RTDC to the bank. Any such demand made by RTDC on the bank shall be conclusive evidence of the amount due and payable by the bank under this guarantee. However, the Bank's liability under this guarantee, shall be limited to Rs.....in the aggregate and the bank hereby agrees to the following terms and conditions:-

(i) This guarantee shall be a continuing guarantee and irrevocable for all claims of RTDC as specified above and shall be valid during the period specified for the performance of the contract including the period of maintenance/warranty i.e. up to.....

(ii) We, the said bank further agree with RTDC that RTDC shall have the fullest liberty without our consent and without affecting in any manner our obligations and liabilities hereunder to vary any of the terms and conditions of the said contract or to extend time for performance of contract by the contractor from time to time or to postpone for any time or from time to time any of the powers exercisable by RTDC against the contractor/supplier under the contract and forbear or enforce any of the terms and conditions relating to the said contract and we shall not be relieved from our liability by reason of any such variations or extension being granted to the contractor or for any forbearance, act or omission on the part of RTDC or any indulgence by RTDC to the contractor or by any such matter or thing whatsoever, which under the law relating to the sureties would, but for this provision, have effect of so relieving us.

This guarantee/undertaking shall be in addition to any other guarantee or security whatsoever RTDC may now or at any time have in relation to the performance of the works/equipment and RTDC shall have full re-course to or enforce this security in performance to any other security or guarantee which the RTDC may have or obtained and there shall be no forbearance on the part of RTDC in enforcing or requiring enforcement of any other security which shall have the effect of releasing the Bank from its full liability. It shall not be necessary for RTDC to proceed against the said contractor/supplier before proceeding against the Bank. This guarantee/ undertaking shall not be determined or affected by the liquidation or winding up, dissolution or change of constitution or insolvency of the supplier/ contractor, but shall in all respects and for all purposes be binding and operative until payment of all moneys payable to RTDC in terms thereof are paid by the Bank.

The Bank hereby waives all rights at any time inconsistent with the terms of this Guarantee and the obligations of the bank in terms hereof, shall not be otherwise effected or suspended by reasons of any dispute or disputes having been raised by the supplier/contractor (whether or not pending before any Arbitrator, Tribunal or Court) or any denial of liability by the supplier/contractor stopping or preventing or purporting to stop or prevent any payment by the Bank to RTDC in terms hereof.

We, the said Bank, lastly undertake not to revoke this guarantee during its currency except with the previous consent of RTDC in writing. Unless a claim is made in writing within three months from the date of expiry of this guarantee i.e. (three months after the date of expiry)
we shall be relieved
from all liabilities under this guarantee thereafter.

Signed this ..... day of ..... at…….

For and on behalf of

Bank WITNESS.
1.

2.

ANNEXURE – IV
FORM OF ADVANCE PAYMENT GUARANTEE

Ropeways and Rapid Transport System Development Corporation limited. US CLUB, Shimla
Himachal Pradesh

In consideration of the Ropeways and Rapid Transport System Development Corporation limited, having its Registered Office at US CLUB Shimla (hereinafter called "RTDC" which expression shall unless repugnant to the subject or context include his successor and assigns) having agreed under the terms and conditions of Contract No..... dated ….. made between…….. and RTDC in connection with..... (hereinafter called "the said contract") to make at the request of the Contractor a Mobilization Advance of Rs for utilizing it for the purpose of the Contract on his furnishing a guarantee acceptable to RTDC, we the Bank Ltd., (hereinafter referred to the "the said Bank") and having our registered office at do hereby guarantee the due recovery by RTDC of the said advance as provided according to the terms and conditions of the Contract. We.....do hereby undertake to pay the amount due and payable under this Guarantee without any demur, merely on a demand from RTDC stating that the amount claimed is due to RTDC under the said Agreement. Any such demand made on the..... shall be conclusive as regards the amount due and payable by the……Under this guarantee and..... agree that the liability of the to pay RTDC the amount so demanded shall be absolute and unconditional notwithstanding any dispute or disputes raised by the Contractor and notwithstanding any legal proceeding pending in any court or Tribunal relating thereto. However, our liability under this Guarantee shall be restricted to an amount not exceeding Rs..... We Bank further agree that RTDC shall be the sole judge of
and as to whether the amount claimed has fallen due to RTDC under the said agreement or whether the said Contractor has not utilized the said advance or any part thereof for the purpose of the Contract and the extent of loss or damage caused to or suffered by RTDC on account of the said advance together with interest not being recovered in full and the decision of RTDC that the amount has fallen due from contractor or the said Contractor has not utilized the said advance or any part thereto for the purpose of the contract and as to the amount or amounts of loss or damage caused to or suffered by RTDC shall be final and binding on us.

We, the said Bank, further agree that the Guarantee herein contained shall remain in full force and effect till the said advance has been fully recovered and its claims satisfied or discharged and till RTDC certify that the said advance has been fully recovered from the said Contractor, and accordingly discharges this Guarantee subject, however, that RTDC shall have no claims under this Guarantee after the said advance has been fully recovered, unless a notice of the claims under this Guarantee has been served on the Bank before the expiry of the said Bank Guarantee in which case the same shall be enforceable against the Bank.

RTDC shall have the fullest liberty without affecting in any way the liability of the Bank under this Guarantee or indemnity from time to time to vary any of the terms and conditions of the said Contract or the advance or to extend time of performance by the said Contractor or to postpone for any time and from time to time of the powers exercisable by it against the said Contractor and either to enforce or forbear from enforcing any of terms and conditions governing the said Contract or the advance or

securities available to RTDC and the said Bank shall not be released from its liability under these presents by any exercise by RTDC of the liberty with reference to the matters aforesaid or by reasons of time being given to the said Contractor or any other forbearance, act or omission on the part of RTDC or any indulgence by RTDC to the said Contractor or of any other matter or thing whatsoever which under the law relating to sureties would but for this provision have the effect of so releasing the bank from its such liability. It shall not be necessary for RTDC to proceed against the Contractor before proceeding against the Bank and the Guarantee herein contained shall be enforceable against the Bank notwithstanding any security which RTDC may have obtained or obtain from the Contractor or shall at the time when proceedings are taken against the Bank hereunder be outstanding or unrealized.

We, the said Bank, lastly undertake not to revoke this Guarantee during its currency except with the previous consent of RTDC in writing and agree that any change in the constitution of the said Contractor or the said Bank shall not discharge our liability hereunder.

Dated this .....day of.....

Dated

For and on behalf of Bank

(NAME AND DESIGNATION)

ANNEXURE-V
PROFORMA OF BANK GUARANTEE
(IN LIEU OF SECURITY DEPOSIT)

(Judicial Stamp paper of appropriate value as per stamp Act-of respective state)

Ropeways and Rapid Transport System Development Corporation limited. US CLUB, Shimla
Himachal Pradesh

In consideration of the Ropeways and Rapid Transport System Development Corporation limited, having its Registered Office at USCLUB, Shimla (hereinafter called "RTDC") which expression shall include its successors and assigns having awarded to M/s. (hereinafter called "the Supplier/Contractor") which expression
shall wherever the subject or context so permits includes its successors and assigns) a Contract in terms inter-alia of RTDC's letter No..... dated..... and the Contract/Purchase Conditions of RTDC and upon the condition of the Supplier/Contractor furnishing Security for the performance of the Supplier's obligations and /or discharge of the contractor's/supplier's liability under and/or in connection with the said contract upto a sum of Rs.....
(Rupees.....only)

We,.....((hereinafter called "The Bank") which expression shall include its successors
and assigns) hereby undertake and guarantee payment to RTDC forthwith on the same day on demand in writing and without protest or demur of any and all moneys payable by the supplier/contractor to RTDC under, in respect or in connection with the said contract inclusive of all the losses, damages, costs, charges and expenses and other moneys payable in respect of the above as specified in any notice of demand made by RTDC to the Bank with reference to this guarantee up to and aggregate limit of Rs…....(Rupees.....only) and the bank hereby agree with RTDC that:

This Guarantee shall be continuing guarantee and shall remain valid and irrevocable for all claims of
RTDC and liabilities of Supplier/Contractor arising upto and until midnight of.....

This Guarantee shall be in addition to any other Guarantee or Security whatsoever that RTDC now or at any time have in relation to the Contractor/Supplier's obligations/liabilities under and/or in connection with the said supply/contract, and RTDC shall have full authority to take recourse or to enforce this Security in preference to any other Guarantee or Security which RTDC may have or obtain and no forbearance on the part of RTDC in enforcing or requiring enforcement of any other Security shall have the effect of releasing the Bank from its liability hereunder.

RTDC shall be at liberty without reference to the Bank and without affecting the full liability of the Bank hereunder to take any other security in respect of the Supplier's/Contractor's obligations and/ or liabilities under or in connection with the said supply/contract or to grant time and / or indulgence to the supplier / contractor or to increase or otherwise vary the prices or the total contract value or to release or to forbear

from enforcement of all or any of the conditions under the said supply / contract and / or the remedies of RTDC under any other security/securities now or hereafter held by RTDC and no such dealings, increase(s) or other indulgence(s) or arrangement(s) with the supplier / contractor or releasing or forbearance whatsoever shall have the effect of releasing the Bank from its full liability to RTDC hereunder or prejudicing rights of RTDC against the Bank. This Guarantee shall not be determined or affected by the liquidation or winding up, dissolution or change of constitution or insolvency of the supplier / contractor but shall in all respects and for all purposes be binding and operative until payment of all moneys payable to RTDC in terms thereof.

The Bank hereby waives all rights at any time inconsistent with the terms of this Guarantee and the obligations of the Bank in terms hereof shall not be otherwise affected or suspended by reason of any dispute or disputes having been raised by the supplier /contractor (whether or not pending before any Arbitrator, Tribunal or Court) or any denial or liability by the supplier/ contractor stopping/ preventing or purporting to stop or prevent any payment by the Bank to RTDC in terms thereof. The amount stated in any notice of demand addressed by RTDC to the Guarantor as liable to be paid to RTDC by the supplier/contractor or as suffered or incurred by RTDC on account of any losses or damages, costs, charges and / or expenses shall as between the Bank and RTDC be conclusive of the amount so liable to be paid to RTDC or suffered or incurred by RTDC as the case may be and payable by the Guarantor to RTDC in terms hereof subject to a maximum of Rs..... (Rupees..... only), unless demand or claim under this Guarantee is made on the Guarantor in writing within three months form the date of expiry of the Guarantee i.e. upto ..... the Guarantor shall be discharged from all liabilities under this
Guarantee there under.

Notwithstanding anything contained herein before our liability under this guarantee is restricted to Rs ……. ..... (Rupees..... only).

We, the said Bank, lastly undertake not to revoke this Guarantee during its currency except with the previous consent of RTDC in writing and agree that any change in the constitution of the said Contractor or the said Bank shall not discharge our liability hereunder.

For and on behalf of the Bank

Place Date
WITNESS: 1.

2.

ANNEXURE –VI
SAFETY CODES

1. Suitable scaffolds should be provided for workmen for all works that cannot safely be done from the ground, or from solid construction except such short period work as can be done safely from ladders. When a ladder is used, an extra mazdoor shall be engaged for holding the ladder and if the ladder is used for carrying materials as well suitable footholds and hand-hold shall be provided on the ladder and the ladder shall be given an inclination not steeper than ¼ to 1(¼ horizontal and 1 vertical).

2. Scaffolding of staging more than 3.6 m (12ft.) above the ground or floor, swung or suspended from an overhead support or erected with stationary support shall have a guard rail properly attached or bolted, braced and otherwise secured at least 90 cm. (3ft.) high above the floor or platform of such scaffolding or staging and extending along the entire length of the outside and ends thereof with only such opening as may be necessary for the delivery of materials. Such scaffolding or staging shall be so fastened as to prevent it from swaying from the building or structure.

3. Working platforms, gangways and stairways should be so constructed that they should not sag unduly or unequally, and if the height of the platform or the gangway or the stairway is more than 3.6 m (12ft.) above ground level or floor level, they should be closely boarded, should have adequate width and should be suitably fastened as described in (2) above.

4. Every opening in the floor of a building or in a working platform shall be provided with suitable means to prevent the fall of person or materials by providing suitable fencing or railing whose minimum height shall be 90 cm. (3ft.).

5. Safe means of access shall be provided to all working platforms and other working places. Every ladder shall be securely fixed. No portable single ladder shall be over 9m. (30ft.) in length while the width between side rails in rung ladder shall in no case be less than 29 cm. (11½") for ladder upto and including 3 m. (10 ft.) in length. For longer ladders, this width should be increased at least ¼" for each additional 30 cm. (1 foot) of length. Uniform step spacing of not more than 30 cm shall be kept. Adequate precautions shall be taken to prevent danger from electrical equipment. No materials on any of the sites or work shall be so stacked or placed as to cause danger or inconvenience to any person or the public. The contractor shall provide all necessary fencing and lights to protect the public from accident and shall be bound to bear the expenses of defence of every suit, action or other proceedings 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 cost which may be awarded in any such suit; action or proceedings to any such person or which may, with the consent of the contractor, be paid to compensate any claim by any such person

6. (a) **Excavation and Trenching** - All trenches 1.2 m. (4ft.) or more in depth, shall at all times be supplied with at least one ladder for each 30 m. (100ft.) in length or fraction thereof, Ladder shall extend from bottom of the trench to at least 90 cm. (3ft.) above the surface of the ground. The side of the trenches which are 1.5 m. (5ft.) or more in depth shall be stepped back to give suitable slope or securely held by timber bracing, so as to avoid the danger of sides collapsing. The excavated materials shall not be placed within 1.5 m. (5ft.) of the edges of the trench or half of the depth of the trench whichever is more.

Cutting shall be done from top to bottom. Under no circumstances, undermining or undercutting shall be done.

(b) Safety Measures for digging bore holes:-

i. If the bore well is successful, it should be safely capped to avoid caving and collapse of the bore well. The failed and the abandoned ones should be completely refilled to avoid caving and collapse;

ii. During drilling, Sign boards should be erected near the site with the address of the drilling contractor and the Engineer in-charge of the work;

iii. Suitable fencing should be erected around the well during the drilling and after the installation of the rig on the point of drilling, flags shall be put 50m all round the point of drilling to avoid entry of people;

iv. After drilling the borewell, a cement platform (0.50m x 0.50m x 1.20m) 0.60m above ground level and 0.60m below ground level should be constructed around the well casing;

v. After the completion of the borewell, the contractor should cap the bore well properly by welding steel plate, cover the bore well with the drilled wet soil and fix thorny shrubs over the soil. This should be done even while reparing the pump;

vi. After the borewell is drilled the entire site should be brought to the ground level.

7. **Demolition -** Before any demolition work is commenced and also during the progress of the work,

(i) All roads and open areas adjacent to the work site shall either be closed or suitably protected.

(ii) No electric cable or apparatus which is liable to be a source of danger or a cable or apparatus used by the operator shall remain electrically charged.

(iii) All practical steps shall be taken to prevent danger to persons employed from risk of fire or explosion or flooding. No floor, roof or other part of the building shall be so overloaded with debris or materials as to render it unsafe.

8. All necessary personal safety equipment as considered adequate by the Engineer-in- Charge should be kept available for the use of the person employed on the site and maintained in a condition suitable for immediate use, and the contractor should take adequate steps to ensure proper use of equipment by those concerned. The following safety equipment shall invariably be provided.

(i) Workers employed on mixing asphaltic materials, cement and lime mortars shall be provided with protective footwear and protective goggles.

(ii) Those engaged in white washing and mixing or stacking of cement bags or any material which is injurious to the eyes, shall be provided with protective goggles.

(iii) Those engaged in welding works shall be provided with welder's protective eyeshields.

(iv) Stone breaker shall be provided with protective goggles and protective clothing and seated at sufficiently safe intervals.

(v) When workers are employed in sewers and manholes, which are in active use, the contractors shall ensure that the manhole covers are opened and ventilated atleast for an hour before the workers are allowed to get into the manholes, and the manholes so opened shall be cordoned off with suitable railing and provided

with warning signals or boards to prevent accident to the public. In addition, the contractor shall ensure that the following safety measure are adhered to :-

3. Entry for workers into the line shall not be allowed except under supervision of the JE or any other higher officer.
4. At least 5 to 6 manholes upstream and downstream should be kept open for at least 2 to 3 hours before any man is allowed to enter into the manhole for working inside.
5. Before entry, presence of Toxic gases should be tested by inserting wet lead acetate paper which changes colour in the presence of such gases and gives indication of their presence.
6. Presence of Oxygen should be verified by lowering a detector lamp into the manhole. In case, no Oxygen is found inside the sewer line, workers should be sent only with Oxygen kit.
7. Safety belt with rope should be provided to the workers. While working inside the manholes, such rope should be handled by two men standing outside to enable him to be pulled out during emergency.
8. The area should be barricaded or cordoned of by suitable means to avoid mishaps of any kind. Proper warning signs should be displayed for the safety of the public whenever cleaning works are undertaken during night or day.
9. No smoking or open flames shall be allowed near the blocked manhole being cleaned.
10. The malba obtained on account of cleaning of blocked manholes and sewer lines should be immediately removed to avoid accidents on account of slippery nature of the malba.
11. Workers should not be allowed to work inside the manhole continuously. He should be given rest intermittently. The Engineer-in-Charge may decide the time up to which a worker may be allowed to work continuously inside the manhole.
12. Gas masks with Oxygen Cylinder should be kept at site for use in emergency.
13. Air-blowers should be used for flow of fresh air through the manholes. Whenever called for, portable air blowers are recommended for ventilating the manholes. The Motors for these shall be vapour proof and of totally enclosed type. Non sparking gas engines also could be used but they should be placed at least 2 metres away from the opening and on the leeward side protected from wind so that they will not be a source of friction on any inflammable gas that might be present.
14. The workers engaged for cleaning the manholes/sewers should be properly trained before allowing to work in the manhole.
15. The workers shall be provided with Gumboots or non sparking shoes bump helmets and gloves non sparking tools safety lights and gas masks and portable air blowers (when necessary). They must be supplied with barrier cream for anointing the limbs before working inside the sewer lines.
16. Workmen descending a manhole shall try each ladder stop or rung carefully before putting his full weight on it to guard against insecure fastening due to corrosion of the rung fixed to manhole well.

17. If a man has received a physical injury, he should be brought out of the sewer immediately and adequate medical aid should be provided to him.
18. The extent to which these precautions are to be taken depend on individual situation but the decision of the Engineer-in-Charge regarding the steps to be taken in this regard in an individual case will be final.
19. The Contractor shall not employ men and women below the age of 18 years on the work of painting with products containing lead in any form. Wherever men above the age of 18 are employed on the work of lead painting, the following precaution should be taken:-

(a) No paint containing lead or lead products shall be used except in the form of paste or readymade paint.
(b) Suitable face masks should be supplied for use by the workers when paint is applied in the form of spray or a surface having lead paint is dry rubbed and scrapped.
(c) Overalls shall be supplied by the contractors to the workmen and adequate facilities shall be provided to enable the working painters to wash during and on the cessation of work.

9. The Contractor shall not employ women and men below the age of 18 on the work of painting with product containing lead in any form, wherever men above the age of 18 are employed on the work of lead painting, the following principles must be observed for such use :

(i) White lead, sulphate of lead or product containing these pigment, shall not be used in painting operation except in the form of pastes or paint ready for use.
(ii) Measures shall be taken, wherever required in order to prevent danger arising from the application of a paint in the form of spray.
(iii) Measures shall be taken, wherever practicable, to prevent danger arising out of from dust caused by dry rubbing down and scraping.
(iv) Adequate facilities shall be provided to enable working painters to wash during and on cessation of work.
(v) Overall shall be worn by working painters during the whole of working period.
(vi) Suitable arrangement shall be made to prevent clothing put off during working hours being spoiled by painting materials.
(vii) Cases of lead poisoning and suspected lead poisoning shall be notified and shall be subsequently verified by medical man.
(viii) RTDC may require, when necessary medical examination of workers.
(ix) Instructions with regard to special hygienic precautions to be taken in the painting trade shall be distributed to working painters.

10. When the work is done near any place where there is risk of drowning, all necessary equipments should be provided and kept ready for use and all necessary steps taken for prompt rescue of any person in danger and adequate provision, should be made for prompt first aid treatment of all injuries likely to be obtained during the course of the work.

11. Use of hoisting machines and tackle including their attachments, anchorage and supports shall conform to the following standards or conditions :-

(i) (a) These shall be of good mechanical construction, sound materials and adequate strength and free from patent defects and shall be kept repaired and in good working order.

(b) Every rope used in hoisting or lowering materials or as a means of suspension shall be of durable quality and adequate strength, and free from patent defects.

(ii) Every crane driver or hoisting appliance operator, shall be properly qualified and no person under the age of 21 years should be in charge of any hoisting machine including any scaffolding winch or give signals to operator.

(iii) In case of every hoisting machine and of every chain ring hook, shackle swivel and pulley block used in hoisting or as means of suspension, the safe working load shall be ascertained by adequate means. Every hoisting machine and all gear referred to above shall be plainly marked with the safe working load. In case of a hoisting machine having a variable safe working load each safe working load and the condition under which it is applicable shall be clearly indicated. No part of any machine or any gear referred to above in this paragraph shall be loaded beyond the safe working load except for the purpose of testing.

(iv) In case of departmental machines, the safe working load shall be notified by the Electrical Engineer-in-Charge. As regards contractor's machines the contractors shall notify the safe working load of the machine to the Engineer-in-Charge whenever he brings any machinery to site of work and get it verified by the Electrical Engineer concerned.

12. Motors, gearing, transmission, electric wiring and other dangerous parts of hoisting appliances should be provided with efficient safeguards. Hoisting appliances should be provided with such means as will reduce to the minimum the risk of accidental descent of the load. Adequate precautions should be taken to reduce to the minimum the risk of any part of a suspended load becoming accidentally displaced. When workers are employed on electrical installations which are already energized, insulating mats, wearing apparel, such as gloves, sleeves and boots as may be necessary should be provided. The worker should not wear any rings, watches and carry keys or other materials which are good conductors of electricity.

13. All scaffolds, ladders and other safety devices mentioned or described herein shall be maintained in safe condition and no scaffold, ladder or equipment shall be altered or removed while it is in use. Adequate washing facilities should be provided at or near places of work.

14. These safety provisions should be brought to the notice of all concerned by display on a notice board at a prominent place at work spot. The person responsible for compliance of the safety code shall be named therein by the contractor.

15. To ensure effective enforcement of the rules and regulations relating to safety precautions the arrangements made by the contractor shall be open to inspection by the Labour Officer or Engineer-in-Charge of the department or their representatives.

16. Notwithstanding the above clauses from (1) to (15), there is nothing in these to exempt the contractor from the operations of any other Act or Rule in force in the Republic of India.

ANNEXURE – VII
MODEL RULES FOR THE PROTECTION OF HEALTH AND SANITARY ARRANGEMENTS FOR WORKERS EMPLOYED BY CONTRACTORS

1. APPLICATION

These rules shall apply to all buildings and construction works in which twenty or more workers are ordinarily employed or are proposed to be employed in any day during the period during which the contract work is in progress.

2. DEFINITION

Work place means a place where twenty or more workers are ordinarily employed in connection with construction work on any day during the period during which the contract work is in progress.

3. FIRST-AID FACILITIES

(i) At every work place, there shall be provided and maintained, so as to be easily accessible during working hours, first-aid boxes at the rate of not less than one box for 150 contract labour or part thereof ordinarily employed.

(ii) The first-aid box shall be distinctly marked with a red cross on white back ground and shall contain the following equipment:-

(a) For work places in which the number of contract labour employed does not exceed 50- Each first-aid box shall contain the following equipments :-

1) 6 small sterilised dressings.
2) 3 medium size sterilised dressings.
3) 3 large size sterilised dressings.
4) 3 large sterilised burn dressings.
5) 1 (30 ml.) bottle containing a two per cent alcoholic solution of iodine.
6) 1 (30 ml.) bottle containing salvolatile having the dose and mode of administration indicated on the label.
7) 1 snakebite lancet.
8) 1 (30 gms.) bottle of potassium permanganate crystals.
9) 1 pair scissors.
10) 1 copy of the first-aid leaflet issued by the Director General, Factory Advice Service and Labour Institutes, Government of India.
11) 1 bottle containing 100 tablets (each of 5 gms.) of aspirin.
12) Ointment for burns.
13) A bottle of suitable surgical antiseptic solution

(b) For work places in which the number of contract labour exceed 500 Each first-aid box shall contain the following equipments.

1) 12 small sterilised dressings.
2) 6 medium size sterilised dressings.

3) 6 large size sterilised dressings.
4) 6 large size sterilised burn dressings.
5) 6 (15 gms.) packets sterilised cotton wool.
6) 6.1 (60 ml.) bottle containing a two per cent alcoholic solution iodine.
7) 1 (60 ml.) bottle containing salvolatile having the dose and mode of administration indicated on the label
8) 1 roll of adhesive plaster.
9) 1 snake bite lancet.
10) 1 (30 gms.) bottle of potassium permanganate crystals.
11) 1 pair scissors.
12) 1 copy of the first-aid leaflet issued by the Director General Factory Advice Service and Labour Institutes / Government of India.
13) A bottle containing 100 tablets (each of 5 gms.) of aspirin.
14) Ointment for burns.
15) A bottle of suitable surgical antiseptic solution.

(iii) Adequate arrangements shall be made for immediate recoupment of the equipment when necessary

(iv) Nothing except the prescribed contents shall be kept in the First-aid box.

(v) The first-aid box shall be kept in charge of a responsible person who shall always be readily available during the working hours of the work place.

(vi) A person in charge of the First-aid box shall be a person trained in First-aid treatment in the work places where the number of contract labour employed is 150 or more.

(vii) In work places where the number of contract labour employed is 500 or more and hospital facilities are not available within easy distance from the works. First-aid posts shall be established and run by a trained compounder. The compounder shall be on duty and shall be available at all hours when the workers are at work.

(viii) Where work places are situated in places which are not towns or cities, a suitable motor transport shall be kept readily available to carry injured person or person suddenly taken ill to the nearest hospital.

4. DRINKING WATER

(i) In every work place, there shall be provided and maintained at suitable places, easily accessible to labour, a sufficient supply of cold water fit for drinking.

(ii) Where drinking water is obtained from an intermittent public water supply, each work place shall be provided with storage where such drinking water shall be stored.

(iii) Every water supply or storage shall be at a distance of not less than 50 feet from any latrine drain or other source of pollution. Where water has to be drawn from an existing well which is within such proximity of latrine, drain or any other source of pollution, the well shall be properly chlorinated before water is drawn

from it for drinking. All such wells shall be entirely closed in and be provided with a trap door which shall be dust and waterproof.

(iv) A reliable pump shall be fitted to each covered well, the trap door shall be kept locked and opened only for cleaning or inspection which shall be done at least once a month.

5. WASHING FACILITIES

(i) In every work place adequate and suitable facilities for washing shall be provided and maintained for the use of contract labour employed therein.

(ii) Separate and adequate cleaning facilities shall be provided for the use of male and female workers.

(iii) Such facilities shall be conveniently accessible and shall be kept in clean and hygienic condition.

6. LATRINES AND URINALS

(i) Latrines shall be provided in every work place on the following scale namely :-

(a) Where female are employed, there shall be at least one latrine for every 25 females.

(b) Where males are employed, there shall be at least one latrine for every 25 males.

Provided that, where the number of males or females exceeds 100, it shall be sufficient if there is one latrine for 25 males or females as the case may be upto the first 100, and one for every 50 thereafter.

(ii) Every latrine shall be under cover and so partitioned off as to secure privacy, and shall have a proper door and fastenings.

(iii) Construction of latrines: The inside walls shall be constructed of masonry or some suitable heat-resisting nonabsorbent materials and shall be cement washed inside and outside at least once a year, Latrines shall not be of a standard lower than borehole system.

(iv) (a) Where workers of both sexes are employed, there shall be displayed outside each block of latrine and urinal, a notice in the language understood by the majority of the workers "For Men only" or "For Women Only" as the case may be.

(b) The notice shall also bear the figure of a man or of a woman, as the case may be.

(v) There shall be at least one urinal for male workers upto 50 and one for female workers upto fifty employed at a time, provided that where the number of male or female workmen, as the case may be exceeds 500, it shall be sufficient if there is one urinal for every 50 males or females upto the first 500 and one for every 100 or part thereafter.

(vi) (a) The latrines and urinals shall be adequately lighted and shall be maintained in a clean and sanitary condition at all times.

(b) Latrines and urinals other than those connected with a flush sewage system shall comply with the requirements of the Public Health Authorities.

(vii) Water shall be provided by means of tap or otherwise so as to be conveniently accessible in or near the latrines and urinals.

(viii) Disposal of excreta: - Unless otherwise arranged for by the local sanitary authority, arrangements for proper disposal of excreta by incineration at the work place shall be made by means of a suitable incinerator. Alternately excreta may be disposed of by putting a layer of night soil at the bottom of a pucca tank prepared for the purpose and covering it with a 15 cm. layer of waste or refuse and then covering it with a layer of earth for a fortnight (when it will turn to manure).

(ix) The contractor shall at his own expense, carry out all instructions issued to him by the Engineer-in-Charge to effect proper disposal of night soil and other conservancy work in respect of the contractor's workmen or employees on the site. The contractor shall be responsible for payment of any charges which may be levied by Municipal or Cantonment Authority for execution of such on his behalf.

7. PROVISION OF SHELTER DURING REST

At every place there shall be provided, free of cost, four suitable sheds, two for meals and the other two for rest separately for the use of men and women labour. The height of each shelter shall not be less than 3 metres (10 ft.) from the floor level to the lowest part of the roof. These shall be kept clean and the space provided shall be on the basis of 0.6 sqm (6 sft) per head.

Provided that the Engineer-in-Charge may permit subject to his satisfaction, a portion of the building under construction or other alternative accommodation to be used for the purpose.

8. CRECHES

(i) At every work place, at which 20 or more women worker are ordinarily employed, there shall be provided two rooms of reasonable dimensions for the use of their children under the age of six years. One room shall be used as a play room for the children and the other as their bedroom. The rooms shall be constructed with specifications as per clause 19H (ii) a,b & c.

(ii) The rooms shall be provided with suitable and sufficient openings for light and ventilation. There shall be adequate provision of sweepers to keep the places clean.

(iii) The contractor shall supply adequate number of toys and games in the play room and sufficient number of cots and beddings in the bed room.

(iv) The contractor shall provide one ayaa to look after the children in the creche when the number of women workers does not exceed 50 and two when the number of women workers exceed 50.

(v) The use of the rooms earmarked as creches shall be restricted to children, their attendants and mothers of the children.

9. CANTEENS

(iii) In every work place where the work regarding the employment of contract labour is likely to continue for six months and where in contract labour numbering one hundred or more are ordinarily employed, an adequate canteen shall be provided by the contractor for the use of such contract labour.

(iv) The canteen shall be maintained by the contractor in an efficient manner.

(v) The canteen shall consist of at least a dining hall, kitchen, storeroom, pantry and washing places separately for workers and utensils.

(vi) The canteen shall be sufficiently lighted at all times when any person has access to it.

(vii) The floor shall be made of smooth and impervious materials and inside walls shall be limewashed or colour washed at least once in each year.

Provided that the inside walls of the kitchen shall be lime-washed every four months.

(viii) The premises of the canteen shall be maintained in a clean and sanitary condition.

(ix) Waste water shall be carried away in suitable covered drains and shall not be allowed to accumulate so as to cause a nuisance.

(x) Suitable arrangements shall be made for the collection and disposal of garbage.

(xi) The dining hall shall accommodate at a time 30 per cent of the contract labour working at a time.

(xii) The floor area of the dining hall, excluding the area occupied by the service counter and any furniture except tables and chairs shall not be less than one square metre (10 sft) per diner to be accommodated as prescribed in sub-Rule 9.

(xiii) (a) A portion of the dining hall and service counter shall be partitioned off and reserved for women workers in proportion to their number.

(b) Washing places for women shall be separate and screened to secure privacy.

(xiv) Sufficient tables stools, chair or benches shall be available for the number of diners to be accommodated as prescribed in sub-Rule 9.

(xv) (a) 1. There shall be provided and maintained sufficient utensils crockery, furniture and any other equipments necessary for the efficient running of the canteen.

2. The furniture utensils and other equipment shall be maintained in a clean and hygienic condition.

(b) 1. Suitable clean clothes for the employees serving in the canteen shall be provided and maintained.

2. A service counter, if provided, shall have top of smooth and impervious material.

3. Suitable facilities including an adequate supply of hot water shall be provided for the cleaning of utensils and equipments.

(xvi) The food stuffs and other items to be served in the canteen shall be in conformity with the normal habits of the contract labour.

(xvii) The charges for food stuffs, beverages and any other items served in the canteen shall be based on 'No profit, No loss' and shall be conspicuously displayed in the

canteen.

(xviii) In arriving at the price of foodstuffs, and other article served in the canteen, the following items shall not be taken into consideration as expenditure namely:-

(a) The rent of land and building.

(b) The depreciation and maintenance charges for the building and equipment provided for the canteen.

(c) The cost of purchase, repairs and replacement of equipment including furniture, crockery, cutlery and utensils.

(d) The water charges and other charges incurred for lighting and ventilation

(e) The interest and amounts spent on the provision and maintenance of equipment provided for the canteen.

(xix) The accounts pertaining to the canteen shall be audited once every 12 months by registered accountants and auditors.

10. ANTI-MALARIAL PRECAUTIONS

The contractor shall at his own expense, conform to all anti-malarial instructions given to him by the Engineer-in-Charge including the filling up of any borrow pits which may have been dug by him.

11. The above rules shall be incorporated in the contracts and in notices inviting tenders and shall form an integral part of the contracts.

12. AMENDMENTS

Government may, from time to time, add to or amend these rules and issue directions - it may consider necessary for the purpose of removing any difficulty which may arise in the administration thereof.

PROFORMA: FORMS
(SECTON – VI)

1	**LETTER OF TRANSMITTAL**	
2	**FORM-A**	FINANCIAL INFORMATION
3	**FORM-B**	STRUCTURE & ORGANISATION
4	**FORM C**	NO CONVICTION CERTIFICATE
5	**FORM D**	UNDERSTANDING THE PROJECT SITE
6	**FORM E**	NO DEVIATION CERTIFICATE
7	**FORM F**	INTEGRITY PACT WITH INTEGRITY AGREEMENT
8	**FORM G**	FORMAT FOR LITIGATION HISTORY, LIQUIDATED DAMAGES, DISQUALIFICATION
9	**FORM H**	AFFIDAVIT

LETTER OF TRANSMITTAL

(on Bidder **Original** *Letter Head)*

To
The Chief General Manager,
Ropeways and Rapid Transport System Development Corporation HP Ltd

Subject: Submission of bids for (Name of the Work/ Project)

Sir,

Having examined the details given in tender document for the above work, I/we hereby submit the relevant information.

1. I/we hereby certify that all the statement made and information supplied in the "Forms" enclosed with the tender and accompanying statement are true and correct.
2. I/we have furnished all information and details necessary for eligibility and have no further pertinent information to supply.
3. I/we submit the requisite certified solvency certificate and authorize the RTDC Ltd. to approach the Bank issuing the solvency certificate to confirm the correctness thereof. I/we also authorize RTDC. to approach individuals, employers, firms and corporation to verify our competence and general reputation.
4. I/we submit the following certificates in support of our suitability, technical knowledge and capability for having successfully completed the following eligible similar works:

Name of work	Certificate from

Certificate:

It is certified that the information given in the enclosed eligibility bid are correct. It is also certified that I/we shall be liable to be debarred, disqualified / cancellation of enlistment in case any information furnished by me/us found to be incorrect.

Enclosures:

Seal of bidder

Date of submission: Signature(s) of Bidder(s).

FORM-A
FINANCIAL INFORMATION
[To be submitted on **Original** Letter Head of Bidder OR **Original** Letter Head of CA]

1. Financial Analysis: Details to be furnished duly supported by figures in balance sheet/ profit & loss account for the last five years duly certified by the Chartered Accountant, as submitted by the applicant to the Income Tax Department (Copies to be attached).

Years	Gross Annual turnover on construction works	Profit/Loss (After Tax)
2015-2016		
2016-2017		
2017-2018		
2018-2019		
2019-2020		

2. Financial arrangements for carrying out the proposed work: It is hereby declared that (Name of firm with address) has enough financial resources to execute the proposed work.
3. Solvency Certificate from Bankers of the bidder: It is hereby certified that attached Solvency Certificate is in Original OR in copy (Originally attested from concern Bank after date of Tender) as per the criteria mentioned in tender Document.

Signature of Chartered Accountant (with Seal)

Signature of Bidder(s) (with Seal)

FORM- B
STRUCTURE & ORGANISATION

S.No.	Particulars	Details Submitted by Bidder
1.	Name & address of the bidder	
2.	Telephone no./Telex no./Fax no.	
3.	Legal status of the bidder (attach copies of original document defining the legal status) (a) A proprietary firm (b) A partnership firm (c) A limited company or Corporation (d) A Company registered under company's Act 1956/2013	
4.	Particulars of registration with various Government Bodies (attach attested photocopy)	
	Organization/Place of Registration 1. 2. 3.	Registration No.
5.	Names and titles of Directors & Officers with designation to be concerned with this work.	
6.	Designation of individuals authorized to act for the organization	
7.	Has the bidder, or any constituent partner in case of partnership firm Limited Company/ Joint Venture, ever been convicted by the court of law? If so, give details.	
8.	In which field of Civil Engineering construction the bidder has specialization and interest?	
9.	Any other information considered necessary but not included above.	

Signature of Bidder(s)

FORM-C

FORMAT FOR NO-CONVICTION CERTIFICATE

[To be submitted on Bidder's **Original** Letter Head]

Accepted

(Signature, name, designation and address of the Attorney)

AFFIDAVIT *(Black listing)

1. I, the undersigned, do hereby certify that all the statements made in the Tender document are true and correct.

2. The undersigned also hereby certifies that neither our firm M/s. .....nor any of its constituent partners are blacklisted by any of the Govt./Semi Govt. and public undertakings and not have abandoned any work of buildings / Infrastructures works in India nor any contract awarded to us for such works have been rescinded, during last five years prior to the date of this application.

Signed by an Authorized Officer of the Firm

Title of Officer:

Name of Firm:

Date:

FORM-D

FORMAT FOR UDERSTANDING THE PROJECT SITE

[To be submitted on Bidder's **Original** Letter Head]

To
The Chief General Manager,
Ropeways and Rapid Transport System Development Corporation HP Ltd

Subject: Undertaking of the Site Visit for --- (Name of the work / project)

Sir,

I/we hereby certify that I/we have examined & inspected the site & its surrounding satisfactorily, where the project is to be executed as per the scope of works. I/ We are well aware about the following

- Location of the proposed building and its allied works.
- Site clearance and location of matured trees.
- Assessment of Topography and contouring of the land where the project is to be executed to understand the cutting & filling during the construction.
- Nature of the ground & sub-soil of the site and accessibility to the site.
- Assessment of depth & type of foundation on the basis of foundation & depth of the nearby constructed buildings and nature of sub soil.
- Existing surrounding road level to finalize plinth beam level.
- Location of existing Sewer line/ STP, existing Water pipe line and storm water drainage.
- Existing electrical supply line/ substation to connect the proposed building and allied works to make the building functional after taking proper permission and approvals from the concerned Departments
- Position of existing underground & overhead HT/ LT electric lines
- Safety of Surrounding structures during excavation and during execution of work
- Hindrances, if any, which may arise during the execution of work

I / We hereby submit our BID considering above all facts gathered during site visit and each & every aspect have been considered in the Quoted cost of the project. I / We hereby confirm that no extra/additional cost shall be claimed on above aspects

Yours faithfully,

Date:

Place:

(Signature, name and designation of the Authorized signatory)

Name and seal of Bidder

FORM-E

FORMAT FOR NO DEVIATION CERTIFICATE

[To be submitted on Bidder's **Original** Letter Head]

To,
The Chief General Manager,
Ropeways and Rapid Transport System Development Corporation HP Ltd

Subject: No Deviation Certificate for (name of Work /Project)

Dear Sir,

With reference to above this is to confirm that as per Tender conditions we have visited site before submission of our Offer and noted the job content and site condition etc. We also confirm that we have not changed/modified the above tender document and in case of observance of the same at any stage it shall be treated as null and void.

We hereby also confirm that we have not taken any deviation from Tender Clause together with other reference as enumerated in the above referred Notice Inviting Tender and we hereby convey our unconditional acceptance to all terms & conditions as stipulated in the Tender Document.

In the event of observance of any deviation in any part of our offer at a later date whether implicit or explicit, the deviations shall stand null and void.

Yours faithfully,

Date: (Signature, name and designation of the Authorized signatory)

Place: **Name and seal of Bidder**

FORM-F
FORMAT FOR INTEGRITY PACT
[To be submitted on Bidder's **Original** Letter Head]

To,
The Chief General Manager,
Ropeways and Rapid Transport System Development Corporation HP Ltd

Sub: Integrity Pact for - (Name of Work / Project)

Dear Sir,
I/We acknowledge that RTDC is committed to follow the principles thereof as enumerated in the Integrity Agreement enclosed with the tender/bid document at **Enclosure-I.**

I/We agree that the Notice Inviting Tender (NIT) is an invitation to offer made on the condition that I/We will sign the enclosed integrity Agreement, which is an integral part of tender documents, failing which I/We will stand disqualified from the tendering process. I/We acknowledge that THE MAKING OF THE BID SHALL BE REGARDED AS AN UNCONDITIONAL AND
ABSOLUTE ACCEPTANCE of this condition of the NIT.

I/We confirm acceptance and compliance with the Integrity Agreement in letter and spirit and further agree that execution of the said Integrity Agreement shall be separate and distinct from the main contract, which will come into existence when tender/bid is finally accepted by RTDC. I/We acknowledge and accept the duration of the Integrity Agreement, which shall be in the line with Article 1 of the enclosed Integrity Agreement.

I/We acknowledge that in the event of my/our failure to sign and accept the Integrity Agreement, while submitting the tender/bid, RTDC shall have unqualified, absolute and unfettered right to disqualify the tenderer/bidder and reject the tender/bid is accordance with terms and conditions of the tender/bid.

Yours faithfully,

Date: (Signature, name and designation of the Authorized signatory)

Place: **Name and seal of Bidder**

Enclosure-I

INTEGRITY AGREEMENT

[To be submitted on Stamp paper of At least Rs.100]

This Integrity Agreement is made at ..... on this ..... day of ..... 20.....

BETWEEN

Ropeways and Rapid Transport System Development Corporation HP Ltd, Shimla (Hereinafter referred as the **'Principal/Owner',** which expression shall unless repugnant to the meaning or context hereof include its successors and permitted assigns)

AND

.....
...

(Name and Address of the Individual/firm/Company)

through ..... (Hereinafter referred to as the

(Details of duly authorized signatory)

"Bidder/Contractor" and which expression shall unless repugnant to the meaning or context hereof include its successors and permitted assigns)

Preamble

WHEREAS the Principal / Owner has floated the Tender (NIT No.....) (hereinafter referred to as "Tender/Bid") and intends to award, under laid down organizational procedure, contract for..... (Name of work) hereinafter referred to as the "Contract".

AND WHEREAS the Principal/Owner values full compliance with all relevant laws of the land, rules, regulations, economic use of resources and of fairness/transparency in its relation with its Bidder(s) and Contractor(s).

AND WHEREAS to meet the purpose aforesaid both the parties have agreed to enter into this Integrity Agreement (hereinafter referred to as "Integrity Pact" or "Pact"), the terms and conditions of which shall also be read as integral part and parcel of the Tender/Bid documents and Contract between the parties.

NOW, THEREFORE, in consideration of mutual covenants contained in this Pact, the parties hereby agree as follows and this Pact witnesses as under:-

Article 1: Commitment of the Principal/Owner

(1) The Principal/Owner commits itself to take all measures necessary to prevent corruption and to observe the following principles:

(a) No employee of the Principal/Owner, personally or through any of his/her family members, will in connection with the Tender, or the execution of the Contract,

demand, take a promise for or accept, for self or third person, any material or immaterial benefit which the person is not legally entitled to.

(b) The Principal/Owner will, during the Tender process, treat all Bidder(s) with equity and reason. The Principal/Owner will, in particular, before and during the Tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential / additional information through which the Bidder(s) could obtain an advantage in relation to the Tender process or the Contract execution.

(c) The Principal/Owner shall endeavour to exclude from the Tender process any person, whose conduct in the past has been of biased nature.

(2) If the Principal/Owner obtains information on the conduct of any of its employees which is a criminal offence under the Indian Penal code (IPC)/Prevention of Corruption Act, 1988 (PC Act) or is in violation of the principles herein mentioned or if there be a substantive suspicion in this regard, the Principal/Owner will inform the Chief Vigilance Officer and in addition can also initiate disciplinary actions as per its internal laid down policies and procedures.

Article 2: Commitment of the Bidder(s)/Contractor(s)

(1) It is required that each Bidder/Contractor (including their respective officers, employees and agents) adhere to the highest ethical standards, and report to the RTDC all suspected acts of fraud or corruption or Coercion or Collusion of which it has knowledge or becomes aware, during the tendering process and throughout the negotiation or award of a contract.

(2) The Bidder(s)/Contractor(s) commits himself to take all measures necessary to prevent corruption. He commits himself to observe the following principles during his participation in the Tender process and during the Contract execution:

(a) The Bidder(s)/Contractor(s) will not, directly or through any other person or firm, offer, promise or give to any of the Principal/Owner's employees involved in the Tender process or execution of the Contract or to any third person any material or other benefit which he/she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the Tender process or during the execution of the Contract.

(b) The Bidder(s)/Contractor(s) will not enter with other Bidder(s) into any undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non- submission of bids or any other actions to restrict competitiveness or to cartelize in the bidding process.

(c) The Bidder(s)/Contractor(s) will not commit any offence under the relevant IPC/PC Act. Further the Bidder(s)/ Contract(s) will not use improperly, (for the purpose of competition or personal gain), or pass on to others, any information or documents provided by the Principal/Owner as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.

(d) The Bidder(s)/Contractor(s) of foreign origin shall disclose the names and addresses of agents/ representatives in India, if any. Similarly

Bidder(s)/Contractor(s) of Indian Nationality shall disclose names and addresses of foreign agents/representatives, if any. Either the Indian agent on behalf of the foreign principal or the foreign principal directly could bid in a tender but not both. Further, in cases where an agent participate in a tender on behalf of one manufacturer, he shall not be allowed to quote on behalf of another manufacturer along with the first manufacturer in a subsequent/parallel tender for the same item.

(e) The Bidder(s)/Contractor(s) will, when presenting his bid, disclose any and all payments he has made, is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the Contract.

(3) The Bidder(s)/Contractor(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.

(4) The Bidder(s)/Contractor(s) will not, directly or through any other person or firm indulge in fraudulent practice means a willful misrepresentation or omission of facts or submission of fake/forged documents in order to induce public official to act in reliance thereof, with the purpose of obtaining unjust advantage by or causing damage to justified interest of others and/or to influence the procurement process to the detriment of the RTDC interests.

(5) The Bidder(s)/Contractor(s) will not, directly or through any other person or firm use Coercive Practices (means the act of obtaining something, compelling an action or influencing a decision through intimidation, threat or the use of force directly or indirectly, where potential or actual injury may befall upon a person, his/her reputation or property to influence their participation in the tendering process).

Article 3 : Consequences of Breach

Without prejudice to any rights that may be available to the Principal/Owner under law or the Contract or its established policies and laid down procedures, the Principal/Owner shall have the following rights in case of breach of this Integrity Pact by the Bidder(s)/Contractor(s) and the Bidder/ Contractor accepts and undertakes to respect and uphold the Principal/Owner's absolute right :

(2) If the Bidder(s)/Contractor(s), either before award or during execution of Contract has committed a transgression through a violation of Article 2 above or in any other form, such as to put his reliability or credibility in question, the Principal/Owner after giving

14 days notice to the contractor shall have powers to disqualify the Bidder(s)/Contractor(s) from the Tender process or terminate/determine the Contract, if already executed or exclude the Bidder/Contractor from future contract award processes. The imposition and duration of the exclusion will be determined by the severity of transgression and determined by the Principal/Owner. Such exclusion may be forever or for a limited period as decided by the Principal/Owner.

(3) Forfeiture of EMD/Performance Guarantee/Security Deposit: If the Principal/Owner has disqualified the Bidder(s) from the Tender process prior to the award of the Contract or terminated/determined the Contract or has accrued the right to terminate/determine the Contract according to Article 3(1), the Principal/Owner apart from exercising any legal rights that may have accrued to

the Principal/Owner, may in its considered opinion forfeit the entire amount of Earnest Money Deposit, Performance Guarantee and Security Deposit of the Bidder/Contractor.

(4) Criminal Liability: If the Principal/Owner obtains knowledge of conduct of a Bidder or Contractor, or of an employee or a representative or an associate of a Bidder or Contractor which constitutes corruption within the meaning of IPC Act, or if the Principal/Owner has substantive suspicion in this regard, the Principal/Owner will inform the same to law enforcing agencies for further investigation.

Article 4: Previous Transgression

(1) The Bidder declares that no previous transgressions occurred in the last 5 years with any other Company in any country confirming to the anticorruption approach or with Central Government or State Government or any other Central/State Public Sector Enterprises in India that could justify his exclusion from the Tender process.

(2) If the Bidder makes incorrect statement on this subject, he can be disqualified from the Tender process or action can be taken for banning of business dealings/ holiday listing of the Bidder/Contractor as deemed fit by the Principal/ Owner.

(3) If the Bidder/Contractor can prove that he has resorted / recouped the damage caused by him and has installed a suitable corruption prevention system, the Principal/Owner may, at its own discretion, revoke the exclusion prematurely.

Article 5: Equal Treatment of all Bidders/Contractors/Subcontractors

(1) The Bidder(s)/Contractor(s) undertake(s) to demand from all subcontractors a commitment in conformity with this Integrity Pact. The Bidder/Contractor shall be responsible for any violation(s) of the principles laid down in this agreement/Pact by any of its Subcontractors/sub-vendors.

(2) The Principal/Owner will enter into Pacts on identical terms as this one with all Bidders and Contractors.

(3) The Principal/Owner will disqualify Bidders, who do not submit, the duly signed Pact between the Principal/Owner and the bidder, along with the Tender or violate its provisions at any stage of the Tender process, from the Tender process.

Article 6 : Duration of the Pact

(1) This Pact begins when both the parties have legally signed it. It expires for the Contractor/Vendor 12 months after the completion of work under the contract or till the continuation of defect liability period, whichever is more and for all other bidders, till the Contract has been awarded.

(2) If any claim is made/lodged during the time, the same shall be binding and continue to be valid despite the lapse of this Pacts as specified above, unless it is discharged/determined by the Competent Authority, RTDC

Article 7 : Other Provisions

(1) This Pact is subject to Indian Law, place of performance and jurisdiction is the

Head quarters of the Principal/Owner, who has floated the Tender.

(2) Changes and supplements need to be made in writing. Side agreements have not been made.

(3) If the Contractor is a partnership or a consortium, this Pact must be signed by all the partners or by one or more partner holding power of attorney signed by all partners and consortium members. In case of a Company, the Pact must be signed by a representative duly authorized by board resolution.

(4) Should one or several provisions of this Pact turn out to be invalid; the remainder of this Pact remains valid. In this case, the parties will strive to come to an agreement to their original intensions.

(5) It is agreed term and condition that any dispute or difference arising between the parties with regard to the terms of this Integrity Agreement / Pact, any action taken by the Owner/Principal in accordance with this Integrity Agreement/ Pact or interpretation thereof shall not be subject to arbitration.

Article 8 : LEGAL AND PRIOR RIGHTS

All rights and remedies of the parties hereto shall be in addition to all the other legal rights and remedies belonging to such parties under the Contract and/or law and the same shall be deemed to be cumulative and not alternative to such legal rights and remedies aforesaid. For the sake of brevity, both the Parties agree that this Integrity Pact will have precedence over the Tender/Contact documents with regard any of the provisions covered under this Integrity Pact.

IN WITNESS WHEREOF the parties have signed and executed this Integrity Pact at the place and date first above mentioned in the presence of following witnesses:

.....
(For and on behalf of Principal/Owner)

.....
(For and on behalf of Bidder/Contractor)

WITNESSES:
1. .....
(signature, name and address)

2. .....
(signature, name and

address) Place:

Dated :

FORM-G

FORMAT FOR LITIGATION HISTORY, LIQUIDATED DAMAGES, DISQUALIFICATION

[To be submitted on Bidder's **Original** Letter Head]

To,
Chief General Manager
Ropeways and Rapid Transport System Development Corporation HP Ltd

Subject: Litigation History, Liquidated Damages, Disqualification for ----------
(Name of Work /Project)

It is hereby declared that our firm (Name of firm with address--) neither disqualified, nor have any Litigation history and no Liquidated Damage imposed on the firm by any Department.

Yours faithfully,

Date: (Signature, name and designation of the Authorized signatory)

Place: **Name and seal of Bidder**

FORM H AFFIDAVIT
(To be submitted by bidder on non-judicial stamp paper of Rs. 100/-
(Rupees Hundred only)
duly attached by Notary Public)
(To be submitted in Envelop-1)

Affidavit of Mr. .....S/o..... R/o.....

I, the deponent above named do hereby solemnly affirm and declare as under:
That I am the Proprietor/Authorized signatory of M/s ……. Having its Head Office/Regd. Office at ……..

That the information/documents/Experience certificates submitted by M/s .....along with the tender for ……. *(NAMEOF WORK*)…… To RTDC Ltd. are genuine and true and nothing has been concealed. I shall have no objection in case RTDC verifies them from issuing authority (ies).

I shall also have no objection in providing the original copy of the document(s), in case RTDC demand so for verification.

I hereby confirm that in case, any document, information & / or certificate submitted by me found to be incorrect / false / fabricated, RTDC at its discretion may disqualify / reject / terminate the bid/contract and also forfeit the EMD / All dues.

I shall have no objection in case RTDC verifies any or all Bank Guarantee(s) under any of the clause(s) of Contract including those issued towards EMD and Performance Guarantee from the Zonal Branch /office issuing Bank and I/We shall have no right or claim on my submitted EMD before RTDC receives said verification.

That the Bank Guarantee issued against the EMD issued by (name and address of the Bank) is genuine and if found at any stage to be incorrect / false / fabricated, RTDC shall reject my bid, cancel pre- qualification and debar me from participating in any future tender for three years.

I, ..., the Proprietor / Authorised signatory of M/s. .....do hereby confirm that the contents of the above Affidavit are true to my knowledge and nothing has been concealed there from..... and that no part of it is false.

Verified at ..... this..... day of .....

DEPONENT

AGREEMENT FORM

This agreement made this day of (Month) (Year), between the Ropeways and Rapid Transport System Development Corporation limited (RTDC), a company incorporated under the Companies Act, 2013 having its Registered Office at US CLUB Shimla (hereinafter referred to as the "RTDC" which expression shall include its administrators, successors, executors and assigns) of the one part and M/s (NAME OF CONTRACTOR) (hereinafter referred to as the 'Contractor' which expression shall unless the context requires otherwise include its administrators, successors, executors and permitted assigns) of the other part. WHEREAS, RTDC, has desirous of construction of (NAME OF WORK) (hereinafter referred to as the "PROJECT") on behalf of the (NAME OF OWNER/MINIST RY) (hereinafter referred to as "OWNER"), had invited tenders as per Tender documents vide NIT No ..... AND WHEREAS (NAME OF CONTRACTOR) had participated in the above referred tender vide their tender dated and RTDC has accepted their aforesaid tender and award the contract for (NAME
OF PROJECT) on the terms and conditions contained in its Letter of Intent No._____ and the documents referred to therein, which have been unequivocally accepted by (NAME OF CONTRACTOR) vide their acceptance letter dated_____resulting into a contract.

NOW THEREFORE THIS DEED WITNESSETH AS UNDER:

ARTICLE 1.0 – AWARD OF CONTRACT SCOPE OF WORK

RTDC has awarded the contract to (NAME OF CONTRACTOR) for the work of (NAME OF WORK) on the terms and conditions in its letter of intent No. _____ dated and the documents referred to therein. The award has taken effect from (DATE) i.e. the date of issue of aforesaid letter of intent. The terms and expressions used in this agreement shall have the same meanings as are assigned to them in the "Contract Documents" referred to in the succeeding Article.

ARTICLE 2.0 – CONTRACT DOCUMENTS

The contract shall be performed strictly as per the terms and conditions stipulated herein and in the following documents attached herewith (hereinafter referred to as "Contract Documents").

RTDC Notice Inviting Tender vide no._____Date:_____and RTDC's tender documents consisting of:

General Conditions of Contract (GCC) along with amendments/errata to GCC (if any) issued. Special Conditions of Contract including Appendices & Annexures, Agreement between RTDC and the Contractor
Scope of work and technical specifications along with amendments/ corrigendum of schedule items, if any.

(NAME OF CONTRACTOR) letter proposal dated_____and their subsequent communication: Letter of Acceptance of Tender Conditions dated _____

RTDC's detailed Letter of Intent No._____dated_____. Agreed time schedule, Contractor's Organization Chart and list of Plant and Equipment's submitted by Contractor.

All the aforesaid contract documents referred herein Article -2 shall form an integral part of this Agreement, in so far as the same or any part thereof , to the tender documents and what has been specifically agreed to by RTDC in its Letter of Intent. Any matter inconsistent therewith, contrary or repugnant thereto or deviations taken by the Contractor in its "TENDER" but not agreed to specifically by RTDC in its Letter of Intent, shall be deemed to have been withdrawn by the Contractor without any cost implication to RTDC. For the sake of brevity, this Agreement along with its aforesaid contract documents and Letter of Intent shall be referred to as the "Contract".

ARTICLE 3.0 – CONDITIONS & CONVENANTS

The scope of Contract, Consideration, terms of payments, advance, security deposits, taxes wherever applicable, insurance, agreed time schedule, compensation for delay and all other terms and conditions contained in RTDC's Letter of Intent No.___dated_____are to be read in conjunction with other aforesaid contract documents. The contract shall be duly performed by the contractor strictly and faithfully in accordance with the terms of this contract.

The scope of work shall also include all such items which are not specifically mentioned in the Contract Documents but which are reasonably implied for the satisfactory completion of the entire scope of work envisaged under this contract unless otherwise specifically excluded from the scope of work in the Letter of Intent.

Contractor shall adhere to all requirements stipulated in the Contract documents.

Time is the essence of the Contract and it shall be strictly adhered to. The progress of work shall conform to agreed works schedule/contract documents and Letter of Intent.

This agreement constitutes full and complete understanding between the parties and terms of the presents. It shall supersede all prior correspondence to the extent of inconsistency or repugnancy to the terms and conditions contained in Agreement.

Any modification of the Agreement shall be effected only by a written instrument signed by the authorized representative of both the parties.

The total contract price for the entire scope of this contract as detailed in Letter of Intent is Rs._____(Rupees_____) which shall be governed by the stipulations of the contract documents.

ARTICLE 4.0 – NO WAIVER OF RIGHTS

Neither the inspection by RTDC or the Engineer-in-Charge or Owner or any of their officials, employees or agents nor order by RTDC or the Engineer-in-Charge for payment of money or any payment for or acceptance of, the whole or any part of the work by RTDC or the Engineer-in-Charge nor any extension of time nor any possession taken by the Engineer-in-Charge shall operate as waiver of any provisions of the contract, or of any power herein reserved to RTDC, or any right to damage herein provided, nor shall any waiver of any breach in the contract be held to be a waiver or any other or subsequent breach.

ARTICLE 5.0 – GOVERNING LAW AND JURISDICTION

The Laws applicable to this contract shall be the laws in force in India and jurisdiction of Shimla Court (s) only.

Notice of Default

Notice of default given by either party to the other party under the Agreement shall be in writing and shall be deemed to have been duly and properly served upon the parties hereto, if delivered against acknowledgment due or by FAX or by registered mail duly addressed to the signatories at the address mentioned herein above.

IN WITNESS WHEREOF, the parties through their duly authorized representatives have executed these presents (execution whereof has been approved by the Competent Authorities of both the parties) on the day, month and year first above mentioned at Shimla.

For and on behalf of:

(Ropeways and Rapid Transport System Development Corporation limited (RTDC)

WITNESS: 1.
2.

For and on behalf of: (NAME OF
CONTRACTOR) WITNESS
1.
2.

FORM OF POWER OF ATTORNEY FOR SIGNING THE BID DOCUMENTS
(On a Stamp Paper of relevant value)

Know all men by these presents, we,..... (name of Contractor and address of the registered office) do hereby irrevocably constitute, nominate, appoint and authorize Mr / Ms ..... son/daughter/wife of ..... and presently residing at…… ....., who is presently employed with us and holding the position of ..... as our true and lawful attorney (hereinafter referred to as the "Attorney") to do in our name and on our behalf, all such acts, deeds and things as are necessary or required in connection with or incidental to submission of bid for **"Engineering, Procurement and Construction of Indoor Sports Hall at Nurpur, Kangra (Himachal Pradesh)"** being developed by the RTDC including but not limited to signing and submission of all applications, proposals/bids and other documents and writings, participating in pre-bid and other conferences and providing information/ responses to RTDC, representing us in all matters before RTDC, signing and execution of all contracts and undertakings consequent to acceptance of our proposal and generally dealing with RTDC in all matters in connection with or relating to or arising out of our Proposal for the said work and/or upon award thereof to us till the entering into of the agreement with RTDC.

AND GENERALLY to act as our Attorney or agent on behalf of us in relation to the bid for **"Engineering, Procurement and Construction of Indoor Sports Hall at Nurpur, Kangra (Himachal Pradesh)"** and to execute and do all instruments, acts, deeds, matters and things in relation to the said Proposal or any incidental or ancillary activity, as fully and effectually in all respects as we could do if personally present.

AND We hereby agree to ratify and confirm all acts, deeds and things whatsoever lawfully done or caused to be done by our said Attorney and that all acts, deeds and things done by our said Attorney in exercise of the powers hereby conferred shall and shall always be deemed to have been done by us.

IN WITNESS WHEREOF WE, ... THE ABOVE NAMED PRINCIPAL HAVE EXECUTED THIS POWER OF ATTORNEY ON THIS ..... DAY OF ..... , 202…..

For

.....
(Signature, name, designation and address) Witness 1.
2. Notarized

B. RTDC REQUIREMENTS

/SCOPE OF WORK

(SECTION-VII)

INDEX

1 SECTION-A: GENERAL
2 SECTION-B: FUNCTIONAL
3 SECTION-C: DESIGN
4 SECTION-D: CONSTRUCTION
5 RTDC REQUIREMENTS- APPENDICS 01 TO 03

SECTION A: GENERAL

1. SCOPE OF WORK

1.1 The following building/ structures/ facilities are to be constructed after developing detailed drawing/ design etc. from the indicative concept drawings, scope of work attached with this document.

1.2 The basic Scope of work of project is :

a) The construction of Indoor Sports Hall (G+1) of Size 43.02 m Length x 32.36 m wide. Total Area of building block: 1916 Sqm.
b) Firefighting works of the Indoor Sports Hall
c) Electrical works of the Indoor Sports Hall
d) Plumbing works including Water supply and drainage works
e) Construction of Pedestrian pathway
f) Construction of underground Septic tank (200 User) size 5mx2mx1m, and soak pit as per standards- 2.5m dia with depth 3M.
g) Construction of underground domestic tank 10,000 litres with vertical centrifugal pump 100 LPM, Head @30M.
h) Construction of overhead PVC tank over steel structure with foundation outside the building with 5,000 litres domestic and 15,000 litres fire tank.

1.3 The indicative broad scope of work of Indoor Sports Building is brought out as under:

1.3.1 Civil Works:

Building works:

a) The Proposed building is composed of PEB - Super structure and RCC- Sub structure
b) The PEB structure is to be fixed over R.C.C. footings. The Height of the Column shaft of the footing is to be raised till plinth level.
c) The Proposed building consist of two floors namely- Ground Floor & First floor.
d) The Height of the Building shall be 7.95m till Roof bottom level inclusive of the plinth level 0.45 meter.
e) The Roof is to be designed as per the average snow load of the site location.
f) The roof shall be pitched roof. The slope of the roof to be at least 22.5 degrees for areas affected by snow.
g) The Superstructure is to be built in steel with Built-up sections as per PEB Standards.
h) The Walls of the Indoor Sports Hall is to be built with Light Gauge steel frame structure with Fibre cement boards as required/ recommended.
i) The walls shall be infilled with insulating material as required/ recommended/as specs.
j) The finishing of the building is broadly specified in the specification sections.

The building's individual area and details of indoor Sports Hall are:

Note:

Areas are as under:			
S.No.	**Floor**	**Floor Area (sqm)**	**Facilities**
1	Ground Floor	**Floor area: 1209**	Multipurpose Hall-1(Double Height), Equipment Store, Fitness Center, Drinking water, First Aid with Attached Toilet & Vestibule, Drinking water Room, Toilet -Male (2 nos W.C. Cubicle, 4Nos. Bath/Change room Cubicle, 3 Nos. Urinals, 3 Nos. Wash basin & Locker Room Space) & Toilet -Female (2 nos W.C. Cubicle, 4 Nos. Bath/change room Cubicle, 5 Nos. Wash basin & Locker Room Space), Handicapped Toilet (1 Nos.), Admin Office with attached toilet, Meeting Room, Entrance Lobby with Reception, Porch (Front and Rear), Staircase upto First floor level
2	First Floor	**Floor area: 541**	Juice bar room, Toilet – Male (2 nos. W.C. cubicle, 2 nos. urinals, 2nos. Wash Basin), Female toilet, drinking water space, Yoga Meditation hall, Equipment Store, Multipurpose Hall -2, Staircase upto First floor level
3	External	**--**	Elevated external Water tank for (Domestic use-5,000 litres+15,000 Litres- Fire) U.G. Water tank for Domestic use -10,000 litres
4	Porch	**Area : 11**	Front & Rear Porch
	Total plinth area	**1761 Sqm**	

a) The Overhead and underground water tank/septic tank will not be counted as story. It shall not be considered for plinth area calculation. The eaves of the roof are also not counted for plinth area calculation.

b) Only 50% of the area of the verandahs & porch has been considered in plinth area calculation irrespective of top being protected or not protected above.

c) Plinth area does not include shafts open to sky above 2 Sqm area However, the shafts/ lift wells covered at top shall be counted at one floor level only.

SCHEDULE OF HARDWARE

S. no.	**tem**	**100 mm brass mortice latch with one dead bolt and a pair of lever handles**	**SS Handle**	**SS Handle**	**Rubber Buff**	**Indicator Bolt**	**SS butt Hinges-35mm thk.**	**SS Tower bolt**	**SS Tower bolt**	**SS Sliding Bolt**	**Hold fast-40x 5 mm flat**	**Lock-100 mm Mortise lock-6 levers-without handle**	**Door stopper-bright finished brass hanging type**	**Door Closer-SS 304-hold open & sliding arm for 1050 mm Door**	**Item Description**
			125mm	**300mm**			**125mm**	**250x 10 MM**	**100x 10 MM**	**250x 16 MM**			**45mm Φ**		
1	D1		2		1	1	4		1	1	6		1		D (750X2100)
2	D2			2	1	1	4		1	1	8		1		D1 (900X2400)
3	D3			2			4	1			8	1		1	D2 (1050X2400)
4	DH	1			1		8	1		1	8		1	1	DH (1000X2400)

S	**tem**	**100**	**SS**	**SS**	**Rubb**	**Indic**	**SS**	**SS**	**SS**	**SS**	**Hold**	**Lock-**	**Door**	**Door**	**Item**

.no.		mm brass mortice latch with one dead bolt and a pair of lever handles	Handle	Handle	er Buffer	ator Bolt	butt Hinges-35mm thk.	Tower bolt	Tower bolt	Sliding Bolt	fast-40x5 mm flat	100 mm Mortise lock-6 levers-without handle	stopper-bright finished brass hanging type	Closer-SS 304-hold open & sliding arm	Description
			600mm	1200 mm			125mm	250 x10 MM	100x10 MM	250x16 MM			45mm Φ		
5	D4		4				8	2		1	8	1	2		D4 (2100X2400)
6	D5		4				8	2		1	8	1	2		D5 (1800X2400)
7	DW2			4			8					1	2		DW2 (2100x3000)
	tem	100 mm brass mortice latch with one dead bolt and a pair of lever handles	SS Handle	SS Handle	Rubber Buffer	Indicator Bolt	SS butt Hinges-35mm thk.	SS Tower bolt	SS Tower bolt	SS Sliding Bolt	Patch Fitting	Lock-100 mm Mortise lock-6 levers-without handle	Door stopper-bright finished brass hanging type	Door Closer-SS 304-hold open & sliding arm For 1050 mm Door	Item Description
			125mm	300mm	600mm	1200 mm	125mm	250 x10 MM	100x10 MM	250x16 MM			45mm Φ		
8	DW1			2			4				8	1	1	1	DW1 (1500x2400)
S.no.	tem	Alu. Handle-powder coated	Sliding shutter-Aluminium lock & handle				SS butt Hinges	Top hung window-Aluminium handle and locking system			Steel Dash Fasteners				Item Description
		125mm-19 mm Φ					125mm	100MM			10x80 mm				
9	W1	1					3	2			10				W1 (1500X2400)
10	W2		2				6				8				W2 (1500X1800)
11	W3		2				12				10				W3 (2100x2400)
12	V1						2	2			6				V1 (1500X600)
13	V2						2				4				V2 (975X600)

1.3.2 Plumbing Works

Internal and external plumbing works of 'Indoor Sports Hall' including drainage and water supply for the following:

a) Drainage and water supply works for all the toilets, drinking water, etc. of 'Indoor Sports Hall' as required/mentioned in the drawings.
b) Drainage system of Rain water from roof as well as immediate building surroundings.
c) Provision of elevated water tank for Fire of capacity 15,000 Litres and Domestic Tank of Cap. 5,000 LItres.
d) Provision of underground water tank for domestic use – 10,000 litres. With centrifugal pump for supply, 100 LPM, Head 30 M.
e) Provision of all the electrical appliance such as :
    I. Geysers for Bathing areas, first Aid room as per drawings
f) Provision of all the accessories such as :
    I. PTMT Liquid soap Container for all wash basins
    II. SS Towel ring for attached toilets
    III. SS Towel Rail for all Bathing area

S. no.	Items as per specifications	Toilet Admin Office	Toilet (H)	Toilet First Aid	Toilet GF - Male	Toilet GF- Female	Toilet FF - Male	Toilet FF- Female	Misc.
A.	**Toilet Wash basin & urinal area**								
1	Wash Basins (630x450mm) + Bottle trap+ Angle Valve + Faucet								
1.a	Under Counter	**1**			**3**	**5**	**2**	**1**	
1.b.	Wall mounted			**1**					
2	Wash Basins (550x400) + Bottle trap+ Angle Valve + Faucet		**1**						
3	Towel ring	**1**		**1**					
4	Paper Dispenser				**1**	**2**	**1**	**1**	
5	Soap Dispenser	**1**	**1**	**1**	**3**	**5**	**2**	**1**	
6	Hand Dryer		**1**		**1**	**2**	**1**	**1**	
7	Urinals (Battery Based-Infrared)	**1**			**3**		**2**		
8	Urinal Partitions- 18mm thk. Granite stone (750x500)	**1**			**4**		**3**		
9	Mirror (600x450)	**1**	**1**	**1**	**3**	**5**	**2**	**1**	
B	**WC Cubicle**								
1	Floor Mounted W.C. + Cistern	**1**	**1**	**1**	**2**	**2**	**2**	**1**	
2	Health Faucets +Bib Cock+ Angle Valve	**1**	**1**	**1**	**2**	**2**	**2**	**1**	
3	SS Grab Rails (600mm)		**1**	**1**					
4	Toi. Paper Holder for W.C.	**1**	**1**	**1**	**2**	**2**	**2**	**1**	
5	Twin coat hooks (C.P. brass)	**1**	**1**	**1**	**2**	**2**	**2**	**1**	
C	**Bathing Cubicle**			**1**	**4**	**4**			
1	Shower fitting (CP brass			**1**	**4**	**4**			

	shower rose)								
2	Facucet -telephonic wall mixer								
3	Towel Rail			**1**	**4**	**4**			
4	Twin coat hooks (C.P. brass)			**1**	**4**	**4**			
D	**Kitchen Sink (600x450250)**								
E	**Gyser**		**1**	**1**	**1**	**1**			
F	Water Cooler- SS with storage- 80 Litres.								**2**

1.3.2 Electrical Works

1. Internal and external electrification of Indoor Sports Building Complex (with LED), Pathway etc. including :
   a) All conducting, cabling/wiring works
   b) MCB Distribution Boards including MCB, RCCB
   c) Light Fixtures, switch sockets, fans, exhaust fans
   d) Earthing
   e) Lightening Arrestor
   f) Electric Connection from the nearest electric pole (To be assessed by the Contractor during the site visit).

2. Provision of main power supply.
3. Provision of fire detection & alarm system. Provision of fighting system as per standard along with fire extinguishers.
4. Provision of water coolers with RO and hand driers.
5. Provision of exhaust fans as per drawing and specification

1.3.3 Miscellaneous Works

1. Development of site
2. Provision of Footpath 1.5m wide around building for pedestrian movement with edges finished with kerb stone all along the length of the pathway as per drawing.
3. Provision of water supply system, storm water drainage system and septic tank for sewage.
4. Proposed Drainage and storm water line to be connected to existing drain line.
5. Provision of one Main gate and one Secondary gate as per drawings.
6. Relocation of services, demolition of structures, if any falling in the foot print of proposed building.
7. Provision of culvert wherever required.
8. 750mm wide Plinth protection required all around the building

The indicative broad scope of work of Indoor Sports Building for Services

Govt. of Himachal Pradesh intends to setup a Multipurpose indoor sports hall Nurpur, Kangra Himachal Pradesh on EPC basis, as per the detailed provided in tender Document. The detailed drawings prepared by the EPC Bidder may differ in internal design, the total built up area shall remain the same as per area program and necessity of the system and requirement are fulfilled.

1. PROJECT OBJECTIVE

Himachal Government intends to the construction of Multipurpose indoor sports hall Nurpur, Kangra (H.P.) on EPC basis whereas EPC Bidder shall carryout the Engineering, Design,

Procurement of materials and Construction/installation of all the works listed below, along with associated works as outlined in this tender document but not limited to. For this purpose, the Bidder shall conduct all necessary field tests and surveys to satisfy / verify himself regarding the correctness of the data furnished vis-à-vis actual condition. No claim whatsoever will be entertained for any variation between the actual site condition met with during the execution of the work and those indicated herein.

The broad items of works covered are listed below:

- Master Planning including functional analysis, workflow analysis giving due regard to the medical equipments.

- Design development based on the indicative concept plans including preparation of architectural brief, design concept, concept for services etc.

- Detailed design engineering including architectural design and construction documents (based on the approved option), structural engineering, electrical engineering, PHE Engineering , ventilation plans fire fighting /fire detection and protection plan Fire Alarm &, HVAC system, etc as required to complete the project.

3.1. General Scope of Work:

1. The detailed scopes of work are project specific. However, any item of work required to be carried out as per the Contract for proper satisfactory completion and completion of system of the work with good standard of workmanship shall be deemed to be included in the scope of work, with no additional cost for such items, whether, or not it is specifically included / described in the Schedule of Quantities.

2. The EPC Bidder shall ensure to meet the schedule milestones, quality and safety requirements of all works.

3. The EPC bidder shall work in close co-ordination with the Engineer-in-charge and Employer's Representative and shall attend all meetings to meet the schedule and quality requirements of the Work.

4. The EPC Bidder shall make his own arrangement for the protection and safety of his material and equipment at site. The Contractor shall also make his own arrangement for the electricity and water for construction purpose. The EPC Bidder is to ensure the proper housekeeping of the Site at all times to the satisfaction of Engineer-in-charge so as to Work in a very safe and clean manner.

5. The EPC bidder shall ensure timely submission of all reports, test results, samples for approvals.

6. The EPC bidder shall arrange his own access to the Site in all seasons and nothing shall be paid extra for temporary roads/ access to the site. The contractor shall maintain and keep in good condition all the access to the site at his own cost.

7. The EPC bidder shall carry out all the survey & layout works in relation to the work. The EPC Bidder shall make the reference pillars etc. required for setting out of the buildings and shall be responsible for safeguarding them till the completion of the Contract.

8. The EPC bidder shall submit his detailed Construction Program within 15 days from award of Letter of commencement of work /work order based on the milestones given in the tender documents describing in details the mobilization and requirement of labour and equipment in the form of CPM analysis and notes, working process for main activities / critical activities / new activities, Monitoring of work Progress, Financial Planning and cash flow charts, Survey and layout, Construction methodology, Quality plan including mix design requirements, Approved external Laboratory facilities, Testing frequencies, Acceptance Criteria, Calibrations, Control of Non-Conformities, Details of Site Quality Records, Various documentation in a formats approved / issued by Engineer-in-charge, performance of tests etc, Approved vendor list for various standard materials like Cement, steel, bitumen, concrete frames, tiles, plumbing and electrical fixtures, wood, plywood, SS steel and accessories and flushed doors etc.

9. The EPC bidder shall prepare requisite documents, its submission on time, coordination, follow-up with concern statutory Authority e.g. Police/ Labour / Health/ Power/ Water / Telecommunication and other statutory Authorities to obtain requisite permission, NOC, completion supply and avail their facilities and to perform legal formalities to avoid any encumbrance on Work program.

10. The EPC bidder shall submit all necessary reports and data's required for monitoring the progress and quality of Works mentioned in the Scope of Work and in the formats approved by Engineer-in-charge.

11. Shop drawings for all fabrication work of permanent as well as temporary structures for approval of Engineer in charge before execution at site.

12. As Built drawings for all works mentioned in the scope of Work.

13. Site safety management and Supervision.

14. Construction of labour camp inside the campus/outside campus as per requirements.

15. Barricading with proper illumination & hording of the site at no extra cost. The EPC bidder shall provide and maintain a suitable approved temporary Barricading and gates to adequately enclose all boundaries of the site for the protection of the public and for proper execution of the works including all costs incurred for the security of the works and in accordance with the requirements of the Engineer - In - Charge and regulations of local authorities. These shall be altered, relocated and adapted from time to time as necessary and removed after complete handing over the work up to the satisfaction of Client.

16. The EPC bidder shall include all taxes as applicable and cost towards packing, handling, transportation and placing in position in the rates quoted for scope of work specified in tender document.

17. The cost towards all the items listed above is deemed to be covered in the rates quoted by the EPC bidder as per tender document.

18. The EPC bidder shall have to make Coordination with other agencies engaged at the site by the employer at no extra cost.

19. EPC bidder shall prepare and deliver the inventory for all the works for handing over of project as per approved format of enginner in charge .

DOCUMENTATION, INSTRUMENTATION & RECORDS

The following items shall be deemed to be included in the tendered cost and no additional payment shall be made:

"Operational and Maintenance Manual" (During Defect Liability Period) Manual describing access arrangements to various portion of the Project for maintenance and repair without affecting the intended operation of the project, important arrangements from the point of view of structural safety, procedure for minor and major repairs of each components of the project, renewals of finishes and treatments periodically shall be supplied by the EPC bidder free of cost.

The EPC bidder shall train the persons nominated by the Client. during handover of the equipment at site free of cost and wherever required during DLP regarding the operation and maintenance of the various equipment being erected in connection therewith. The persons so nominated shall be supplied with a set of necessary literature, operating instructions, wiring diagrams, etc. so as to enable them to attend to minor faults and maintenance of the equipment at a later date. For these purpose three copies of the operating instructions, literature, wiring diagrams etc. shall be supplied to the employer soon after Installation, Testing and commissioning of the said equipments.

"Quality Assurance Manual" covering mix-designs, materials, testing, statistical quality control, etc. shall be prepared and supplied by the EPC bidder free of cost well before starting the work.

"Construction manual" covering various aspects of construction methods, difficulties faced and how they were overcome during execution etc. shall be supplied by the EPC bidder free of cost at the time of completion of work.

All the records of testing material reports, material challans, labour reports, etc. are to be maintained by the EPC bidder. Records connected with the execution of the work should be maintained in a proper manner. The registers/files, wherein important data such as record of the mandatory test, record of hindrances, record of receipt and supply of materials, record of issue of drawings/design etc. are kept should be properly bound and page numbered. These records should be maintained under the signature of designated senior officials.

Following check-points are suggested:

i. The registers are to be properly bound and having machine numbered pages.
ii. The registers to keep record of important data like mandatory test, hindrances etc are to be issued under the signature of designated senior officer/ Engineer in charge.
iii. Records to be maintained properly with signatures of EPC bidder/ his authorized representative and attestation of the designated officers/ Engineer in charge.
iv. No tampering/manipulation is permitted in these records. Corrections, if any, shall be duly signed and attested by the Engineer in charge/ Senior Officer.
v. Quality registars as per IS/CPWD with requirement.

3.2. Project Specific Scope of Work:

The Multipurpose indoor sports hall Nurpur, Kangra Himachal Pradesh

2. DESIGN OVERVIEW

The EPC bidder is expected to prepare all good for construction drawings and shop drawings for structure and Mep works. Architectural drawings will be provided by RTDC

A. INDOOR SPORTS HALL

The building will be designed as per the concept design norms provided and the detail area requirement provided in tender document. The building would be fitted with following Engineering services:

- Civil works
- Electrical works
- PHE works
- Fire alarm
- HVAC system
- Interior as per specification

3. SCOPE OF WORK

- **Mobilizing of Design Team**

The EPC bidder shall mobilize the design team required to design the project and intimate the Client with the detailed CV of the design team within 15 days of the award of the contract. The design team shall closely work in association with Client/Associate consultant's head office and Client to get the concept plan and detailed design approved. The approval process will include signing of the final concept plan and detailed drawings from Client/ associate consultant.

- **Preparation of submission drawings**

The EPC bidder would be required to prepare, submit and obtain all necessary statutory approvals before commencing any construction activity at site.

- **Preparation of Detailed Design drawings for construction**

The EPC bidder will prepare submit and seek approval from Client for all materials for Construction drawings for architectural, structural, MEP services etc.

- **Site Acceptance and Mobilization/Demobilization**

a) **Acceptance of Site**: In accordance with these specifications, the EPC Bidder shall have examined the site and familiarized himself with all existing conditions. He shall accept the site in its existing condition at the time of award of contract.

b) **Permits and Licenses:** Except as expressly stated in the Employer's Responsibilities, the EPC Bidder shall obtain all permits and licenses necessary for the execution and completion of the Works. He shall also give the Employer a copy of all relevant correspondence and other documents relating to the permits and licenses, approval/NOC.

- **Temporary Works**

The EPC BIDDER shall design, install and maintain all temporary facilities required for the construction of facilities under this contract Package, which he requires on or at the site throughout the execution of the work, and remove the same on completion of the works. He shall provide all such buoying, fencing, watching, lighting, connections to public utilities etc. as he needs or as required by authorities and shall install and use his temporary facilities in accordance with all statutory regulations and the requirement of the relevant authorities.

The EPC BIDDER shall submit his plan for temporary works to the Employer/ Client, for approval.

Before or upon completion of work, unless otherwise required or directed, preparatory structures, installations and utility services shall be disconnected and removed from the site.

- **Utilities**

Temporary utilities used for construction shall have to be adequate for the intended uses and not to be overloaded or otherwise used or arranged in any manner endangering persons, premises or works. Connections shall be properly made, lines and wiring securely anchored in place and protected against accidents.

a) Water

The EPC BIDDER shall provide his own arrangements for sourcing and for distribution adequate supply water for the Project including:

Drinking water: providing and maintaining canisters, coolers or connected drinking fountains of sufficient number to reasonably serve the Project.

Construction water: providing and maintaining temporary water service and distribution of adequate capacity for construction.

b) Electricity

The EPC BIDDER shall make his own arrangement for power supply.

If found necessary, the EPC BIDDER shall provide and maintain generators including a stand-by generator of adequate capacity to meet his additional Power requirements.

The EPC BIDDER shall make his own arrangements as outlined hereunder:

- Distribution of adequate capacity for power, lighting and other construction needs.
- As necessary to properly and safely perform work at enclosed spaces or under hazardous conditions. Likewise, providing lights for night work/ protection as necessary.
- Temporary electrical systems shall comply with the local codes and regulations.

c) Waste and Rubbish

The EPC BIDDER shall provide regular daily clean-up and removal of trash, waste, scraps, construction debris, etc. from site and temporary work yard and shall arrange for disposal of waste and rubbish to appropriate disposal areas.

d) First Aid and Fire Protection

i. Emergencies: The EPC BIDDER shall maintain the lists of nearest available police, hospital or medical services at the EPC Bidder's Site Office and the same are to be displayed at a number of locations & work places.
ii. Fire Protection: The EPC BIDDER shall establish and submit the following measures to the Client/ Employer.
    - Establish appropriate emergency escape routes and procedures;
    - Maintain fire extinguishers, connected hoses and other facilities necessary for reasonable fire-fighting action at the site and temporary work yard;
    - Provide and maintain a first aid kit containing bandages, medicines and sterilized materials for first aid treatment of minor injuries at the EPC BIDDER's Site Office.

e) Access

Access to structures such as scaffolds, ladders, ramps, hoists etc. shall be provided, maintained and operated as necessary.

f) Storage Areas

Storage and shop areas shall be provided, arranged and maintained at approved locations as necessary to properly store, handle and fabricate the various materials and equipment required.

g) Protection of the Public

The EPC BIDDER shall provide barricades and enclosures as necessary for public protection.

Environmental Protection

The EPC Bidder shall comply with all the conditions stipulated by the relevant statutory and regulatory organization of Govt. of Himachal Pardesh.

Fires

Fires and burning of rubbish on the Site are not permitted. Where fires or burning is permitted, the EPC bidder shall prevent the structures which are to be preserved from staining, smoke and damage. The EPC bidder shall restore, clean and make good stained or damaged work to new condition.

Disposal of Waste and Cleanliness

The EPC bidder shall not bury rubbish and solid waste materials on the Site and he shall not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into the waterways, storm water drainage or sanitary sewers. The EPC bidder shall keep all pavements and areas leading to and from the site, clean and free of mud, dirt, and debris at all times for movement of vehicles and pedestrians.

Drainage

The EPC bidder shall provide temporary drainage and pumping facilities as necessary to keep the areas of work site and adjoining areas free from water logging and flooding.

Pollution Control

The EPC bidder shall cover or wet down dry materials and rubbish to prevent blowing dust and debris, and provide dust control for temporary roads and yards. The EPC bidder shall take all measures necessary to ensure that no pollution of the waterways or any land areas occurs as a result of his activities. He shall undertake at his own expense all measures necessary to clean up or otherwise rectify any pollution arising from his activities under this Contract to the satisfaction of the Employer.

Environment

The EPC bidder prior to the commencement of works shall prepare and implement a Environment Management Programme. The EPC bidder shall deploy most suitable construction equipment to minimize the suspension of fine sediments at the work site.

- **Submission of Documents during Project Execution**

Programme of Works

The EPC bidder shall prepare and submit (both hard copy and soft copy) to the client/ Employer .

- Detailed CPM Schedule showing the various activities of the Work using MS Project
- List of designs/drawings/documents along with their schedule of submission.

- The above shall be updated every month and submitted to the Employer.
- Detail 3d building infrastructure modeling.

Work Schedules, Survey Data & Drawings

The EPC bidder shall prepare and submit construction schedules, survey data, and field drawings to illustrate the appropriate portion of work. The work items shall be described and related to responsibility, fabrication, layout, and setting or erection details as specified in appropriate Sections.

The EPC Bidder shall keep allowance in program of works for any stoppages during monsoon period, and he has to take all necessary measures to protect his equipment and the partly completed structures. The EPC bidder is expected to build such stoppages of work during monsoon in his overall schedule for completion. The Employer will not entertain any claims from the EPC Bidder on this account.

All the drawings shall be submitted in Six sets in hard copy and a soft copy (in AutoCAD format).

- **Maintenance Plan**

General

The EPC bidder shall prepare maintenance plan covering all aspects of the works for the review of the Employer. This plan shall be prepared to ensure that the design life periods stated are met in full and where no design life periods are stated, the maintenance plan shall be prepared to maximize the serviceable life.

Maintenance Document

The EPC bidder shall provide six copies of the maintenance plan and manuals to the client.

Weekly and Monthly Progress Reports

The EPC bidder shall maintain a daily log describing the important events pertaining to the Works, (the working hours, the number of laborers employed, effective operation time of equipment, overtime hours), progress made in the Works. This daily log shall be submitted to the client / Employer. Compilation of these logs and their summary shall be submitted to the client/ Employer as Weekly Progress Report in three (3) copies by middle of the next week.

The monthly progress reports shall include progress photographs taken at a fixed point and angle. The photographs shall be sufficient in numbers and locations to record the exact progress of works. The colour photographs shall be in size 200 mm x 250 mm and the soft copy containing the digital version of the same shall be provided.

The EPC BIDDER shall furnish the client/ Employer with three (3) copies along with soft copy of the monthly progress reports within seven (7) days after the end of every month.

- **Design & Drawing Submissions**

Design Submissions – General

The scope of drawings listed in this tender document is issued for information and guidance to the extent mentioned in the Tender document. EPC bidder shall make all arrangement and design drawings and submit the same for approval to the client/ Employer as directed by engineer incharge after getting vetted by approved institution. Detailed Engineering shall be done by the EPC bidder. The EPC bidder shall not be entitled to any extension of time for completing construction/commissioning or any other relief on account of delay caused due to providing any clarifications or in resubmitting any designs and drawings.

The EPC bidder shall not change any design and drawings reviewed by client / Employer, without submitting such revised designs and drawings for the review of Employer.

The EPC BIDDER shall submit for the approval of client/ Employer, progressively from the date of receipt of the Letter of Award, Six (6) copies along with soft copy (AutoCAD) of the following:

a) Detailed Design /Drawings for Architectural, structural, MEP services
b) Concept Design drawings for Architectural, structural, MEP services etc.
c) Detailed Design drawings for Architectural, structural, MEP services etc.
d) Elevations (all), sections (as required), 3D views of all the buildings with actual finishing schedule, interior views with actual finishing schedule, bird's eye view, fly around and walk through as per tender document.
e) Concept drawings of landscaping and horticulture drawings along with plantation plan external lighting as per tender document.
f) Detailed drawings of landscaping and horticulture drawings along with plantation plan
g) Area calculation
h) General arrangement drawings of all structures
i) Cross sections and other details showing important particulars such as overall dimensions, clearances, etc.
j) Technical Specification/catalogues of all standard bought-out items.
k) All drawings including shop fabrication/manufacturing drawings. These will include, but not be limited to assembly, sub-assembly, key components, etc. However, two week prior to fabrication, fabrication and part drawings shall be made available to the client/ Employer.
l) Wiring drawings and equipment inter-connection diagrams of local control panels & Single Line Diagram of facility power distribution.
m) All design calculations pertaining to all structures along with STAAD/Etab models and services.
n) A further digital copy (in AutoCAD format and other relevant format) of the submission shall be given on soft editable format. This digital copy shall include the full submission with scanned copies of any documents prepared by hand.

o) Technical data sheet for all the equipments/ fixtures items.

The list of submission will however be discussed with the EPC bidder after the award of work.

- **Submission of Calculations**

All calculations submitted for the client/ Employer's approval shall comply with the following:

A. Each calculation page shall be uniquely numbered.
B. Each section of calculations shall have a Table of Contents, including page numbers.
C. Calculations shall be accompanied by all necessary sketches or extracts from drawings.
D. Calculations shall include introductions explaining the purpose of the calculations and the methods and design philosophies adopted. This shall clearly state the Standards on which the calculations are based.
E. Equations and values from International Standards and Codes of Practice are to be clearly referenced which are used in the design shall be attached to the submission.
F. Where values used in the calculations are brought forward from previous calculation pages, the page reference shall be included.
G. At the end of each section there shall be a summary, listing the conclusions of the calculations, and referring to construction drawings.
H. If calculations are revised due to design changes or corrections or comments of the client/ Employer, the calculations sheets shall be clearly marked with a revision letter.
I. All calculations shall be signed / initialed by the designer and design verification engineer.
J. The design calculations shall be written in English. In case any software is utilized to perform the calculations a sample set of manual calculations with references of various formulae used shall also be submitted for proper verification.

- **Submission of Drawings**

All drawings submitted for the client/ Employer's approval shall comply with the following:

A. All drawings shall be in metric (mm) dimensions, and be finally prepared in ink with legible lettering on appropriate size drawings using AutoCAD. The submitted prints shall be clearly legible throughout and there shall be no ambiguity.
B. All drawings shall be submitted in digital format in soft copy, as well as Six (6) hard copy print outs.
C. Drafting Standards employed in the preparation of all drawings shall be sufficient to produce legible drawings.
D. Drawings from various sub-contracting services, specialist suppliers etc. shall also be presented in a similar manner to provide a matched set of drawings.
E. All drawings shall clearly show the status and revision of the drawings. Revised drawings shall clearly indicate the nature and details of the revision work and also revision cloud & revision mark shall be marked wherever revised.

F. All drawings shall clearly identify the drafts-person responsible together with the identity of the drawings checker.
G. Each drawing shall show the scale(s) of the components illustrated by the drawing related to the original drawing size, A0, A1, A3 etc.

- **Inspection of Drawings at Site**

The client/ Employer shall have the right at all reasonable times to inspect all drawings at the premises of the EPC BIDDER or call for any drawing to be given to client/ Employer's office.

- **Manuals and Technical Data**

A) Manuals

The EPC BIDDER shall supply Five (5) hard copies along with One (1) soft copy (in editable format) of Erection & Installation Manuals, Operation Manuals, Spare Parts Manuals and Inspection and Maintenance Manuals and safety manual prior to the starting of erection. Recommendations of the manufacturer in respect of preventive maintenance, trouble shooting, and breakdown maintenance and over haul shall be brought out in the inspection and maintenance manuals. Soft copies of all drawings shall be supplied.

B) Technical Data

(i) On completion of the works and before handing over possession to Employer, the EPC Bidder shall supply Five (5) hard copies together with One (1) soft copy of the following:

o Shop drawings of all wearing parts and also major assemblies and minor assemblies which require unit replacement;
o All "As Built" Drawings of equipment, civil / structural, all engineering and medical services & other services.

(ii) Complete technical data and dimensional drawings of all bought out product/ items in the system, shall be furnished - Six (6) hard copies together with One (1) soft copy of the following:

o List of recommended spare parts.
o Parts catalogues in the case of all equipment /assemblies illustrated with part numbers in drawings both for electrical and mechanical items & other items.

- **Tools and Maintenance Equipment**

A list of complete set of tools/tackles and instruments required to be provided for satisfactory maintenance of the Works shall be furnished.

- **As Built Drawings, Design and Final Construction Report**

Before submitting a request for Taking over Certificate, the EPC BIDDER shall ensure that it has furnished to the Employer all required documents including but not limited to Two (2) sets of as-built drawings in hard copy and One (1) set in soft copy, final design report in the supporting of as-built drawings and a final construction report as draft. And within thirty (30) calendar days after receipt of comments from the Employer, the EPC Bidder shall submit Six (6) sets of the Final Construction Report and Six (6) sets of Final As-built drawings & Design documents. As-built drawings of the works consists of two (2) sets of original size copies (white print) and six (6) sets of bound copies reduced to A3 size. All documents and drawings will be also delivered in editable soft copy (drawings in Auto-CAD format, documents in other required formats and soft copy of the file used in software on which design was carried out).

Before submitting a request for Taking over Certificate, the EPC BIDDER shall ensure that it has furnished to the Employer all required documents including but not limited to six copies of manuals for equipment installation, commissioning, operation and maintenance and the drawings/ documents etc., covering all aspects of the Works for review. This plan shall be prepared to ensure that the design life periods stated are met in full and where no design life periods are stated, the maintenance plan shall be prepared to maximize the serviceable life. In the event the EPC BIDDER makes any changes effecting such submission the EPC Bidder shall submit afresh such document duly revising to that extent.

- **Quality Control and Assurance**

The EPC BIDDER will be required to adopt a system of self-certification in accordance with his general quality plan and the appropriate detailed quality procedures. The quality system shall comply with Standards of ISO 9001. The EPC BIDDER shall submit quality control manual for ready reference for quality procedures for construction.

Quality Plan and Quality Procedures

The EPC BIDDER will be required to submit his complete General Quality Plan to the Employer within four weeks of the Commencement Date. A designer's quality plan will be accepted as an interim measure to permit design work to be started in advance of the preparation of the General Quality Plan.

Detailed Quality Procedures for each element or item of work must be submitted to the Employer for review at least four weeks before that work is due to commence. Detailed Quality Procedures are required for all items manufactured prior to delivery to site.

The EPC BIDDER shall monitor his performance of executing his Works against two levels of certification:

The completion of individual work items

The completion of activities listed in the Programme.

In addition to the certification of the completion of work items and activities, the EPC BIDDER shall be required to issue the Quality Assurance (QA) certificates concerning the Quality Plan, Quality Procedures and Construction Documents.

The Employer may monitor the EPC BIDDER work against the EPC BIDDER Quality Plan and Quality procedures. The Employer may do this by spot checks, and/or by continuous monitoring of the work. The Employer may also do this by carrying out compliance audits periodically against the EPC BIDDER Quality Procedures. The frequency and intensity of such checks will depend on the proven reliability of the EPC BIDDER as work progresses. Each non-compliance with the Quality Plan shall be notified promptly to the Employer by the EPC BIDDER, together with proposals for remedy of the non-compliance. The absence of monitoring of or commenting on quality aspects as above by the Employer shall not absolve the EPC BIDDER from any of its contractual obligations and/or shall not entitle the EPC BIDDER for any claim.

Improper Certification of Unsatisfactory Work

If the EPC BIDDER or its personnel repeatedly confirms/declares a work as being satisfactory when such work is not satisfactory, the client may reject such work any time during the currency of the Contract and instruct the EPC Bidder to re-execute such work in full or a part thereof without any implication to the Employer. In case of improper certification and/or EPC Bidder's failure to rectify, the Employer may proceed as per the Contract .

Submission and Certification of Construction Documents

The EPC BIDDER shall submit a Design Certificate (in duplicate) and Design Check Certificate whenever he is submitting Construction Documents to the Employer for review. Construction Documents submitted without the relevant Design Certificate will not be reviewed.

The EPC BIDDER is to ensure that all Construction Documents submissions are in a form that enables the Employer to review the Construction Documents as required by the Contract without delaying completion of the Works.

Certificates for Work Item Completion

Readily identifiable Work Items must be certified as checked and found satisfactory by

a) EPC BIDDER's surveyor responsible for checking and certification
b) EPC BIDDER's supervisor responsible for checking temporary works, material cleanliness, dimensions (not checked in (a) above), workmanship and all other matters to enable him to certify that the item of work complies in every respect to the contract.

The Work Item Completion Certificate shall be checked and approved by the EPC Bidder's Quality Manager.

Each Work Item Completion Certificate must be identified by a unique and appropriate reference number.

If the Employer is not satisfied that the works have been carried out satisfactorily as certified, the Employer shall raise a non-conformance report to which the EPC Bidder shall respond stating his proposals for rectifying the non-conforming item and what action will be taken to prevent recurrence. The Employer may reject such work any time during the currency of the Contract and instruct the EPC Bidder to re-execute such work in full or a part thereof without any implication to the Employer. In case of recurrence/failure of the EPC BIDDER to rectify, the Employer may adjust the Contract price by deducting the value of such work.

Any consequences in respect of any revisions arising out of Work Item Completion Certificates being returned with comments shall not be treated as a compensation event.

Certificates for Activity Completion

When a section of work has been completed satisfactorily, the EPC Bidder shall certify that the activity has been completed in accordance with the Contract.

The Activity Completion Certificate shall be checked by the EPC BIDDER ’s Quality Manager and confirmed by the EPC BIDDER. The Designer’s Representative shall also certify that the activity has been completed in conformance with the relevant Construction Documents and the Employer’s Requirements.

The Activity Completion Certificate shall list the reference numbers and dates of Work Item Completion certificates that have been relied upon by the signatories to the Activity Completion Certificate.

Each Activity Completion Certificate shall have attached to it, copies of any materials test certificates which were received after signing the relevant Work Item Completion Certificates and which have not been submitted to the Employer under separate cover during the period between the signing of the Work Item Completion Certificate and the preparation of the Activity Completion Certificate.

- **Field Surveys and Investigations**

General

The EPC BIDDER shall carryout the engineering design and prepare drawings for the various components under this specification, based on the data on field surveys and investigations, including that of Temporary Works.

The EPC BIDDER may carry out all necessary investigations to supplement and complete his design data, to satisfy them self. The soil investigation provided in tender document are indicative.

The EPC bidder shall, at his own expense, carry out all the necessary surveys, measurements and setting out of the works and shall for this purpose engage well qualified, experienced and competent land surveyors.

Setting Out

The EPC bidder shall establish working bench marks related to the Reference Bench Mark in the area soon after taking possession of the site. The Employer shall provide the EPC bidder with one Permanent Bench Mark and its datum. These marks shall be maintained until the works reach finished formation level and are accepted by the Employer.

The EPC bidder shall be solely responsible for safe-guarding all survey monuments, bench marks etc. All dimensions and levels shown on the drawings or mentioned in documents forming part of or issue under the Contract shall be verified by the EPC BIDDER on the site and he shall immediately inform the Employer of any apparent errors or discrepancies in such dimensions and levels.

Post Construction Survey

The completion of the works will be examined by the EPC BIDDER in the presence of the Employer. During these examinations, the EPC BIDDER shall perform the survey, which shall be used to prepare a final drawing showing all dimensions, elevations and cross sections of the "As Built" conditions of the structures. The EPC BIDDER shall be required to remove excess materials or place additional materials, as directed by the Employer, in order to comply with the Contract Documents. EPC BIDDER shall submit the final location of all structures with reference to the Master Grid, which shall show the actual position of each structure and deviation from the theoretical position.

Employer's Responsibilities

Datum Points and Levels: The Employer will give the reference Bench Mark in the vicinity of the Project Site and the EPC BIDDER shall establish working benchmarks linked to this and reduce to Chart Datum (CD). The EPC BIDDER prior to the start of works shall confirm the location and details of datum points and levels. The EPC BIDDER shall convert all the levels accordingly with respect to CD.

EPC BIDDER Working Area

The Employer shall provide land area limited to the designated site within the Project Site for the EPC BIDDER's working area.

4. MEP Design Objective

The MEP 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 3 Certification. This goal shall be achieved by adopting the following fundamental principles:-

- By Optimizing Site Potential
- By Optimizing Energy Use
- By Optimizing Building Space & Material Use
- By Enhancing Indoor Environmental Quality
- By Optimizing Operational & Maintenance Practices

- Proposed building envelope shall be efficiently designed having very less exposed area in West / South-West / North-West direction

MEP system design shall be based on compliance with the local and national codes, standards, bye-laws & regulations such as latest NBC, ASHRAE, ECBC, LEED India, NEC, BIS, NFPA, SP-35, NFC and IEC etc.

The scope of MEP work shall include complete design, approval from client, supply, installation, testing, commissioning, & handing over in satisfactory working condition. Specification & list of make given in the tender shall be followed. The detailed scope of MEP work shall be as under:-

6.1. ELECTRICAL WORK

6.2.1. Source of Power:

The power will be provided from the existing system to the building panel as per requirement.

6.2.1.1. Light & Power Wiring System:

The wiring in all the areas of the Building shall be provided with FRLS insulated flexible Copper Wiring in recessed / surface MS conduits. The wiring installations shall conform to IS-732:1963. The wiring for lights shall be with FRLS insulated flexible Copper Conductor wires of 1.5 sq. mm size and power wiring shall be carried out with 2.5/4.0/6.0 sq. mm FRLS flexible Copper Conductor wires. Colour Codes shall be maintained for the entire wiring installations, i.e. Red, Yellow and Blue for the phases, Black for the neutral and Green for earth.

All electrical wires shall run through one side of the corridor ceiling and communication / data wiring shall run through other side of the ceiling to keep distance between electrical and low current cables. Minimum distance between LV/LT cables would be kept as per stipulated norms in case electrical & data cables are running parallel to each other.

6.2.2. Electrical Point detail in various areas

Electrical Point detail in various areas : Will be as per final approved drawings.

Internal Area Lighting Fixture & Recommended Illumination Levels:

1. Sufficient lighting in the Cabin and Common Areas like Rooms, Lobbies, passages, wash rooms, stair cases, lift lobbies, etc.

Specification of Light Fittings & Fans		
10 W Bulk head Light (Cat no-Bajaj Lighting BIBWP 10W LED or equivalent as specified in the approved list of make.)	Each	4
5W Mirror Light (Cat no-Bajaj Lighting BCLSB 05 WH or equivalent as specified in the approved list of make.)	Each	11

20W Pendant Light 4 ft. LED (Cat no-Bajaj Lighting BPTX 20W LED 4F WH or equivalent as specified in the approved list of make)	Each	53
18W Recesed mounted LED circular Downlighter (Cat no-Wipro Model No LD06-221-XXX-57-IB or equivalent as specified in the approved list of make)	Each	26
18W Surface mounted LED circular Downlighter (Cat no-Bajaj Lighting BGSLO SLEEK SURFACE 18W WH RD or equivalent as specified in the approved list of make)	Each	11
20W Wall/Surface mouted 4 ft. LED (Cat no-Bajaj Lighting BCLSB 20 WH or equivalent as specified in the approved list of make)	Each	4
15W Surface mounted LED Square Downlighter (Cat no-Bajaj Lighting BGSLO SLEEK SURFACE 15W WH SQ or equivalent as specified in the approved list of make)	Each	12
36W (Nominal) 2x2 ft Recess Mounted LED Luminaire (Cat no-Bajaj Lighting BCTBLR 36W ZTN WH or equivalent as specified in the approved list of make.)	Each	30
4X14W 2X2' Surface mounted LED Square Downlighter	Each	R.O
12W Recessed mounted LED circular Downlighter (Cat no-Wipro Model No LD06-151-XXX-57-IB equivalent as specified in the approved list of make.)	Each	33
24W Hanging Light LED (Cat no-Bajaj Lighting BLSPD LED 24W WH or equivalent as specified in the approved list of make)	Each	R.O
80W Highbay Light LED Includind down road. (Cat no-Bajaj Lighting BGHB 80W LED G V or equivalent as specified in the approved list of make)	Each	91
A.C. ceiling fan of 1200 mm sweep including wiring the down rods of standard length (upto 30 cm) with 1.5 sq.	Each	49

300 mm, 230 v A.C. exhaust fan in the existing opening including making good the damage, connection testing, commissioning etc as required.	Each	4
450 mm, 230 v A.C. exhaust fan in the existing opening including making good the damage, connection testing, commissioning etc as required.	Each	32
Two module stepped type electronic fan regulator on the existing modular plate switch box including connections but excluding modular plate etc. as required.	Each	49

Lighting Control System for Common Area:

It is recommended that lighting fixtures in common area may be provided with centralized control from distribution boards. Keeping in view the flexibility and a practical means to conserve energy, general lighting in the common area shall have the lighting fixtures on two parallel circuits, in a 'staggered (alternate) pattern, so that lighting level is varied based on time & day.

Cable Support System:

The following shall be used for carrying wires / cables from the electrical distribution boards to loads:

a. PVC conduit wherever the conduit is buried in slab at the time of casting.
b. M.S conduits wherever the conduit runs exposed in ceiling space or chased in wall.
c. GI cable trays and G.I. raceways for carrying multi conductor cables to workstations.

The fire partitions penetrations by raceways/cable trays shall be protected by approved sealing methods, maintaining the same fire resistance rating as the partition.

Lighting System for External Area:

Specification of External Light Fittings	**Qty.**
Flood light fitting suitable for 120 watt IP 66 LED having system lumen output of minimum 12000 lumens complete with all accessories and lamp	10 Nos.

Installation Work

Electrical Installation

a. Preparation of necessary Single line diagram (SLD), Power Distribution etc. of all electrical installation for each floor as well as electrical conduit/race way if required layout drawing of each room, corridor, verandas etc. as per requirement.

b. Submit Detailed Project Report including preliminary drawings to the Architect in respect of internal electrification considering all electrical requirements of all electrical loads such as luminaries , fans , electrically operated instruments required, HVAC etc. with distribution panels, distribution boxes showing their actual positions in drawings for incorporating suggested changes, additions and alterations and secure approval of the client.

Fire Detection & Alarm and Public Address System

a. To submit detailed design & drawings of fire detection & alarm system. The addressable analogue system with floor vise repeater panel to installed. SLD of the total distribution system of Fire alarm, intelligent fire & smoke detection, public address system, control wiring etc shall be required. The drawing and design for actual position of smoke & heat detectors, MCP (manual call points), Hooter, Addressable Automatic control Panel & floor wise repeater panels as per fire department requirement,

b. The fire control room shall be showed on the drawing at ground floor level and as requirement of local fire authority.

Earthing System:

Considering the hazardous nature of electrical energy, safety measures in using this energy is of paramount importance. Earthing system shall be provided in accordance with Indian Standards IS-3043-1987 / BS 7430 and other statutory regulations.

All non current carrying metal parts forming the Electrical System shall be connected to the Earthing System as per the requirements of Indian Electricity Rules and local statutory requirements. The earthing system shall be so designed that the resistance of the earthing network shall be less than 1.0 ohm at any point of the system.

All the Cable Trays shall be provided with suitable size of 2 Nos. G.I. strip in full length. Separate Earthing shall be provided for Computers/UPS Network and entire earthing shall be insulated with PVC sleeve.

The Earthing System is proposed as follows:

Panel and other Equipment:

Distribution Boards Earthing : copper Wires
UPS Neutral Earthing : Copper
Lighting / Power Point : PVC Cu Wire
EPABX/Server etc : Copper

The scope of work in this Section shall include, but not limited to the following works, in accordance with Detailed Specifications of all the works; Architectural, Approved Structural & Services Drawings, list of Approved makes of works, General Technical specifications of works. The works / items / Specification /equipment though not specifically mentioned in tender document, but needed to make the project complete in all respects and reliable for safe and smooth operation and guaranteed performance as per norms of buildings to make building functional, shall be considered and shall be included in the quoted cost by the bidder. **Bidder shall consider all scope of works given in this Section of Scope of work while quoting the cost.**

- **OPERATION AND MAINTENANCE DURING DEFECT LIABILITY PERIOD (DLP)**

  The operation and maintenance of all the works carried out by the contractor, shall be taken by the contractor during 1 year of defect- liability period as per the standard norms of operation and maintenance.

- **IMPORTANT POINTS AND WORKS RELATED TO THE PROJECT**

  - If any existing services lines (i.e., electric lines, telephone conduits, sewer lines, gas pipelines, water pipelines and other cables/lines) passing through the area of proposed Structure and appear during the excavation below ground level, will be diverted/rerouted by the Contractor at his own cost. Therefore, Contractor is advised to assess the same from the concern departments / CPWD/HPPWD/ RTDC and quote the cost accordingly. If any damage occurs to the existing services lines/cables during the excavation, the same will be rectified or replaced by the Contractor at his own cost.

  - The provision of connecting cables from existing electrical source to Structure is included in the scope of work of contractor.

  - The contractor must take up all the additional works without any dispute/ claim which are essential to make the project habitable, if directed by RTDC

1.2.1.5 MISCELLANEOUS

2. **LIST OF ABBREVIATION FOR COMMONLY USED TERMS**

Abbreviations used in this report are the following:

Abbreviations	**Description**
RTDC	Ropeways and Rapid Transport System Development Corporation HP
AC	Alternating Current
ACPH	Air Change Per Hour
AHU	Air Handling Units
ALS	Approach Lighting System
AMS	Deleted
APP	Approach
BAS	Building Automation System

BC	Bituminous Concrete
BIS	Bureau of Indian Standards
BM	Bituminous Macadam
BS	British Standards
CAS	Controlled Access System
CAT I	Category I
CCTV	Closed Circuit Television
CPCB	Central Pollution Control Board, Ministry of Environment and Forest
CUTE	Deleted
DB	Dry Bulb
DBM	Dense Bituminous Macadam
DC	Direct Current
DG	Diesel generator
DLC	Dry Lean Concrete
DPR	Detailed Project Report
ELV	Elevation
EMP	Environmental Management Plan
EPC	Engineering, Procurement and Construction
FDB	Final Distribution Board
FRLS	Fire Retardant Low Smoke
GI	Galvanized Iron
GSB	Granular sub base
GSS	Galvanized Sheet Steel
HV	High Voltage
HVAC	Heating, Ventilation, and Air-conditioning
IRS	Indian Road Congress
IS	Indian Standard
ISHRAE	Indian Society of Heating, Refrigeration and Air- conditioning
IST	Indian Standard Time
LAN	Local Area Network
LV	Low Voltage
MDB	Main Distribution Board
MOM	Management, Operation and Maintenance
MORTH	Ministry of Road Transport and Highways
MS	Mild Steel
NBC	National Building code-2016
NEC	National Electrical Codes
NFPA	National Fire Protection Association (USA)
PA	Public Address
PABX	Private Automatic Branch Exchange
PBX	Private Branch Exchange
PCC	Plain Cement Concrete
PMC	Pre-Mix Carpet
PQC	Pavement Quality Concrete
PVC	Poly Vinyl Chloride
QA/QC	Quality Assurance/ Quality Control
RCC	Reinforced Cement Concrete
RH	Relative Humidity
RO	Reverse Osmosis
RPM	Rotations Per Minute
SDB	Sub Distribution Board
STP	Sewage Treatment Plant
SW	Sand or graveled sand, well graded
THR	Threshold
UPS	Uninterrupted Power Supply
VGA	Video Graphics Adapter

VHF	Very High Frequency
WMM	Wet Mix Macadam
All abbreviated terms used but not defined in these RTDC Requirements shall have the meaning given to them in the Conditions of Contract.	

1.
2.

LIST OF ABBREVIATION FOR COMMONLY USED TERMS

AE /AEE	Assistant Engineer /Assistant Executive Engineer
BIM	Building Information Management
BIS	Bureau of Indian Standards
C & D Waste	Construction & Demolition Waste
COA	Council of Architecture
CPI	Consumer Price Index
CE cum ED	Chief Engineer cum Executive Director
CPWD	Central Public Works Department
DBR	Design Basis Report
DLP	Defects Liability Period
DSR	Delhi Schedule of Rates
EE & SM (C)	Executive Engineer & Senior Manager (Civil)
EE & SM (E)	Executive Engineer & Senior Manager (Electrical)
EM	Earnest Money
EPC	Engineering Procurement & Construction
GCC	General Conditions of Contract
GRIHA	Green Rating for Integrated Habitat Assessment
HSE	Health Safety & Environment
IGBC	Indian Green Building Council
IPC	Interim Payment Certificate
IS	Indian Standard
MAS	Material at Site
MEP	Mechanical Electrical Plumbing
MT	Metric Tonne
MTC	Material Testing Certificate
NBC	National Building Code
NGT	National Green Tribunal
NIT	Notice Inviting Tender
OEM	Original Equipment Manufacturer
PPE	Personal Protection Equipment
SAP	Safety Action Plan
SOP	Schedule of Payment
SOQ	Schedule of Quantities
TDS	Tax Deduction at Source
WPI	Wholesale Price Index

3. DEFINITIONS USED

a) "Approval" means approval by RTDC.

b) "As-Built Drawings" means those drawings produced by the Contractor, and endorsed as true records of construction of the Permanent Works and which have received a Approval from the RTDC Representative.

c) "Designer" means the designer, either in-house or consulting firm, appointed by the `Contractor to design the Permanent Works, Temporary Works and Enabling Works.

d) "Design Manual" means the manual to be prepared and submitted by the Contractor as part of the Final Design and as described in, Section C (*RTDC Requirements – Design*).

e) "Design Phase": means the development of the design as specified in Section C (RTDC Requirements - Design)

f) "Design & Construction Specification" means those parts of the Specification which relate to the design & construction as specified in the Tender Document.

g) "Final Design Submission" means the submission of documents which comprise the whole or parts of the proposed Final Design and for which the Contractor seeks a Notice from the Engineer-in-Charge.

h) "Notice" means instructions given under the Contract which includes any written instructions, orders, approvals / disapprovals, refusals and confirmations. The Notice shall be issued by the Engineer-in-Charge to relevant parties carrying out the Execution of the Works. The same shall be conveyed / forwarded by personal delivery, post, telefax or e-mail to the address of the relevant party. Refer Annexure-A1 of this section for document Approval / review form.

i) "Quality Plan" means the quality plan, setting out the Contractor's means of complying with his obligations in relation to Quality Assurance provided and maintained in accordance with *Conditions of Contract*.

j) "Safety Plan" means the safety plan setting out the Contractor's means of complying with his obligations in relation to safety provided and maintained in accordance with contract.

k) "GFC Drawings/ Working Drawings" means the Good for Construction drawings pertaining to Permanent, Temporary and Enabling Works submitted by the Contractor after vetting from the third party as per Contract Agreement used for the Execution of the Works after obtaining Notice from the Engineer-in-Charge.

l) "Shop Drawings": means that section of the working drawings used for the fabrication of the works, plumbing, electrical works

4. RELEVANT DOCUMENTS

The Design & Construction Specifications shall be read in conjunction with *Conditions of Contract*, and any other document forming part of the Tender Documents.

In the event of a conflict between the RTDC Requirements and any Design & Construction Specifications the Contractor shall always immediately seek advice from the Engineer-in-charge.

5. EXECUTION OF WORKS

a) The Execution of the Works shall include the Design Phase to the Construction Phase.

b) Design Phase: The Design Phase shall commence upon issuance of Work order in accordance with *Conditions of Contract* to the Contractor. Contractor's submittals during Design and Construction Phase for the Scope of Works shall include the following stages of design:

i) Detailed Design (DTD)
ii) Working Drawings (WD)
iii) Shop Drawings (SHD)
iii) As Built Drawings (ABD)

6. SPECIFICATIONS

For specifications refer Technical Specifications. Wherever required, latest CPWD specifications, MORTH specifications, manufacturer specification, specification as per RTDC requirement mentioned in the tender document be followed.

If the specification for a material/ product is not provided in this document then Contractor will consider best available material in India and submit the Specifications for such material/ product and obtain RTDC prior approval before use of such material/ product for the work.

7. THE PROGRAMME

The Contractor shall prepare and submit the Programme in accordance with Conditions of Contract.

8. MONITORING OF PROGRESS

In accordance with *Conditions of Contract*, the Contractor shall submit a report to the RTDC specifying the percentage completion achieved when compared to the planned percentage completion. The Contractor shall also have a meeting every Fortnight with the Engineer-in- charge.

SECTION B: FUNCTIONAL

1. VETTING OF DRAWINGS BY IIT/NIT

All Structural Design & Shop Drawings, GFC etc. of each and every aspect of the project shall be got vetted from Consultant appointed by RTDC. Thereafter the contractor shall get the Structural Design & Drawings proof checked from the IIT/ NIT. The fee payable for proof checking/vetting by IIT/NIT shall be borne by Contractor. The approval of IIT/NIT shall be submitted to RTDC Consultant on letter head of the Institute (forwarding letter) along with the stamped and duly signed drawings.

The vetting of drawings from RTDC Consultant and approval of drawings / IIT/ NIT does not means, Contractor shall not be absolved of their responsibility of structural stability and correctness of structural design. The contractor shall bear all the losses if arises out of the failure of any part of the project.

2. NOC'S / APPROVALS/ CLEARANCE FROM LOCAL BODIES/ AUTHORITIES

All the necessary Statuary Approvals/ NOCs/ Clearances such as Forest NoC, if necessary; approval of local Development Authority for architectural plans; Approval of ground water board, if necessary; clearance of height from concerned authority, if any; etc. which are required from any Govt. Department, before start of the work / during execution of work / after execution of work & before handing over the project, are the responsibility of the Contractor and are in the scope of work of the Contractor.

If any modification/revision is required in all the above mentioned Statuary Approvals/ NOCs/ Clearances, before start of the work / during the work / after execution of work are the responsibility of the Contractor and are in the scope of work of the Contractor. The fee deposited for getting approvals, shall be deposited by the Contractor to the concerned Department / Authorities and will be reimbursable to the Contractor on producing of original receipt of deposited fee and no extra cost for the same shall be claimed by the contractor.

SECTION C: DESIGN

DESIGN AND DRAWINGS OF PROJECT / WORKS

The Scope of work, shall include execution of work as per the following Specification mentioned in tender document and drawings approved by RTDC. The scope of work is not limited to these Specification & tender drawings. The tender drawings may also be modified as per the availability of land at locations. The EPC Contractor will consider all other necessary Specification and Items of works, while quoting the cost, which are essential to complete the work in all respect, for the smooth/ safe running of the project as per the norms of Government along with safety of structure. No claim of Contractor in respect of extra Specification & items of works which are essential and not mentioned in tender document, shall be entertained. The modifications/ improvements may be made by RTDC as per the requirement of RTDC during execution of work.

Contractor will submit the detailed Structural drawings including Layout Plans, Floor Plans, Sections, Elevations, etc of project according to the enclosed tender drawings OR modified Structural drawings as per the requirement of RTDC. The proposed work contains one number of Indoor Sports Hall, Kangra, H.P.

All the Civil/ Structural Design and drawings as per the Tender drawings are within the scope of contractor. The Contractor shall submit column layout plan, detailed structural drawings, electrical drawings in synchronization with Fire-Fighting drawings and all the other necessary working drawings on the basis of approved Architectural drawings, technical specification, topographical survey, geo-technical investigation and considering all design loads as per the Indian Standard Codes at his own cost. Design and detailing of Indoor Sports Hall comprising of Steel Built-up members including design of foundations and associated civil works shall be submitted by the Contractor. The detailed Design shall be done conforming to IS 800:2007 or as mentioned in the tender for Steel Structure and the all the material shall conform to the relevant IS Standards.

Design on appropriate software like Staad-Pro and drawing on a software like AuotCAD including fabrication drawings, shop drawings, detailed Steel Structure Drawings, bar bending schedule etc. of each and every component of Indoor Sports Hall within Scope of work of Contractor on suitable scale of Drawings.

It is entirely the responsibility of the contractor to get the above designs approved and finalized. The contractor shall submit 2 sets of laminated and 2 sets non- laminated above drawings to RTDC.

In addition to above sets of drawings, contractor shall keep necessary sets of drawings required at site for its execution as directed by the Engineer-in-charge.

S.No.	Description	Duration.
1	Structural drawings on the basis of Architect drawings for vetting from RTDC Consultant in hard as well as in soft copy along with STADD model	Submit to RTDC within 2 weeks.
2	IIT/ NIT Vetted Structural drawings in hard as well as in soft copy along with STADD Model	3 weeks from the date of vetting of Structural Drawings by RTDC.

Bidder shall make own assessment about the work involved in foundation according to the topography of area before quoting cost. The depth & type of foundation may also be assessed on the basis of foundation of nearby buildings, before quoting cost. No extra claim of Contractor in this respect shall be entertained.

SECTION D: CONSTRUCTION

1. Introduction

This section pertains to the responsibilities, obligations and other requirements relating to the construction of the Permanent Works, Enabling Works and Temporary Works.

2. Contractor's Superintendence

Throughout the Execution of the Works, and as long thereafter as is necessary to fulfill his obligations under the Contract, the Contractor shall provide all the necessary superintendence to plan, arrange, direct, manage, inspect and test the Works.

Superintendence shall comprise of sufficient number of supervisory staff having adequate knowledge of the works, the language for communications and of the operations to be carried out (including the methods and techniques required, the hazards likely to be encountered and methods of preventing accidents),for the satisfactory and safe Execution of the Works.

3. Project Site

3.1 Use of Project Site

a) Project Site shall not be used by the Contractor for any purpose other than for carrying out the Works, except with a Notice from the Engineer-in-Charge.

b) The location and size of each stockpile of materials, including excavated materials, within the Project Site shall be as permitted by the Engineer-in-Charge. Stockpiles shall be maintained at all times in a stable condition.

c) Entry and exit from the Project Site shall be controlled and shall be only available at the locations for which the Engineer-in-Charge has given approval.

3.2 Access to the Project Site

a) The Contractor shall make his own arrangements, subject to approval from the Engineer- in-Charge, for any further access required to the Project Site.

b) In addition, the Contractor shall ensure that access to every portion of the Project Site is continuously available to the RTDC and the Engineer-in-Charge.

c) The Contractor shall be responsible for ensuring that any access or ingress through the Project Site boundaries are controlled such that no disturbance or damage to public or private property occurs as a result of the use of such access or ingress by its employees and Subcontractors.

d) Alternative access shall be provided to all premises if interference with the existing access, public or private, is necessary to enable the Contractor's works to be carried out. The arrangements for the alternative access shall be as agreed by

the Engineer-in-Charge. Unless otherwise notified by the Engineer-in-Charge, permanent access shall be reinstated as soon as practicable after completion of the Works, the alternative access shall be removed immediately when it is no longer required and the ground surfaces reinstated to the satisfaction of the Engineer-in-Charge.

3.3 Barricades and Signboards

a) The Contractor shall erect barricades (as required) with gates around his areas of operations to prevent entry by un-authorized persons to the Project Site and necessary identity cards /permits should be issued to workers and staff by the Contractor. The Contractor shall submit a proposal for barricades/gates around the Project Site for approval of the Engineer-in-Charge and nothing extra shall be payable.

b) Approval from the Engineer-in-Charge shall be obtained before hoardings, fences, gates or signs are removed.

c) Hoardings, barricades, gates and signs shall be maintained in clean and good order by the Contractor until the completion of the Works, whether such hoardings, fences, gates and signs have been installed by the Contractor or by others and ownership transferred to the Contractor during the Execution of the Works.

d) All hoardings, barricades, gates and signs installed by the Contractor shall be removed by the Contractor upon the completion of the Works, unless otherwise directed by the Engineer-in-Charge.

e) Hoarding/ barricades can be reused after removing from one place to other- locations, provided they are in good condition after approval of the Engineer-in-Charge.

f) Damaged/worn-out barricades /hoardings shall be replaced by the Contractor. The decision of Engineer-in-Charge regarding need for replacement shall be final and binding.

3.4 Clearance of the Project Site

All Temporary Works which are not required and not to remain on the Project Site after the completion of the Works shall be removed as instructed by the Engineer-in-Charge. The Project Site shall be cleared as existed before the Works started except as otherwise stated in the Contract.

4. Safety, Security & Occupational Health Requirements

4.1 Security

The Contractor shall be responsible for keeping un-authorized persons off the Project site and authorized persons shall be limited to the Contractors personnel and the RTDC's personnel and to any other personnel notified to the Contractor by (or on behalf of) the RTDC, as authorized personnel.

4.2 Safety

a) The Contractor shall adhere to safe construction practice, guard against hazardous and unsafe working conditions.

b) The Contractor shall take all adequate precautions and select appropriate tools, equipment and installation methods to avoid causing a nuisance arising from his operations and shall minimize inconvenience to the public.

c) The Contractor shall take all necessary dust control and suppression measures to stop dust from spreading.

d) All Contractor's Equipment used for Execution of the Works shall be operated and maintained in such manner so as to minimize the emission of smoke and obnoxious fumes.

5. Care of the Works

5.1 General

a) The Works, including materials for use in the Works, shall be protected from damage.

b) The methods used for keeping the Works free from water shall be such that settlement, or damage to, new and existing structures do not occur.

5.2 Protection of the Works

a) Works shall not be carried out in inclement conditions of the weather that may adversely affect the Works unless proper protection is provided to the satisfaction of the Engineer-in-Charge.

b) Permanent Works, including materials for such Works, shall be protected from exposures of weather conditions that may adversely affect such Permanent Works or materials.

a) The finished works shall be protected from any damage that could arise from any activities on the adjacent site/ works.

5.3 Protection of the adjacent structures and works

The Contractor shall take all necessary precautions to protect the structures or works being carried out by others adjacent to and, for the time being, within the Project Site from the effects of vibrations, undermining and any other earth movements or diversion of water flow arising from the- Works.

6. Damage and Interference

a) Works shall be carried out in such a manner that there is no damage to or interference with watercourses or drainage systems, utilities, structures (including foundations), roads including street furniture, or other properties, public or private vehicular or pedestrian access, monuments, trees, graves or burial grounds other than to the

extent that is necessary for them to be removed or diverted to permit the Execution of the Works.

b) Items which are damaged or interfered with as a result of the Execution of the Works and items which are removed to enable Works to be carried out shall be reinstated to the satisfaction of the Engineer-in-Charge. Any claims by Relevant Authorities due to damage of utilities by the Contractor shall be borne by the Contractor.

7. Site Establishment

7.1 Contractor's site accommodation

The Contractor shall provide and maintain his own site Offices, sheds, garages, workshops, and other accommodation at his cost in a clean, stable and secure condition. These shall be constructed only after approval has been sought from the RTDC. He shall also be responsible for providing water electricity, telephone, sewerage and drainage facilities for site offices, structures and buildings and all such services that are necessary for satisfactory performance of the Works.

7.2 Site Laboratory

The Contractor shall provide, erect and maintain in a clean, stable and secure condition a laboratory, equipped for the routine testing of concrete, soil, any other materials, equipments etc. This laboratory shall be located at the Project Site or at a location approved by Engineer-in-Charge.

7.3 Site Utilities

a) Temporary power, water and permission for sewerage and drainage for the Execution of the Works shall be obtained by the Contractor from the Relevant Authorities. The RTDC shall not be responsible for the provision of temporary power and water supply for the Execution of the Works. The RTDC will provide assistance, wherever possible, to obtain relevant permission. Copies of all applications, correspondences and approvals from the Relevant Authorities must be submitted to the Engineer-in-Charge.

7.4 Submission of Particulars

The following particulars shall be submitted to the Engineer-in-Charge on issue of work order:

a) Drawings showing the formation works and the layout within earmarked area for the Contractor's offices, project signboards, access roads and other major facilities required together with all service utilities;

b) Drawings showing the details to be included on the project signboards and diversion boards; and

c) Drawings showing location of stores, storage areas, concrete batching plants, wheel washing facilities and other major facilities and their access roads/paths etc.

8. Materials

a) Certificates of tests from manufacturers which are to be submitted to the Engineer-in- Charge shall be current and shall relate to the batch of material delivered to the Project Site.

b) Materials which are specified by means of trade or proprietary names may be substituted by materials from a different manufacturer which have received approval from the Engineer-in-Charge, provided that the materials are of the same or better quality and comply with the specified technical requirements.

c) Samples of materials for which approval has been issued by the Engineer-in-Charge shall be kept at the Project Site by the Contractor in a secure dry storage room. These samples shall not be returned to the Contractor or used in the Permanent Works unless the Engineer-in-Charge has issued a Notice. The samples shall be used as a means of comparison by the Engineer-in-Charge to determine the quality of the materials subsequently delivered. Materials delivered to the Project Site for use in the Permanent Works shall be of the same or better quality as the samples which have received a Notice.

C.SPECIFICATIONS

(SECTION-VIII)

INDEX

1	DESIGN AND CONSTRUCTION SPECIFICATION : CIVIL WORKS
2	DESIGN AND CONSTRUCTION SPECIFICATION : PLUMBING WORKS
3	DESIGN AND CONSTRUCTION SPECIFICATION : FIREFIGHTING WORKS
4	DESIGN AND CONSTRUCTION SPECIFICATION : ELECTRICAL WORKS
5	TENDER DRAWINGS
6	SOIL INVESTIGATION REPORT

TECHNICAL SPECIFICATION NOTE:

1. CIVIL WORKS

The General Technical Specification of Civil Works as per CPWD/HPPWD specifications issued time to time.

2. PHE WORKS

The general technical specification of PHE works CPWD/HPPWD specifications issued time to time.

3. ELECTRICAL AND OTHER WORKS

The General Technical Specification of electrical and other works CPWD/HPPWD specifications issued time to time.

4. OTHER WORKS

Other works shall be executed by the contractor as per the standard guidelines, manuals and provisions in CPWD

5. NOTE ABOUT INCONSISTENCY

The work specified in the tender will be executed as per Detailed Specification of Works, General Technical Specifications, Approved Drawings and CPWD standards & methodology. In case of any inconsistency about the "Type of Item(s) which are to be executed" between Detailed Specification of Works, General Technical Specifications, Approved Drawings and CPWD standards & methodology, the contents of following will be the order of priority.

1. Detailed Specifications of works.
2. Approved Drawings
3. General Technical Specifications
4. CPWD standards & methodology

1. DESIGN AND CONSTRUCTION SPECIFICATION: CIVIL WORKS

1. Earth work

1.1 DSR Item 2.6/2.6.1 : For Earth work in excavation by mechanical means

1.2 DSR Item 2.25 : For Filling available excavated earth

1.3 DSR Item 2.27 : For Filling in plinth with local sand

1.4 DSR Item 2.28/2.28.1 : For Surface dressing works

1.5 DSR Item 2.34/2.34.1 : Supply of chemical emulsion/ Anti-termite treatment

1.6 DSR Item 2.35/2.35.3/2.35.3.1 : Anti-termite Treatment of soil under existing floors

1.7 DSR Item 1.12 : For Disposal of Surplus earth by mechanical means

2. Concrete work

2.1 DSR Item 4.1/4.1.6 : For Providing and laying cement concrete of 1:3:6 grade stone aggregate 40 mm

2.2 DSR Item 4.1/4.1.8 : For Providing and laying cement concrete of 1:4:8 grade stone aggregate 40 mm

2.3 DSR Item 4.2/4.2.3 : For Providing and laying cement concrete of 1:2:4 grade stone aggregate 20 mm

2.4 DSR Item 4.11 : Providing and laying damp-proof course

2.5 DSR Item 4.12 : Extra for providing and mixing water proofing material in cement concrete work

2.6 DSR Item 4.13 : Applying a coat of residual petroleum bitumen on DPC

2.7 DSR Item 4.17 : Making plinth protection 50 mm thick of cement concrete 1:3:6

3. R.C.C. Work

3.1 DSR Item 5.37/5.37.1 : For Providing and laying in position ready mixed M-25 grade concrete for all works upto Plinth level.

3.2 DSR Item 5.37/5.37.2 : For Providing and laying in position ready mixed M-25 grade concrete for all works above Plinth level.

3.3 DSR Item 5.22/5.22.6: For Steel reinforcement for R.C.C. work upto plinth level.

3.4 DSR Item 5.22A/5.22A.6: For Steel reinforcement for R.C.C. work above plinth level upto V floor.

3.5 DSR Item 5.9/5.9.1/5.9.5/5.9.6/5.9.2/5.9.4/5.9.16.1 : For Centering and shuttering

3.6 DSR Item 5.30: For plaster drip course/ groove in plastered surface level.

4. Brick Work

4.1 DSR Item 6.1/6.1.2 : For Brick work in foundation and plinth

4.2 DSR Item 6.4/6.4.2 : For Brick work Above plinth upto V floor

4.3 DSR Item 6.12/6.12.2 : For Half-Brick work in foundation and plinth

4.4 DSR Item 6.13/6.13.2 : For Half-Brick work Above plinth upto V floor

4.5 DSR Item 6.15 : For Extra for providing and placing 2 Nos 6mm dia. M.S. bars at every third course of half brick masonry

5. Marble Work

5.1 DSR Item 8.20/8.2.2.1/8.2.2.2 : For Providing and fixing 18 mm thick Granite

5.2 DSR Item 8.3 : For Providing edge moulding

5.3 DSR Item 8.4 : For Providing granite stone in facia
5.4 DSR Item 8.5: For Providing opening of required size & shape for wash basin etc.
5.5 DSR Item 8.10/8.10.2 : For Providing granite urinal partitions
5.6 To be Analysed similar to DSR Item 8.11: For Cladding works: 18mm thk. Granite cladding over Riser of steps, skirting dado and pillars.
Specifications : Granite stone slab 18 mm thick in risers of steps, skirting, dado and pillars laid on 12 mm (average) thick cement mortar 1:3 (1 cement : 3 coarse sand) and jointed with grey cement slurry mixed with pigment to match the shade of the slab, including rubbing and polishing complete.

6. Wood Work

6.1 DSR Item 9.21/9.21.1 : For Providing and fixing flush door shutters all complete

6.2 DSR Item 9.127/9.127.2 : For Providing and fixing decorative high pressure laminated sheet

6.3 DSR Item 9.96/9.96.2 : For Providing and fixing aluminium sliding door bolts

6.4 DSR Item 9.82 : Providing and fixing bright finished brass hanging type floor door stopper

6.5 DSR Item 9.113 : For Providing and fixing mortice lock with 6 levers without pair of handles

6.6 DSR Item 9.23 : Extra for providing lipping with 2nd class teak wood

6.7 DSR Item 12.62 : For Providing and fixing thermal insulation with Resin Bonded Fibre glass wool for internal and external partition walls

10. Steel Work

10.1 DSR Item 10.27/10.27.2/10.27.3 : For Providing and fixing dash fastener

10.2 DSR Item 10.25/10.25.2 : For Steel work welded in built up sections

10.3 DSR Item 10.2 : For Structural steel work riveted or bolted in built up sections

10.4 DSR Item 10.16/10.16.2 : For Steel work in built up tubular trusses

11. Flooring

11.1 DSR Item 11.26/11.26.1 : For Kota stone slab flooring

11.2 DSR Item 11.27 : For Kota stone slab 20 mm thick in risers

11.3 DSR Item 11.32: For Extra for Kota stone / sand stone in treads of steps and risers using single up to 1.05 meter length.

11.4 DSR Item 8.31 : For Providing and fixing Ist quality ceramic glazed wall tiles

11.5 DSR Item 11.37 : For Providing and laying Ceramic glazed floor tiles of size 300x300 mm

11.6 DSR Item 11.41/11.41.2 : For Providing and laying vitrified floor tiles

11.7 DSR Item 11.45 : Providing and laying 500x500x40 mm thick Turf paver

11.8 DSR Item 11.46/11.46.2 : For Providing and laying vitrified tile in skirting

11.9 DSR Item 8.6 : For Mirror polishing on marble work/stone work to give high gloss finish

11.10 DSR Item 11.55/11.55.1 : For Providing and laying flamed finish Granite stone flooring

11.11 DSR Item 11.56/11.56.1 : For Providing and laying Polished Granite stone flooring

11.12 DSR Item 11.24: For Extra for pre finished nosing to treads of steps of marble stone

11.13 DSR Item 11.3/11.3.1: For Cement concrete flooring 1:2:4, 40 mm thick with 20 mm nominal size stone aggregate

12. Finishing

12.1 DSR Item 13.4/13.4.2 : For 12 mm cement plaster

12.2 DSR Item 13.16/13.16.1 : For 6 mm cement plaster

12.3 DSR Item 13.11 : For 18 mm cement external plaster

12.4 DSR Item 13.45/13.45.1 : For Exterior Textured paint

12.5 DSR Item 13.82/13.82.2 : For Acrylic emulsion paint

12.6 DSR Item 13.83/13.83.2 : For Acrylic emulsion paint of Interior Grade

12.7 DSR Item 13.61/13.61.1 : For Synthetic enamel paint

13. Roofing

13.1 DSR Item 12.59/12.59.1 For Calcium Silicate Ceiling

13.2 DSR Item 26.27/26.27.2 For Mineral fibre grid ceiling (Acoustic Grid Ceiling)

14. Water-proofing works

14.1 DSR Item 22.3 For water proofing treatment to vertical and horizontal surfaces

15. Aluminium works

15.1 DSR Item 21.1/ 21.1.1/21.1.1.2 For Aluminium - Fixed portions of doors, windows, ventilators and partitions

15.2 DSR Item 21.1.2/ 21.1.2/21.1.2.2 For Aluminium - Shutters of doors, windows & ventilators

15.3 DSR Item 21.3/ 21.3.2 For fixing glazing (5.5mm thk glass panes) in Aluminium-doors, windows, ventilators and partitions

15.4 DSR Item 21.8/ 21.8.1 For filling the gap in between aluminium frame & adjacent RCC/ Brick/Stone work

15.5 DSR Item 21.15/ 21.15.2 For Providing and fixing aluminium casement windows fastener of required length

16. New Technologies and Material

16.1 DSR Item 26.41 For Structural Framework of LGSF Works

16.2 DSR Item 26.44 : For fixing in all exterior face panels breathable vapour barrier underneath the cement fiber board

16.3 DSR Item 26.65 : For providing and fixing of deck sheet slab

17. Road work

17.1 DSR Item 16.69 : For Providing and laying at or near ground level factory made kerb stone of M-25 grade

17.2 DSR Item 19.6/19.6.4: For Providing and laying non-pressure NP2 class (light duty) R.C.C. pipes-300mm dia.

17.3 DSR Item 19.7/19.7.2/19.7.2.1 : For Constructing brick masonry manhole in cement mortar 1:4 - Inside size 120x90 cm and 90 cm deep including C.I. cover with frame

17.4 DSR Item 16.48 / 16.48.1 : For Painting road surface marking with adequate nos of coats to give uniform finish

18. Market Rate items

18.1 Polycarbonate Sheet

Providing and fixing 10mm thick Multi layered polycarbonate sheet system, with Aluminium Frame work confirming to the detail technical specifications as per approved architectural drawing and direction of the Engineer-In-Charge. Aluminium frame work shall be paid separately as per relevant item of the BOQ.

18.2 Canadian Maple Wood

Supply and Installation of Canadian Maple wood sports flooring of approved make, colour, shade and patterns in approved plank sizes. Rates shall be inclusive of all types of profiles, skirting, 2-3mm thick approved underlay material as per manufacturers recommendations, all operations as listed above at all heights and levels all complete as per drawings and as directed by the Engineer-in-charge.

SURFACE BOARD: - Canadian Maple Hardwood Sports Flooring **“Certified by the BWF according to BWF standards - Grade 1” LABO SPORTS TEST CERTIFY** finished with **21mm thick, 57 to 83mm** wide and in random length in tongue and groove shape. The edges of the boards will have a finger lock groove and the bottom

side with air pass groove and treated with special anti-termite and water-resistant lacquer.
THE UNDER FRAME: - Resilient SPF Pine Wood sleeper subfloor of **70 mm x 45 mm**, treated with anti-termite solution and fixed on the bottom side with **10/19 mm thick EPDM rubber pads**, stappled through the two wings at **350 mm x 350 mm.**

INSTALLATION: - IPS subfloor treated with a vapour barrier to be placed on the levelled IPS sub-floor before laying the under frame. The runners having air cushion pads to be placed on the vapour barrier in perfect level at 350 mm in 1 direction. The surface board to be screwed to the runner through the tongue only and will lock the screwed tongue by the groove of adjoining board. Ends of the boards will be locked by inserting the wooden fingers through the edge grooves and fixed with suitable adhesive. The expansion of 12-15 mm will be left open between the wooden flooring and the surrounding tiled area / walls.

FINISHING: - After installation the floor will be machine sanded in uniform level and finished with **2K SPORT** is a two-component water-based polyurethane lacquer for sportive wooden floors. It has been formulated in order to meet the highest anti slip standard requirements for sport wooden floors. **ECOSTAR 2K SPORT is in conformity with European standards for sportive wooden floors meeting EN14904 standard's requirements, DIN 18032-2 for slip resistance and it's classified as EN 13501-1. Hardness**, distension, chemical and mechanical resistances put 2K SPORT on top of range's quality. It is recommended and certified by the International Basketball Federation (FIBA)

18.3 Vinyl Flooring

Supply and laying of UNI Color & Wooden pattern of minimum 6.0mm thick heterogeneous sports vinyl floor, 3.7kg per sqmtr, roll dimensions 1.5x20.5mtr., vertical deformation EN 14809 ≤ 3.5 mm, Energy return NF P 90 203 ≥ 0.31 m/s, Sliding coefficient EN 13036-4 80 to 110 , Ball bounce EN 12235 ≥ 90 % , Ball speed UEFA 50 to 65 cm, Abrasion resistance EN ISO 5470-1 ≤ 1000 mg, Impact resistance EN 1517 ≥ 8 N/m, Indentation resistance EN 1516 ≤ 0.5 mm, Certified by EHF, AFC, AVC, IFF & BWF.

18.4 Rubble Roll

Supply and installation of 8mm thick rubber rolls, environmental friendly and non-toxic recycled, tough and abrasion resistant, SBR base with EPDM chips embossed as specified by Engineer in charge

18.7 Structural Steel Works (PEB):

Design, Manufacture, Supply and Erection of MS structure for frames, purlin, Mezzanine Floor Supporting Column & Beam, Mezzanine Joist, Staircase and Roof sheet as per approved document.
Dimensions of the building : 43.02 (L) x32.60 (B)

A. Structural Framework:
Design, Fabrication, Supply and erection of Structural Framework as per design approved. The Structural Steel built up sections are made from hot rolled steel plates confirming to ASTM A 572, Grade 50 or equivalent with a minimum yield strength of 345 Mpa.(Base material from Tata / Jindal / Equivalent etc)

a. Primary Steel
Primary steel members will be cleaned and painted at factory with One coat of Alkyd based Red Oxide primer minimum of 35DFT and one Coat of Finish Enamel Paint of minimum 35-micron DFT will be applied at shop and 35-micron DFT will be done .

b. Secondary Steel
- Secondary members are painted with similar application like primary members.
- All other secondary steel members (Wind columns, Base angles, Angle, Clips, Brace Rod, Gable angles, Flange stays and other small misc. items) will be cleaned and painted at factory with the paint same as primary steel paint.

c. Standard Colour
- Panel colors will be as per the SELLER standard colors (The standard colors are Frost White, Cactus Green, Shasta Blue, Terra-cotta & Z-Blue).
- Color shades for finish coat of primary components will be as per the SELLER standard colors (The standard colors are, RAL 7035, RAL 5012, RAL 7046).
- The color shades for primer & other intermediate coats will be as per the paint supplier's recommendations.

d. Wind Speed IS 875 (Part 3): 1987 Code of practice for Design Loads

e. Seismic Load is Calculated in accordance with IS 1893 (part 1): 2002 criteria for earthquake resistant design of structures

f. Design Parameter:
- Snow Load – 750mm thk
- The Slope of trusses shall be bwtween 22.5-25 degrees

g. Material Specifications

1	Built-up Members	ASTM A 572M Grade 345 (or) its Equivalent	Fy = 34.5 kN/cm2
2	**Hot Rolled Members**		
	Beams & Columns	IS 2062: 2006 Grade E250 Type A (or) its Equivalent	Fy = 25.0 kN/cm2
	Tubes	IS 4923: 1997 Grade YSt 310	Fy = 31.0 kN/cm2
	Channels	IS 2062: 2006 Grade E250 Type A (or) its Equivalent	Fy = 25.0 kN/cm2

	Pipes/ Handrails	IS 1161: 1998	Fy = 24.0 kN/cm2
3	**Cold Formed Secondary Members**		
	Galvanized Steel	ASTM A 653M SS Grade 480	Fy = 48.0 kN/cm2
4	**Valley Gutters**		
	Galvanized Steel	ASTM A 653M SS Grade 340	Fy = 34.0 kN/cm2
5	**Mezzanine Deck Panels**		
	Galvanized Steel	ASTM A 653M SS Grade 340, Coating Z180	Fy = 34.0 kN/cm2
6	**X-Bracing Members**		
	Rods	IS 2062: 2006 Grade E250 Type A (or) its Equivalent	Fu = 41.0kN/cm2
	Angles	IS 2062: 2006 Grade E250 Type A (or) its Equivalent	Fu = 41.0 kN/cm2
7	**Anchor Bolts**		
		ASTM A 36M (or) IS 2062: 2006 Grade E250 Type A (or) its Equivalent (Black / Unpainted Bolts)	Fy = 25.0 kN/cm2 Fu = 40.0 kN/cm2
8	**High Strength Bolts**		
		ASTM A 325M Type 1, Hot Dip Galvanized to ASTM A 153M Class C	Fu = 83.0 kN/cm2
9	**Machine Bolts**		
	Galvanized Steel	DIN 933 Class 4.6 / 4.8 Electro Plated Yellow Chromate	Fu = 40.0 kN/cm2

B. Mild Steel
Design, Fabrication and Supply of Structural Framework with Mild steel for staircase. The Structural Steel built up sections are made from hot rolled steel plates confirming to ASTM A 572, Grade 50 or equivalent with a minimum yield strength of 345 Mpa. These plates together on one side of the web by a continuous automatic submerged arc welding process to produce the section required. Primary member Hollow Section as per IS 4923. (Base material from Tata / Jindal).

C. Purlin : G.I hat Section

D. Screws/ACC :
Hex Head Self Drilling Screws / wafer head screw and anchor bolts with High steel as per ASTM. Fasteners shall be of Fischer and All screws shall be anti-rust coated

E. Roofing :
Providing percolated galvanized iron profile sheets (size, shape and pitch of corrugation as approved by Engineer-in-charge) 0.50 mm (+ 0.05 %) total coated thickness with zinc coating 120 grams per sqm as per IS: 277, in 240 mpa steel grade, 5-7 microns epoxy primer on both side of the sheet and polyester top coat 15-18 microns. Sheet should have protective guard film of 25 microns minimum to avoid scratches during transportation and should be supplied in single length upto 12 metre or as desired by Engineering-charge. The sheet shall be fixed using self-drilling /self-tapping screws of size (5.5x 55 mm) with EPDM seal, complete upto any pitch in horizontal/ vertical or curved surfaces, excluding the cost of purlins, rafters and trusses and including cutting to size and shape wherever required.

F. Roofing Insulation (Under deck insulation works):
Providing and installing 50mm thick insulation with Rock wool 16 kg /m3 with one side FSK. At all heights and levels including hardware all complete as per drawing and direction of Engineer-in-charge.

18.8 Stainless steel Handle for doors:

1. Providing and fixing Stainless steel satin finish back to back pull handle of size 19mm dia of CTC length 150mm with SS screws for wooden doors of approved make all complete.

2. Providing and fixing Stainless steel satin finish back to back pull handle of size 25mm dia of CTC length 300mm with SS screws for wooden doors of approved make all complete.

3. Providing and fixing Stainless steel satin finish back to back pull handle of size 30mm dia of CTC length 600mm with SS screws for wooden doors of approved make all complete

4. Providing and fixing Stainless steel satin finish back to back pull handle of size 32mm dia of CTC length 1200mm with SS screws for wooden doors/glass doors/aluminium door shutters of approved make all complete

18.9 Indicator bolt for W.C. and toilet doors:

Providing and fixing Stainless steel indicator bolt for W.C. / Bath cubicle's door with SS screws complete for wooden doors of approved make all complete of approved make as specified in the make list.

18.10 Rubber buffer for w.c. and toilet doors:

75mm transparent rubber buffers with washers and necessary screws etc. complete to be provided as per schedule of finishes of approved make as specified in the make list.

18.11 SS Tower bolt for doors:

Providing and fixing Stainless steel Tower bolts with necessary SS screws all complete of approved make as specified in the make list.

a) 250x10 mm for double leaf doors
b) 100x10 mm for single leaf doors

18.12 SS Sliding bolt for doors:

Stainless steel Sliding door bolts with necessary SS screws all complete of approved make as specified in the make list.

a) 300x16 mm for double leaf doors
b) 250x16 mm for single leaf doors

18.13 SS Door Closer: (for Toilet main door, Handicapped toi. Door, admin office and first aid)

Providing and fixing overhead Stainless steel door Closer necessary SS screws all complete suitable for

a) Door upto 1050mm width and 2400mm height of approved make as specified

in the make list.

18.14 : LGSF Walls

LGSF Wall (External cladding):

Providing and fixing of external wall system on Light gauge steel frame work with. Outer face having 6mm thick heavy duty fiber cement board fixed on **12mm** thick heavy duty fiber cement board (moisture / fire resistant) confirming to IS 14862:2000, category IV type A (High pressure steam cured) as per standard sizes fixed with self-drilling / taping screws / fasteners @ 60cm c/c of approved make. A grove of 2 mm to 3mm shall be maintained and groves shall be sealed with silicon based sealant. The board shall be fixed in a staggered pattern.Screws shall be of
counter sunk rib head of 1.60mm to 4 mm thick of 8 to 10 gauge of length varying from 25 to 45 mm and internal face 12.5mm thick gypsum plaster board fixed on 8mm thick fiber cement board confirming to IS 14862:2000 of category III type B (High pressure steam cured) as per standard sizes fixed with self-drilling / taping screws / fasteners @ 60cm c/c of approved make, proper taping and
jointing to be done using fiber mesh tape and epoxy and acrylic based jointing compound for seamless finish.

LGSF Wall (Internal cladding):

For Internal partition works other than wet areas :
Supply and fixing internal wall with Single layer of boards with **9 mm thick heavy duty water proof Cement fibre** boards type A Category IV as per IS: 14862; 2000 on wall panels of cold formed galvanized light gauge steel frame structure to form wall/partition on internal face of the frame and finished& fixed with self-drilling, tapping screws, fasteners of approved make including jointing and fixing to a flush finish of tapered and square edges of the board recommended filler, jointing tapes and finisher as per manufacturer specifications. The hollow wall space between the cement boards will be provided with rock wool insulation conforming to IS 8183 and of density not less than 48 kg/m3 for periphery walls and partition walls of thickness not less than 50 mm for thermal and acoustic insulation. Proper taping and jointing to be done using fiber mesh tape and epoxy and acrylic based jointing compound for seamless finish.

LGSF Wall (Interior Grade- For Wet areas):
Such as Toilets, Kitchen, pantry, drinking water area etc.

Supply and fixing internal wall with Single layer of boards with **9 mm** thick heavy duty water proof Cement fibre boards type A Category IV as per IS: 14862; 2000 on wall panels of cold formed galvanized light gauge steel frame structure to form wall/partition on internal face of the frame and finished& fixed with self-drilling, tapping screws, fasteners of approved make including jointing and fixing to a flush finish of tapered and square edges of the board **cladded with dado and skirting as per specifications.** The hollow wall space between the cement boards will be provided with rock wool insulation conforming to IS 8183 and of density not less than 48 kg/m3 for periphery walls and partition walls of thickness not less than 50 mm for thermal and acoustic insulation.

18.14 : Sports Equipment

Basket ball (2 nos. pole)

Basket ball pole movable and height adjustable international standard board size: 180cm x 105cm, 25mm transparent acrylic board standard pole extension 3.20 mtr, made of 6 inch square, base made of 4 x 2 inch pipe, heavy dunking ring & nylon net, pole padding on front and sides, wheelsize6x2 inch pvc, 6 portable battery boxes each side, these boxes would contain 600kg rubble (concrete) weight each side, best quality pu spray paint.

Badminton (2 nos. pole)
Movable badminton pole, made of 40x40mm square pipe, 70 kg weight each side, adjustable rachid with net, fine quality spray pu paint.

SCHEDULE OF FINISHES

Indoor Sports Hall						
S.no.	**Enclosure/space description**	**Flooring**	**Skirting/Dado**	**Walls**	**Misc.**	**Ceiling**
A	**Internal**					
	Ground Floor					
1	Admin Office	Vitrified Tiles	100mm high Vitrified Tiles Skirting	Acrylic paint	Soffit and eaves lining +Chajja	False ceiling-Acoustic grid tile ceiling (75%) with Calcium Silicate (25%)
2	Admin Toilet	Antiskid ceramic Tiles	Ceramic Tiles upto 2.1m Height	Acrylic paint	18mm thk. Granite Stone for Slabs countertops	False ceiling-Calcium silicates
3	Entrance Lobby & reception	Vitrified Tiles	100mm high Vitrified Tiles Skirting	Acrylic paint		False ceiling-Calcium Silicate
4	Corridor	Vitrified Tiles	100mm high Vitrified Tiles Skirting	Acrylic paint		False ceiling-Calcium Silicate
5	Meeting Room	Vitrified Tiles	100mm high Vitrified Tiles Skirting	Acoustic wall panels	Glass walls	Acoustic grid tile ceiling (75%) with Calcium Silicate (25%)
6	Multipurpose Hall-01	Canadian Maple Hardwood Sports Flooring with self levelling screeding	100mm high Wooden Skirting for Maple wood flooring	Acrylic paint		Truss With Enamel paint +False Ceiling-Acoustic Grid tile ceiling
7	Equipment store-01	Kota Stone	100mm high Kota Stone Skirting	Acrylic paint		--
8	Utility Store	Kota Stone	100mm high Kota Stone Skirting	Acrylic paint		False ceiling-Calcium silicates
9	First Aid	Vitrified Tiles	100mm high Vitrified Tiles Skirting	Acrylic paint		False ceiling-Acoustic grid tile ceiling (75%) with Calcium Silicate (25%)

10	Fitness Centre	Gym Rubber Roll flooring over PC.C. flooring (75%) + Seamless Synthetic Polyurethane flooring (25%) with self levelling screeding	100mm high Wooden Skirting	Acrylic paint		False ceiling-Acoustic grid tile ceiling (75%) with Calcium Silicate (25%)
11	Toilet M&F	Vitrified Tiles-600x600 mm	Ceramic Tiles upto 2400 mm high Dado	Acrylic paint above 2400mm high dado	18mm thk. Granite Stone for slabs Countertop	False ceiling-Calcium silicates
12	Individual WCs	AntiSkid ceramic Tiles-300x300mm	Ceramic Tiles upto 2400 mm high Dado	Acrylic paint above 2400mm high dado		False ceiling-Calcium silicates
13	Baths	AntiSkid ceramic Tiles-300x300mm	Ceramic Tiles upto 2400 mm high Dado	Acrylic paint above 2400mm high dado		False ceiling-Calcium silicates
14	Locker Room	AntiSkid ceramic Tiles-600x600mm	Acrylic paint	Acrylic paint		False ceiling-Calcium silicates
15	Staircase	Kota Stone	100mm high Kota Stone Skirting	Acrylic paint		--
	First Floor					
16	Toilet M&F	Vitrified Tiles-600x600 mm	Ceramic Tiles upto 2400 mm high Dado	Acrylic paint above 2400mm high dado		Truss With Enamel paint +False ceiling-Calcium silicates
17	Individual WCs	AntiSkid ceramic Tiles-300x300mm	Ceramic Tiles upto 2400 mm high Dado	Acrylic paint		Truss With Enamel paint +False ceiling-Calcium silicates
18	Juice Bar	Kota Stone	100mm high Kota Stone Skirting	Acrylic paint		Truss With Enamel paint +False ceiling-Calcium silicates
19	Yoga/meditation Hall	Seamless Synthetic Polyurethane flooring over PC.C. floor with self levelling screeding	100mm high Wooden Skirting	Acrylic paint		Truss With Enamel paint +False ceiling-Acoustic grid tile ceiling (75%) with Calcium Silicate (25%)
20	Small Multipurpose Hall	Seamless Synthetic Polyurethane flooring over PC.C. floor with self levelling screeding	100mm high Wooden Skirting	Acrylic paint		Truss With Enamel paint +False ceiling-Acoustic grid tile ceiling (75%) with Calcium Silicate (25%)
21	Corridor	Vitrified Tiles	100mm high Vitrified Tiles Skirting	Acrylic paint		False ceiling-Acoustic grid tile
B	**External**					

22	Steps	Granite-Polished	100mm high Granite (Polished) Stone Skirting			
23	Ramp	Flamed(60%)+ Polish granite (40%)stone	100mm high Granite Stone Skirting			
24	Roof	G.I. Sheet				
25	External walls	LGSF – Exterior cladding walls as specs				
26	Internal walls with infilled Insulation	LGSF – Interior cladding walls as specs.				
27	Canopy	Deck slab over PEB Support systems				Fibre cement board in ceiling
28	Floor slab	1. Floor is made of Deck slab (144mm thk.) 2. Deck slab 144mm thk. Consist of 44mm corrugated 0.5mm thk. G.I. sheet with 100 mm thck M-25 conc with reinforcements as specified in drawings casted over it. 3. The G.I. Sheet to be supported over MS member of the PEB system				
29	Multipurpose hall external wall at first floor level			Polycarbonate sheet over LGSF frame (Both Inside and outside)		
30	Structural System	Composite PEB and LGSF Structure				
31	Doors	Aluminium frame with flush door				
32	Window, door-window	Aluminium frame with aluminium glass shutters as specified in drawings				
33	Railing	Mild steel				
34	External building materials	Texture paint over Fibre cement board, Granite on plinth' facade, Polycarbonate sheet for diffused light				
35	Soffit and eaves lining + Chajja	Providing 6mm thick (high pressure steam cured) high density fiber cement board with suitable fibre cement screw. The final finish shall be in grooves of 6mm in between the boards conforming to IS 14862:2000				

LIST OF MAKES/AGENCIES: Civil Works

FOR WORKS COVERED UNDER THIS CONTRACT

1) All materials and products used in the work shall conform to the relevant standards/ specifications and shall be of approved make and design. Lists of approved manufacturers / vendors for Plumbing works, Firefighting, are given herein below. The approval of a manufacturer/ vendor shall be given only after review of the sample/specimen by the Engineer-in-charge. The complete system and installation shall also be in conformity with the "Applicable Codes Standards and Publications".
2) The Engineer- In-charge/consultant reserves the right to select any of the brands indicated in the list of approved make. The tenderer shall quote his rates on the basis of price of best quality product of the brand/make stipulated in the items of works as described in specifications as well as in the list of approved make. The contractor cannot claim anything extra if the Engineer In-charge/ Client changes the make but within the list of approved make.

3) When certain makes are missing in the below list, the make will be decided as per the approval of consultant/Engineer In-charge.

LIST OF MAKES FOR CIVIL WORKS

The Following Brand Makes/ Manufacturer'S Makes Listed Below May Be Used With Prior Approval Of The Architect. In Case It Is Established That Any Material As Listed Below Is Not Available In The Market, Approved Equivalent Materials And Finishes Of Any Other Specialized Brand Names/ Manufacture'S Makes May Be Used As Per Approval Of The Architect Or Eic.

S.No.	Item Description	Make/Brand
1	Cement(Opc/Ppc/ Portland Slag)	Acc/Ambuja/Ultra Tech
2	White Cement & Putty	Jk White / Birla
3	Steel, Tor Steel (Reinforcement Fe 500d) & Structural	Sail/Tata Steel/Jindal Steel
4	Structural Steel	Tata Steel/Jsw/SAIL
5	Roofing Sheet	Tata Steel/ Jsw/Tata Bluescope
8	White Cement Putty	Birla White/ Asian/ Walplast
9	Bitumen	Iocl/Tiki Tar Industries/ Juno Bitumix Pvt. Ltd
10	Cement Admixture/Plasticizer	Fosroc/Sika/Pidilite/Cico/Basf
11	Anti-Termite Treatment Chemical	Bayer/Gibraltor/Basf/Gibraltor
Floor/Wall Finishing		
12	1st Quality Acrylic Distemper, Acrylic/ Plastic Emulsion , Synthetic Enamel Paint, Acrylic Exterior Paint, Epoxy Paint	Asian Paints/ Dulux / Nerolac
13	Textured Paints -Exterior	Acro Paints/ Unistone/ Spectrum/Heritage
14	Steel Primer (Red Oxide Zinc Chromate Primer)	Asian Paints, Nerolac, Berger, Ici

15	Rectified Ceramic Tiles, Ceramic Tiles, Vitrified Tiles, Heat Resistance Tile (Vitrified Tiles To Be Double Charged Manufactured From Mother Plant)	First Quality Nitco/ Kajaria/ Somany/ Johnson/Rak Of Approved Design, Color And Shade
16	Brick Pavers	Jay Jalaram Bricks/Pioneer Bricks/Jindal Mechano Bricks
17	P.O.P	Sriram Nirman/ Birla Wall Putty/ Jk
18	Cement Primer	Nerolac/Bp White (Berger)/Decoprime-Wt (Asian)/White Primer (Ici)
19	Fire Retardant Paint	Nippon Paint/Berger/Asian Paints/Shalimar Paints
Ceiling And Panelling		
20	False Ceilings	
A	Calcium Silicate	Usg Boral/Shera/Gyproc
B	Metal Ceiling (Clip-In And Lay-In)	Armstrong/ Ecotone/Usg Boral
C	Open Cell Ceiling	Armstrong/Usg Boral/Hunter Douglas
D	Calcium Silicate Boards/Tiles	Hilux (Ramco Industries Ltd.)/Aerolite/Gyproc
E	Acoustic False Ceiling	Armstrong/ Earcons/ Ecotone/Ecophon
F	Acoustic Wall Panel	Armstrong/ Earcons/ Anutone/Ecotone/Ecophon
Wood Work		
21	Flush Door, Block Board, Plywood	Duroply Industries Ltd., Green Ply, Century,National, Kitply Products
22	Decorative Laminate	Formica/ Greenlam/ Merinolam/Duro
Doors And Windows		
23	Fire Doors	Navair International Pvt. Ltd./ Hormann
23	Upvc Doors & Windows	Fenesta/ Aluplast/Deceuninck/ Lg Hausys
24	Aluminium Extruded Profiles	Hindalco/ Jindal/Indal
25	Aluminium Louvred Door	Domal/ Eternia/ Agv Alfab/Aditya Birla
26	Window Turn Handles, Friction Hinges	Ipsa, Dorma, Ebco, Dorma, Hettich, Geze, Kich
27	Hermetically-Sealed Double Insulated Glass	Saint Gobain/Ais Asahi India Glass Ltd./Gsc Trutuf

28	Float Glass, Mirrors	Saintgobain /Ais Asahi India Glass Ltd/ Modiguard
29	Floor Spring, Patch Fittings For Frameless Doors	Dorma/Hettich/Ozone/Doorset/Geze/Kich/Hafele
30	Structural Glazing/ Spider Glazing	Kalco/Consolidated Group/Alumax India/Domal/Aastha Alumina Pvt. Ltd.
31	Stainless Steel Fire Rated Hardware	Dorma,Geze,Hafele
32	Ss Handles, Tower Bolts, Hinges, Aldrop, Floor Stopper, Casement Stay, Safety Chain, Magnetic Door Catcher, Magic Eye, Drawer Glides, Panic Bar/ Push Bar	Hafele/ Dorma/ Geze/ Hettich/ Kich
Misc Items		
34	Aac Block Adhesive	Pidilite/Ferrouscrete/Laticrete
35	Glue	Fevicol/Dunlop/Vemicol/ Araldite
36	Blinds	Vista/Decorex/Elegant Décor
37	Fire Curtain	Orient Fire Curtains India Pvt. Ltd
38	Silicon Sealant	Ge Bayer Silicone/ Sika/Becker/Dow Corning
39	Tile Adhesives/Epoxy Grout/Silicone Spray/Polysulphide Sealant	Laticrete/Roffe/Pidilite
40	Water Proofing	Soprema/Fosroc/Basf
41	Antitermite Paint	Nocil/Pyramid/Trisul/Montari Industries
42	Fasteners/Cramps	Fischer/Hilti/Bosch/Canon
43	Thermal Insulation/Rockwool/Glas S Wool/Mineral Wool/Puf	Twiga/Polyglass/Owens Corning
44	Tile Adhesives, Epoxy Grout, Silicone Spray, Polysulphide Sealant	Laticrete, Roffe, Pidilite
45	Sports Equipments For Basketball	Apex, Stag, Koxton, Ngs
46	Sports Equipments For Badminton Both Movable	Apex, Koxton, Ktr, Metco, Stag, Vinex

	And Fixed	
47	Sports Equipments For Volleyball Both Movable And Fixed	Apex, Koxton, Ktr, Metco, Stag
48	Sports Equipments For Football	Cosco, Koxton, Stag, Ngs

2. DESIGN AND CONSTRUCTION SPECIFICATION: PLUMBING WORKS:

PLUMBING SYSTEM

1. INTRODUCTION

The proposed Building requires a comprehensive infrastructure for the convenience, comfort and safety of the users. A continuous water supply at adequate pressure, an efficient soil and waste disposal system and a fire protection system for the safety of life and property are part of the complete services infrastructure.

2. SALIENT FEATURES OF THE PROJECT

2.1 Max. Height of Building -- Less than 10 m in height.

2.2 Categories as per NBC /Building -- Group D-1(assembly building).

3. DETAILED SCOPE OF WORK

3.1 Internal Plumbing Works

- Sanitary Fixtures & C.P Brass Fittings.
- Soil, waste and Rain water pipes.
- Internal Water Supply System.
- Disposal of Soil, waste and Rain water pipes to 1st Manhole.

3.2 External Water Supply System

- connection of existing dom water supply ring / rising main

3.3 Sewerage System

- Collection and Conveyance around the proposed buildings.
- Septic tank and overflow to soak pit

3.4 Storm Water Drainage System

- Collection and Conveyance around the proposed buildings.
- Disposal of storm water to existing external Storm Water line.

3.7 Fire Fighting System

- overhead static water storage tank and terrace fire pump
- Portable Fire extinguishers.
- Downcomer and fire fighting accessories.

4. APPROACHES FOR PLANNING

4.1 Considering the nature of activities to be conducted and buildings to be developed, our 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 a continuous basis to every user in all the buildings.
- Efficient disposal from toilets/Wet areas.
- Quick disposal of rainwater without flooding.
- Reliable fire-fighting system.

4.2 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 use Standard Engineering Practices.

5. INTERNAL PLUMBING SYSTEMS

5.1 Sanitary Fixtures & C.P Brass Fittings

5.1.1 Sanitary fixtures shall be off-white /pastel colors/special colors vitreous china and of standard quality low flow as per Client/Architects specifications/AS per approval from the mock room.

5.1.2 C.P. fittings shall be as per requirement and of good quality as per Client/Architects specifications.

5.1.3 Water closets with dual flushing cistern are proposed. Wash basin shall be provided with single lever / Central hole pillar tap/basin mixer. Shower shall be C.P brass good quality comprising of single lever concealed mixer diverter with overhead shower, shower arm and bath spout.

5.1.4 Urinal shall be provided with electrical / battery operated urinal sensor

5.1.5 Vitreous China Sanitary Fixtures like EWC, WB, and Urinal shall be Parry ware and Jaquar. CP Fittings like Shower, WB Mixer, Sink Mixer, and Angle Valve shall be Parry ware and Jaquar.

5.2 Soil, Waste & Vent Piping System

5.2.1 Above ground piping is based on two pipe system as recommended in code of practice for soil and waste pipes as per (IS: 5329 - 1964). This implies that there are separate vertical stacks for soil pipes connected to a separate vertical anti-siphon age pipe and for the waste pipes will also be provided for the following:

- Soil pipes shall carry the wastes from WC's & urinals. Soil pipes shall connect directly to the manhole outside the building.
- Waste pipes shall carry the wastes from waste appliances (Showers, basins, kitchen sinks etc.). Waste pipes shall connect to Gully Traps outside the building, which shall in turn be connected to the external manholes.

5.2.2 Design Parameters

- Piping system will be designed in accordance with Code of Practice for Installation of Soil & Waste Pipes above Ground of the Bureau of Indian Standards (BIS) No. IS: 5329-1969.
- All vertical stacks will terminate as vent pipes at terrace level.

5.2.3 Pipe Work

- All vertical stacks will be installed in pipe shafts on the external face of the buildings or in internal shafts within the building according to the architectural planning of the toilets.
- All shafts will be provided with suitable access. Suitable platforms accessible with-in toilet or common areas will be detailed in the Architectural Planning. All shafts opening shall be casted after pipes are laid as per fire requirement and all shaft will be sealed at each floor level.
- Access to internal shafts shall be through fire rated doors from within the building.
- Provision will be made to provide cleanout doors and plugs for Roding and maintenance where necessary and required.
- All shaft

5.2.4 Materials for Soil, Waste & Vent Pipe System.

5.2.4.1 Pipes used for Soil, Waste and Vent system shall be uPVC SWR Type- B pipes conforming to IS: 13592 and fittings conforming to IS: 14735.

5.2.4.2 Soil, Waste and Rain Water Pipe shall be Supreme and Prince. CP Grating and Khurra Grating shall be Chilly and Neer.

5.3 Rain Water System

5.3.1 Separate and independent rain water drainage system will be provided which collects the rain water from the roofs, balconies, paved area, lawns & roads and finally dispose the rain water from outside the building into the external catch basin chambers / external drains/Rain water harvesting pits.

5.3.3 Design Parameters

- Rainwater down takes piping system will be designed in accordance with IS Code &CPWD Specifications.

5.3.4 Materials for Rain Water System

5.3.4.1 Pipes used for Rain water shall be Upvc SWR Type- B pipes conforming to IS: 13592 and fittings conforming to IS: 14735.

5.3.4.2 Rain Water Pipe shall be Supreme and Prince. Khurra Grating shall be Chilly and Near.

6. WATER SUPPLY SYSTEM

6.1 The following water requirements will be estimated on the basis of present acceptable standards, references from various sources such as the National Building Code of India, Public Health Manuals, Ministry of Environment & Forests Guidelines, as well as inputs from other services consultants involved on the project.

6.2 Proposed Water Management System

Reduce, Re-use, Re-cycle Model has to be adopted for meeting the water requirement. The following measures are proposed for reducing water consumption:

- Discipline use of water
- Installing water saving toilet fixtures and faucets and flow regulators

6.3 Source of Water Supply

Source of water supply shall be provided from the existing system on site.

.6 Water Tank Storages

Connection of existing dom water supply ring / rising main

S.No.	Description		OHT/UG	No of Tanks	Total Capacity
1.	Fire (external structure)-OHT		15 KL	1	15 KL
2.	Domestic (external structure)-OHT		5 KL	1	5KL
2.	Domestic-UG		10 KL	1	10KL
	Total				**30 KL**

6.9 Materials for Water Supply

6.9.1 Pipes used for internal / concealed water supply system with in toilets & kitchen shall be of CPVC SDR 11 pipes with fittings conforming to IS: 15778.

6.9.2 Pipes used for exposed water supply system with in shafts & terrace shall be of G.I pipes with G.I fittings shall be as per is : 1879 part (I to X)

6.9.3 Pipes used for external water supply system shall be of G.I pipes with fittings conforming to IS 1239 (Heavy Class).

6.9.4 Valves on branches, main line and delivery line of pumps shall have ball Valve/ butterfly valve of good approved quality, as per Requirement.

6.9.5 CPVC Pipe shall be Astral / Ashirvad make. GI Pipe shall be Tata / Jindal Hissar make. GI Fittings shall be KS / UNIK make.

8. SEWERAGE SYSTEM

The domestic sewage generated from the building shall be disposed by gravity system, which shall be connected to septic tank and overflow connected to soak pit
The network of sewerage system shall be sw pipe,

8.3 Material Specifications for the Sewerage System

8.3.1 The network of sewerage system shall be Upvc pipe network, as per requirements. Upvc Pipe shall be Supreme Make.

9. DRAINAGE SYSTEM

9.1 Proposed Storm Water Drainage System

9.2 The system has been proposed after studying the site conditions and considering the following factors:-

- The pattern of slopes of terrain of site.
- The existing conditions of site and surrounding.
- The final levels and patterns of different type of roads.
- Final disposal to external system as per site.

PHE /SANITATION AND FIREFIGHTING MATERIALS

LIST OF APPROVED MAKES OF EQUIPMENT & MATERIALS OF PLUMBING/FIRE FIGHTING WORKS

S.NO.	ITEM NO.	APPROVED MAKES
1.	SANITARY FIXTURES & FITTINGS	
A)	SANITARY WARE	JAQUAR / PARRYWARE / CERA
B)	CP FITTINGS	JAQUAR / PARRYWARE / CERA
C)	BATHROOM ACCESSORIES	JAQUAR / PARRYWARE / CERA
D)	SENSOR BATHROOM ACCESSORIES	JAQUAR / PARRYWARE / CERA
2	TRAPS/ WASTES/SHOWER TRAPS	POLOPLAST/ ASTRAL / REHAU/MCALPILE
3	PAN CONNECTORS	VIEGA/ MCALPILE
4	CONCEALED CISTERN	JAQUAR / PARRYWARE / CERA
5	SHOWER DRAINS (TRAPPED/UNTRAPPED)	POLOPLAST/ ASTRAL / REHAU/MCALPILE
6	STAINLESS STEEL PIPES/FITTINGS	JINDAL / VIEGA / KANTHERM / GEBERIT
7	G.I. PIPES /M.S.PIPES IS 1239/3589	TATA/JINDAL HISSAR/PRAKASH SURYA
8	UPVC PIPES AND FITTINGS	SUPREME/AKG/PRINCE/FINOLEX
9	POLYPROPYLENE PIPES & FITTINGS	POLOPLAST/ ASTRAL / REHAU
10	G.I. FITTINGS	KS/SANT/UNIK
11	CHECK VALVES (DUAL SLIM TYPE)	AUDCO/SANT/ZOLOTO
12	BUTTERFLY VALVE	AUDCO/SANT/ZOLOTO
13	BALL VALVES (15 TO 40MM)	AUDCO/SANT/ZOLOTO
14	RCC PIPES IS 458	PRAGATI CONCRETE UDYOG/ISI APPROVED
15	C.I. /D.I. MANHOLE COVER & FRAME IS 1726	NECO/MUNICAST /SKF/RIF
16	F.R.P. MANHOLE COVER, GRATING, CATCH BASIN COVER	PRODUCTS UNLIMITED/NECO/REF
17	HOT WATER INSULATION	K-FLEX/A-FLEX/SUPREME
18	ANTI CORROSIVE TAPE FOR PIPE PROTECTION	PYPKOTE/MAKPOLYKOTE/NECO/NEER
19	ANTICORROSIVE BITUMASTIC PAINT	ISI APPROVED
20	EPOXY PAINT	ISI APPROVED
21	HYDRO-PNEUMATIC SYSTEM	
I	PUMPS	GRUNDFOSS/XYLEM/ DP
II	PLC	AS PER MANUFACTURERS SPEC'S
III	PRESSURE VESSEL	AS PER MANUFACTURERS SPEC'S
IV	PRESSURE SENSOR	AS PER MANUFACTURERS SPEC'S
V	WATER PUMPS	GRUNDFOSS/XYLEM/ DP
VI	SUBMERSIBLE DRAINAGE PUMPS	GRUNDFOSS/XYLEM/ DP
22	FILTER/SOFTENER	THERMAX/ION EXCHANGE/PENTAIR
23	ELECTRICAL SWITCHGEAR & STARTERS	L&T/ABB/SIEMENS

24	CABLE TRAYS	SLOTCO OR EQUIVALENT
25	1100 VOLT GRADE XLPE CABLES	POLYCAB/HAVELLS/BATRA HENLEY
26	PVC INSULATED COPPER WIRES	POLYCAB/HAVELLS/BATRA HENLEY
27	VIBRATION ELIMINATOR PADS & CONNECTIONS	RESISTOFLEX/DUNLOP
28	SUCTION STRAINER/POT STRAINER	VENUS/LEADER/SANT/NVR
29	METERS, INDICATION LAMP	ENERCON OR EQUIVALENT
30	FORGED STEEL FITTINGS	VS/SAINT
31	PRESSURE GAUGE	FIEBIG/ H GURU

SPECIFICATIONS
PLUMBING

GENERAL REQUIREMENTS

1 A SCOPE OF WORK

1.1 The form of Contract shall be according to the "Conditions of Contract". The following clauses shall be considered as an extension and not in limitation of the obligation of the Contractor.

1.2 Work under this Contract shall consist of furnishing all labour, materials, equipment and appliances necessary and required. The Contractor is required to completely furnish all the plumbing and other specialised services as described hereinafter and as specified in the schedule of quantities and/or shown on the plumbing drawings.

1.3 Without restricting to the generality of the foregoing, the sanitary installations shall include the following:-

Plumbing Works

- Sanitary Fixtures
- Soil, Waste, Vent, Rainwater Pipes & Fittings
- Water Supply System
- Sewerage & Storm Water Drainage

1.4 Services rendered under this section shall be done without any extra charge.

1 B GRIHA CONSIDERATIONS

1.1 ewc with dual flushing cistern (3 / 6 liter) capacity

1.2 wash basin pillar tap with aerator and flow restricted up to 2.5 lpm

1.3 sink mixer with aerator and flow restricted up to 2.5 lpm

1.4 Oh shower and bath spout with aerator and flow restricted up to 4.5 lpm and 2.5 lpm respectively

1.5 Urinal with urinal sensor and flow restricted up to 250 ml / 500 ml per flush

2 SPECIFICATIONS

2.1 Work under this Contract shall be carried out strictly in accordance with specifications attached with the tender.

2.2 Items not covered under these specifications or due to any ambiguity or misprints, or additional works, the work shall be carried out as per specifications of the latest Central Public Works Department with up to date amendments as applicable in the Contract.

2.3 Works not covered under Para 2.1 and 2.2 shall be carried out as per relevant Codes & Bureau of Indian Standards and in case of its absence as per British Standard Code of Practice.

3 EXECUTION OF WORK

3.1 The Contractor should visit and examine the site of work and satisfy himself as to the nature of the existing roads and other means of communication and other details pertaining to the work and local conditions and facilities for obtaining his own information on all matters affecting the execution of work. No

extra charge made in consequence of any misunderstanding, incorrect information on any of these points or on ground of insufficient description will be allowed.

3.2 The work shall be carried out in conformity with the Plumbing drawings and within the requirements of architectural, electrical, structural and other specialised services drawings.

3.3 The Contractor shall cooperate with all trades and agencies working on the site. He shall make provision for hangers, sleeves, structural openings and other requirements well in advance to prevent hold up of progress of the construction schedule. All supports to the civil structure shall be provided with dash fasteners.

On award of the work, Contractor shall submit a schedule of construction in the form of a PERT chart or BAR chart for approval of the Project Manager/Architect/ Consultant. All dates and time schedule agreed upon shall be strictly adhered to within the stipulated time of completion/ commissioning along with the specified phasing, if any.

4 DRAWINGS

4.1 Contract drawings are diagrammatic but shall be followed as closely as actual construction permits. Any deviations made shall be in conformity with the architectural and other services drawings.

4.2 Architectural drawings shall take precedence over plumbing or other services drawings as to all dimensions.

Contractor shall verify all dimensions at site and bring to the notice of the Project Manager all discrepancies or deviations noticed. Decision of the Project Manager shall be final.

Large size details and manufacturers dimensions for materials to be incorporated shall take precedence over small scale drawings.

4.5 Any drawings issued by the Architects/Consultant for the work are the property of the Architects/ Consultant and shall not be lent, reproduced or used on any works other than intended without the written permission of the Architects/Consultant.

5 INSPECTION AND TESTING OF MATERIALS

5.1 Contractor shall be required, if requested, to produce manufacturers test certificate for the particular batch of materials supplied to him. The tests carried out shall be as per the relevant Bureau of Indian Standards.

5.2 For examination and testing of materials and works at the site Contractor shall provide all testing and gauging equipment necessary but not limited to the following:

Steel tapes

Weighing machine

Plumb bobs, sprit levels, hammer

Micrometers

Hydraulic machine

5.3 All such equipment shall be tested for calibration at any approved laboratory, if required by the Project Manager. All testing equipment shall be preferably located in special room meant for the purpose.

5.4 Samples of all materials shall be got approved before placing order and the approved samples shall be deposited with the Project Manager.

6 METRIC CONVERSION

6.1 All dimensions and sizes of materials and equipment given in the tender document are commercial metric sizes.

6.2 Any weights, or sizes given in the tender having changed due to metric conversion, the nearest equivalent sizes accepted by Indian Standards shall be acceptable without any additional cost.

7 REFERENCE POINTS

7.1 Contractor shall provide permanent bench marks, flag tops and other reference points and check that with other agencies to confirm the same reference point for all the proper execution of work and these shall be preserved till the end of the work.

7.2 All such reference points shall be in relation to the levels and locations, given in the architectural and plumbing drawings.

8 REFERENCE DRAWINGS

8.1 The Contractor shall maintain one set of all drawings issued to him as reference drawings. These shall not be used on site. All important drawings shall be mounted on boards and placed in racks indexed. No drawings shall be rolled.

8.2 All corrections, deviations and changes made on the site shall be shown on these reference drawings for final incorporation in the completion drawings to be submitted by the contractor in fulfilment of the conditions of this contract.
8.3. On award of the work the contractor shall be issued four sets of consultant's working drawings stamped "good for construction" by the Project Manager. The consultant's drawings shall be the basis of contractor's shop drawings. In addition, the Project Manager shall also issue one copy of the Interior Designer's; Electrical & HVAC approved shop drawings relevant to his work
8.4 Shop drawings are detailed working drawings which incorporate the contractor's details for execution of the work and incorporate equipment manufacturer's details and dimensions to ensure that the same can be installed in the space provided.
8.5 All shop drawings should detailed pipe routing and levels, showing location of other services at crossings etc., cable runs, route cable trays and all allied works and must be fully co-ordinated with other services and approved by the Project Manager before execution of the works. Project Manager shall arrange to issue two copies/prints of services drawings from the respective contracting agencies. Additional copies/prints may be provided on payment of actual cost of the copies/ prints. All drawings will valid only when stamped and issued by the Project Manager.

8.6 Shop drawings shall also be furnished for detailed layout of all equipment, foundation, bolting and vibration elimination details along with information on dead and dynamic load, vibration etc.
8.7 Six sets of manufacturer's equipment drawings, roughing in and wiring diagrams shall be submitted.
8.8 Contractor shall submit shop drawings furnishing all details of MCC panels, cable routes, wiring diagrams and connection details as required.
8.9 Three copies of each set of shop drawings shall be submitted for initial scrutiny, discussion and approval.
8.10 Each submission shall be accompanied by contractor's certificate stating that the shop drawings meet all the contract requirements and that the piping and equipment can be satisfactorily installed without any obstructions in the space available.
8.11 On approval of the above the contractor shall furnish six sets of the approved shop drawings for execution of the work.
9 COMPLETION DRAWINGS
9.1 On completion of work, Contractor shall submit one complete set of original tracings and two prints of "as built" drawings to the Project Manager. These drawings shall have the following information.
a) Run of all piping, diameters on all floors, vertical stacks and location of external services.
b) Ground and invert levels of all drainage pipes together with location of all manholes and connections up to outfall.
c) Run of all water supply lines with diameters, locations of control valves, access panels.
d) Location of all mechanical equipment with layout and piping connections and mechanical equipment.
e) All shop drawings shall be updated from time to time for the purpose of making completion drawings. No completion certificate shall be issued unless the above drawings are submitted.

9.2 Contractor shall provide four sets of catalogues, service manuals, manufacturer's drawings, performance data and list of spare parts together with the name and address of the manufacturer for all electrical and mechanical equipment provided by him.
9.3 All "warranty cards" given by the manufacturers shall be handed over to the Project Manager.
10. CONTRACTOR'S RATES
10.1 Rates quoted in this tender shall be inclusive of cost of materials, labour, supervision, erection, tools, plant, scaffolding, service connections, transport to site, taxes, octroi and levies, breakage, wastage and all such expenses as may be necessary and required to completely do all the items of work and put them in a working condition.
10.2 Rates quoted are for all heights and depths and in all positions as may be required for this work.
10.3 All rates quoted must be for complete items inclusive of all such accessories, fixtures and fixing arrangements, nuts, bolts, hangers as are a standard part of the particular item except where specially mentioned otherwise.
10.4 All rates quoted are inclusive of cutting holes and chases in walls and floors and making good the same with cement mortar/concrete/water proofing of appropriate mix and strength as directed by the Project

Manager. Contractor shall provide holes, sleeves, recesses in the concrete and masonry work as the work proceeds. All hot and cold water supply pipes crossing masonry walls shall be provided with G.I. pipe sleeves. The annular space between the pipe and sleeve shall be filled up with fire proof sealant after testing. Contractor shall give the pipe sleeves to the civil contractor well in time so that the same can be fixed along with civil works. Any co-ordination gap shall be of contractor's responsibility.

10.5 The Contractor shall furnish the Project Manager with vouchers & test certificates, on request, to prove that the materials are as specified and to indicate that the rates at which the materials are purchased in order to work out the rate analysis of non-tendered items which he may be called upon to carryout.

11 TESTING

11.1 Piping and drainage works shall be tested as specified under the relevant clauses of the specifications.

11.2 Tests shall be performed in presence of the Project Manager and test records for the tests shall be duly signed by Contractor and the Project Manager.

11.3 All materials and equipment found defective shall be replaced and whole work tested to meet the requirements of the specifications.

11.4 Contractor shall perform all such tests as may be necessary and required by the local authorities to meet municipal or other bye-laws in force.

11.5 Contractor shall provide all labour, equipment and materials for the performance of the tests.

12 SITE CLEARANCE AND CLEANUP

12.1 The Contractor shall, from time to time, clear away all debris and excess materials accumulated at the site.

12.2 After the fixtures, equipment and appliances have been installed and commissioned, Contractor shall clean-up the same and remove all plaster, paints, stains, stickers and other foreign matter or discolouration leaving the same in a ready to use condition.

12.3 On completion of all works, Contractor shall demolish all stores, remove all surplus materials and leave the site in a broom clean condition, failing which the same shall be done by the Project Manager at the Contractor's risk and cost. Cost of the cleanup shall be deducted from the contractor's bills on pro-rata basis in proportion to his contract value.

13 LICENCE PERMITS AND AUTHORITIES

13.1 Contractor must hold a valid plumbing or any other as required licence by the municipal authority or other competent authority under whose jurisdiction the work falls.

13.2 Contractor must keep constant liaison with the local development, municipal/statutory authority and obtain approval of all drainage, water supply, fire suppression and other works carried out by him.

13.3 Contractor shall obtain, from the municipal and other authorities 'C' & 'D' & other forms as required for approval of drainage and water supply works during execution and the completion certificate with respect to his work as required for occupation of the building. Contractor shall obtain permanent water supply and drainage connections from authorities concerned. CLIENT shall re-imbrues the fees paid to the authorities towards the connection charges on production of receipts for money paid.

13.4 Contractor shall get any materials tested from the appropriate authority if so required with no cost to the CLIENT.

14 RECOVERY OF COST FOR MATERIALS ISSUED TO CONTRACTORS FREE OF COST

If any material issued free of cost by the CLIENT to the contract for use on the work and the same is lost, stolen ,pilfered or broken while in contractor' possession, the cost of the same shall be recovered from the Contractor on the basis of actual cost to CLIENT. The cost shall include the cost paid, freight, transportation, excise duty, sales tax, octroi, import duty and other levies, plus 100% as penalty. The decision on the actual cost given by the CLIENT shall be final and binding on the Contractor.

14.1 Contractor has to keep full records of material issued by the CLIENT with reference and challans etc. Contractor has to give account of all such materials to the Project Manager.

15 CUTTING OF WATER PROOFING MEMBRANE:

No walls terraces shall be cut for making and opening after water proofing has been done without written approval of project manager. Cutting of water proofing membrane shall be done very carefully so as other portion of water proofing is not damaged. On completion of work at such place the water proofing

membrane shall be made good and ensured that the opening/cutting is made fully water proof as per specifications and details of water proofing approved by Project Managers.

16 CUTTING OF STRUCTURAL MEMBERS

No structural member shall be chased or cut without the written permission of the Project Manager.

17 MATERIALS SUPPLIED BY CLIENT.

The Contractor shall verify that all materials supplied by the CLIENT conform to the specifications of the relevant item in the tender. Any discrepancy found shall be brought to the notice of the Project Manager.

18 MATERIALS

18.1 Unless otherwise specified and expressly approved in writing by the Project Manager, only materials of makes and specification as mentioned in the list of approved makes attached with the specifications shall be used.

18.2 If required, the Contractor shall submit samples of materials proposed to be used in the works. Approved samples shall be kept in the office of the Project Manager.

SANITARY FIXTURES

1 SCOPE OF WORK

1.1 Work under this section shall consist of furnishing all materials & labour necessary and required to completely install all sanitary fixtures, chromium plated fittings and accessories as required by the drawings specified hereinafter and given in the Schedule of Quantities.

1.2 Without restricting to the generality of the foregoing the sanitary fixtures shall include the following:-

a) Sanitary fixtures

b) Chromium plated fittings

c) Accessories e.g., toilet paper holders, soap dish, coat hooks etc.

d) Connections to all kitchens, equipment, pump headers and other equipment requiring water and drainage connections.

1.3 Whether specifically mentioned or not all fixtures and appliances shall be provided with all fixing devices, nuts, bolts, screws, hangers as required.

1.4 All exposed pipes within toilets and near fixtures shall be chromium plated brass or copper unless otherwise specified.

2 GENERAL REQUIREMENTS

2.1 Sanitary fixtures and C.P. fittings in manufacturer’s packing as specified in the schedule of quantities shall be supplied by the Contractors.

All fixtures and fittings shall be provided with all such accessories as are required to complete the item in working condition whether specifically mentioned or not in the Schedule of Quantities, specifications, drawings. Accessories shall include proper fixing arrangement, brackets, nuts, bolts, screws and required connection pieces, WC flexible connectors etc.

2.3 Fixing screws shall be half round head chromium plated brass screws with C.P. washers where necessary.

2.4 Contractor shall furnish without cost all such accessories and fixing devices that are necessary and required but not supplied along with the Plumbing Fixtures & CP Fittings by the manufacturers as a part of the original and standard supply.

2.5 All fittings and fixtures shall be fixed in a neat workmanlike manner true to level and heights shown on the drawings and in accordance with the manufacturer’s recommendations. Care shall be taken to fix all inlet and outlet pipes at correct positions. Faulty locations shall be made good and any damage to the finished floor, tiling or terrace shall be made good at Contractor's cost.

2.6 Contractor shall seal all fixtures fixed near wall, marble and edges with an approved type of poly-sulphide sealant appropriate for its application.

3 EUROPEAN W.C

3.1 European W.C. shall be wash down or syphonic type floor or wall mounted set flushed by means of porcelain/ plastic flushing cistern, which will be an integral part of the WC system. Framework, walling and finishing will not form a part of the contractor’s work. Where applicable flush pipe/ bend shall be connected to the W.C. by means of a suitable rubber adapter. Wall hung W.C. shall be supported by C.I.

floor mounted chair.
3.2 Each W.C. set shall be provided with a plastic seat shall be with rubber buffers and chromium plated hinges.
3.3 Plastic seat shall be so fixed that it remains absolutely stationary in vertical position without falling down on the W.C. Each W.C. shall be suitable for flushing in low volume of water 3-6 litres.
3.4 Flushing cistern when provided shall be provided with all internal flushing mechanism, 15 mm dia ball cock with unbreakable polythene float and overflow pipe. Any frame work required for fixing cistern has to be provided by the contractor.
4 URINALS
4.1 Urinals shall be 18mm thk. Polished granite stone partition of size 750x500, shape and type specified in the Schedule of Quantities.
4.2 Bowl urinals shall be provided with 15 mm dia C.P. spreader, 32 mm dia stainless steel domical waste and C.P. cast brass bottle trap with pipe and wall flange, and shall be fixed to wall by C.I. brackets and C.I. wall clips as recommended by manufacturers complete as directed by Project Manager.
4.3 Urinals shall be fixed with C.P. brass screws and shall be provided with 32 mm dia domical waste leading to urinal's trap.

4.4 Flush pipes shall be G.I. pipes concealed in wall chase but with chromium plated bends at inlet and outlet or as given in Schedule of Quantities.
4.5 Urinal shall be flushed by means of fully automatic electrical / battery operated urinal sensor
Waste pipes for urinals shall be G.I pipes (Medium class) to IS: 1239 or uPVC class III (6 kg/sqcm) conforming to IS: 4985 as given in schedule of quantities.
Urinal sensor flushed the water 250 / 500 ml maximum
Waste pipes may be exposed on wall or concealed in chase as directed by the Project Manager.
Specifications for waste pipes shall be same as given in Section II.
5. WASH BASINS
5.1 Wash basins shall be wall mounted type or Counter top type as specified in the BOQ.
5.2 Each basin shall be supported on MS galvanized or CI brackets and clips and the basin securely fixed to wall or on the counter. The design of the brackets shall suit the basin selected and as recommended by the manufacturer.
5.3 Each wash basin shall be provided with 32 mm dia C.P.waste with overflow, pop-up or standard waste with rubber plug and chain, 32 mm dia C.P. brass bottle trap with CP pipe to wall and flange.
5.4 Each wash basin shall be provided with cp brass pillar tap / push bib cock.
5.5 Wash basin pillar tap / push bib cock shall be provided with aerator and flow restricted up to 2.5 lpm
5.6 Washbasins shall be fixed at proper heights as shown on drawings. If height is not specified, the rim level shall be 79 cms or as directed by Project Managers.
6 ACCESSORIES
6.1 Contractor shall install all chromium plated and porcelain accessories as shown on the drawings or directed by the Project Manager.
6.2 All C.P. accessories shall be fixed with C.P. brass half round head screws and cup washers in wall with rawl plugs or nylon sleeves and shall include cutting and making good as required or directed by Project Manager.

6.3 Recessed porcelain accessories shall be fixed in walls and set in cement mortar 1:2 (1 cement: 2 coarse sand) and fixed in relation to the tiling work as per Interior Designer’s drawings.
7 URINAL PARTITIONS
7.1 Urinal partitions shall be white glazed vitreous china, marble, granite or any other material selected by the Project Manager.
Urinal partitions shall be fixed at proper heights with C.P. brass bolts, anchor fasteners and M.S. Clips as recommended by the manufacturer and directed by Project manager
8 MEASUREMENT
8.1 Sanitary fixtures and accessories shall be measured by numbers in the unit given in the Schedule of Quantities.
8.2 Rates for all items shall be inclusive of cutting holes and chases and making good the same, C.P Brass screws, nuts, bolts and any fixing arrangements required and recommended by manufacturers, testing

and commissioning.
Electric Geysers
Electrical operated Geysers shall be Vertical and Horizontal storage type water heater fixed to wall with anchor , bolts , nuts 15 mm CP brass angle stop cock and 15 mm CP brass non return valve complete including making connections with 15 mm dia CP connecting pipes on inlet and outlets suitable length of power cables and 15 amps plugs shall be provided on the wall .
Capacity of geyser storage tank shall be 15L and 25L.
15L Geyser shall be use in kitchen areas while 25L geysers shall be use in showers or bath areas.

SOIL, WASTE, VENT & RAINWATER PIPES & FITTINGS
1. SCOPE OF WOR
1.1 Work under this section shall consist of furnishing all labour, materials, equipments and appliances necessary and required to completely install all soil, waste, vent and rainwater pipes and fittings as required by the drawings, and given in the Schedule of Quantities.
1.2 Without restricting to the generality of the foregoing, the soil, waste & vent and rainwater piping system shall include the following:-
a) Vertical and horizontal soil, waste & vent and rainwater pipes and fittings, joints, clamps and connections to fixtures.
b) Connection of all pipes to sewer lines as shown on the drawings at ground floor levels.
c) Floor and urinal traps, cleanout plugs, inlet fittings and rainwater heads.
d) Testing of all pipe lines.
2. GENERAL REQUIREMENTS
2.1 All materials shall be new of the best quality conforming to specifications and subject to the approval of Engineer-in-Charge.
2.2 Pipes and fittings shall be fixed truly vertical, horizontal or in slopes as required in a neat workmanlike manner.
2.3 Pipes shall be fixed in a manner as to provide easy accessibility for repair and maintenance and shall not cause obstruction in shafts, passages etc.
2.4 Pipes shall be securely fixed to walls and ceilings by suitable clamps a intervals specified.
2.5 Access doors for fittings and cleanouts shall be so located that they are easily accessible for repair and maintenance.
3. UPVC PIPES & FITTINGS“
3.1 Pipes
3.1.1 uPVC pipes for drainage system shall be un-plasticized (rigid) PVC pipes conforming to I.S:13592 type B as specified in schedule of quantities.

3.1.2 Fittings for the pipes shall be injection molded with approved type of sockets and 'O' rings joints/solvent welded joints as per recommendations of the manufacturers.
3.1.3 Jointing shall be done as per the manufacturers recommendation. The pipes and fittings must have matching dimensions for a perfect joint. Loose or excessively tight joints in the system shall not be accepted. Fittings must have sufficient gap (approx. 10 mm) for permissible thermal expansion of pipes.
3.1.4 uPVC pipes shall be clamped to the wall with approved type uPVC saddle clamps.
Fittings
3.2.1 Fittings shall conform to the same Indian Standard IS:14735 . Contractor shall use pipes and fittings of matching specifications.
Fittings shall be of the required degree of curvature with or without access door.
3.2.3 Access door shall be made up with 3 mm thick insertion rubber washer and white lead. The bolts shall be lubricated with grease or white lead for easy removal later. The fixing shall be air and water tight.
3.3 Fixing
3.3.1 All vertical pipes shall be fixed by M.S. clamps truly vertical. Branch pipes shall be connected to the stack at the same angle as that of the fittings. No collars shall be used on vertical stacks. Each stack shall be terminated at top with a cowl (terminal guard).
3.3.2 Horizontal pipes running along ceiling shall be fixed on structural adjustable clamps of special design shown on the drawings or as directed. Horizontal pipes shall be laid to uniform slope and the clamps adjusted to the proper levels so that the pipes fully rest on them.
3.3.3 Contractor shall provide all sleeves, openings, hangers, inserts during the construction. He shall

provide all necessary information to the building Contractor for making such ovisions in the structure as necessary. All damages shall be made good to restore the surfaces.

4. CLAMPS

4.1 Holder bat clamps shall be of standard design and fabricated from M.S. flats 40x3 mm thick and 12 mm dia M.S. Rod and 6 mm nuts and bolts. They shall be painted with two coats of black bitumen paint before fixing. Holder bat clamps shall be fixed in cement concrete 1:2:4 mix blocks 10x10x10 cms deep.

4.2 Where holder bat clamps are to be fixed in RCC column or slotted angles, walls or beam they shall be fixed with 40x3 mm flat iron "U" type clamps with anchor fasteners of approved design or 6 mm nuts and bolts.

4.3 Structural clamps shall be fabricated from M.S. structural members e.g. rods, angles, channels flats as per detailed drawing or as directed. Contractor shall provide all nuts, bolts, welding material and paint the clamps with one coat of red oxide and two or more coats of black enamel paint.

4.4. Slotted angle/channel supports on walls shall be provided wherever shown on drawings. Angles/channels shall be of sizes shown on drawings or specified in schedule of quantities. Angles/channels shall be fixed to brick walls with bolts embedded in cement concrete blocks and to RCC walls with suitable anchor fasteners. The spacing of support bolts horizontally shall not exceed 1 m.

4.5 Wherever M.S. clamps are required to be anchored directly to brick walls, concrete slabs, beams or columns, nothing extra shall be payable for clamping arrangement and making good with cement concrete 1:2:4 mix (1 cement :2 coarse sand :4 mm stone aggregate 20 mm nominal size) as directed by the Engineer-in-Charge.

5. TRAPS

5.1 Urinal traps: Urinal traps shall be Upvc P or S traps with or without vent and set in cement concrete block specified in Para above without extra charge.

5.2 Floor trap inlet: Bath room traps and connections shall ensure free and silent flow of discharging water. Where specified, Contractor shall provide a special type Upvc inlet fitting hoper fabricated from 110 mm Upvc (IS:13592) pipe without or with one, two or three inlet sockets to receive the waste pipe (s). Joint between waste and hopper inlet socket shall be solvent cement/ring joint. Hopper shall be connected to a Upvc P or S trap with at least 50 mm seal (hopper and traps shall be paid for separately.)Floor trap inlet hoppers and the traps shall be set in cement concrete blocks as specified in Para above without extra charge.

5.4 Floor Trap Grating: Floor and urinal traps shall be provided with 75-150mm square or round C.P./Stainless steel grating, with rim of approved design and shape. Minimum thickness shall be 4 mm (for C.P. brass) or 1.2 mm (for SS), as specified in the Schedule of Quantities.

JOINTING

Soil, waste vent, anti-syphonage and rainwater pipes shall be jointed with solvent cement/ring joint.

7. END CAP

Contractor shall provide cast brass end cap as required. End cap shall be threaded and provided with key holes for opening. End cap shall be fixed to the pipe by a Upvc socket and cement solvent joint.

8. WASTE PIPE FROM APPLIANCES

9.1 Waste pipe from appliances e.g. washbasins, sinks and urinals shall be of Upvc pipe class III (6 kg / sqcm) as per is : 4985 as given in the Schedule of Quantities.

9.2 All pipes shall be fixed in gradient towards the outfalls of drains. Pipes inside a toilet room shall be in chase unless otherwise shown on drawings. Where required pipes may be run at ceiling level in suitable gradient and supported on structural clamps. Spacing for clamps for such pipes shall be as follows:-

	Vertical	horizontal
Upvc pipes	180 cms	120 cms

10. KHURRAS

10.1 The khurras shall be constructed before the brick masonry work in parapet wall is taken up and it shall be 45cmx45cm unless otherwise specified in the description of the item and shall be formed of cement concrete 1:2:4 mix (1 cement: 2 coarse sand: 4 graded stone aggregate 20 mm nominal size) or other mix as stipulated in the description of the item.

10.2 Laying:

10.2.1 A PVC sheet 1mx1mx400 micron shall be laid under the khurras and then cement concrete shall be laid over it to average thickness of 50mm with its top surface lower than the level of adjoining roof surface by not less than

a) 20mm in case of roof surface finished with lime concrete terracing.
b) 70 mm in case of roof surface finished with lime concrete terracing covered with brick tiles.
c) 50mm in case of roof surface finished with mud phuska with brick tile covering.

10.2.2 The concrete shall be laid to a size greater than the stipulated size of the khurras in such a way that the adjoining terracing whether of lime concrete or of the tile brick shall overlap the concrete on its three edges by not less than 7.5 cm. The concrete will slope uniformly from the edges to the outlets the slope as being as much as possible and in no case less than 20mm cement concrete at outlet. The concrete shall be continued at the same slope through the width of the wall into the outlet opening to ensure a water tight joint.

10.2.3 The khurras and the side of the outlet shall than be rendered with 12mm coat of cement plaster 1:3 mix ((1 cement:3 coarse sand) or other mix as stipulated in the description of the item. This shall be done when the concrete is still green and shall be finished with floating coat of neat cement. The sides of the khurras and the sides of the outlet opening shall be well rounded. The size of the finished outlet opening shall be 10cm wide by 20 cm high or as directed by Engineer -in-charge.

As a safeguard against choking of rainwater outlet through rain water pipes at terrace level, Cast Iron rainwater outlet fitting with aluminum ring and aluminum domical head (fixed with SS screw) of size 250x100 mm shall be provided as directed by the Engineer in-Charge.

11. CEMENT CONCRETE

12.1 Upvc soil and waste pipes under floor in sunken slabs and in wall chases (when cut specially for the pipe) shall be encased in cement concrete 1:2:4 mix (1 cement :2 coarse sand :4 stone aggregate 12 mm size) 75 mm in bed and all-round. When pipes are running well above the structural slab, the encased pipes shall be supported with suitable cement concrete pillars of required height at intervals of 1.8 m. Rate for concrete round pipes shall be inclusive of pillars, supports, shuttering and centering.

13. CUTTING AND MAKING GOOD

14.1 Pipes shall be fixed and tested as building proceeds. Contractor shall provide all necessary holes cut outs and chases in structural members as building work proceeds. wherever holes are cut or left originally, they shall be made good with cement concrete 1:2:4 (1 cement: 2 coarse sand: 4 stone aggregate 20 mm nominal size) or cement mortar 1:2 (1 cement: 2 coarse sand) and the surface restored as in original condition.

15. TESTING

15.1 Before use at site all Upvc soil pipes shall be tested by filling up with water for at least 10 minutes. After filling, pipes shall be struck with a hammer and inspected for blow holes and cracks. All defective pipes shall be rejected and removed from the site within 48 hours. Pipes with minor sweating may be accepted at the discretion of the Engineer-in-Charge.

15.2 Pipes shall be tested after installation, by filling up the stack with water. All opening and connections shall be suitably plugged. The total head in the stack shall be however not exceed 3 m.

15.3 Alternatively Contractor may test all soil and waste stacks by a smoke testing machine. Smoke shall be pumped into the stack after plugging all inlets and connections. The top end shall, however, be left open. The stack shall then be observed for leakages and all defective pipes and fittings removed or repaired as directed by the Engineer-in-Charge.

15.4 A test register shall be maintained and all entries shall be signed and dated by Contractors and Engineer-in-Charge.

16. MEASUREMENTS

16.1 General

16.1.1 Rates for all items quoted shall be inclusive of all work and items given in the above mentioned specifications and Schedule of Quantities and applicable for the work under floors, in shafts or at ceiling level at all heights and depths.

16.1.2 All rates are inclusive of cutting holes and chases in RCC and masonry work and making good the same.

16.1.3 All rates are inclusive of pre testing and on site testing of the installations, materials and commissioning.

16.2 Pipes (Unit of measurement: Linear meter to the nearest centimeter)

16.2.1. All uPVC soil, waste, vent, anti-syphonage and rain water pipes shall be measured net when fixed correct to a centimeter including all fittings along its length. No allowance shall be made for the portions of pipe lengths entering the sockets of the adjacent pipes or fittings. The above will apply to both case i.e. whether pipes are fixed on wall face or pillars or embedded in masonry or pipes running at ceiling level. Cement concrete around pipes shall be measured along the centre of the pipe line measured per linear metre and include any masonry supports, shuttering and centering cutting complete as described in the relevant specifications.
16.4 Slotted angles/channels shall be measured per linear metre of finished length and shall include support bolts and nuts embedded in masonry walls with cement concrete blocks and nothing extra will be paid for making good the same.

16.5 Fittings: Unit of measurement shall be the number of pieces. All urinal traps, trap gratings, hoppers, end cap shall be measured by number per piece and shall include all items described in the relevant specifications and Schedule of Quantities.
16.6 Painting: Painting of pipes shall be measured per running metre and shall be inclusive of all fittings and clamps. No deduction for fittings shall be made.
16.7 Excavation for soil, waste, anit-siphonage and rainwater pipes: - no extra payment shall be admissible with respect to excavation, refilling and disposal of surplus earth for uPVC pipes.
16.8 Khurras shall be counted in numbers. The rate for each completed khurra of the specified size shall include the cost of all materials and labour involved in forming the khurra an the outlet opening as described in specifications above, except for the rainwater head grating, which shall be paid separately.

WATER SUPPLY SYSTEM
1. SCOPE OF WORK
1.1 Work under this section consists of furnishing all labour, materials equipment and appliances necessary and required to completely install the water supply system as required by the drawings, specified hereinafter and given in the Schedule of Quantities.
1.2 Without restricting to the generality of the foregoing, the water supply system shall include the following:-
a) Distribution system from main supply headers to all fixtures and appliances for cold & hot water. Cold water supply lines from city water connections to Under Ground Water Tank.
c) Garden irrigation system
d) Excavation and refilling of pipes trenches.
e) Pipe protection and painting.
f) Control valves, masonry chambers and other appurtenances.
g) Connections to all plumbing fixtures, tanks, appliances and municipal mains
h) Inserts for R.C.C. tanks
2 GENERAL REQUIREMENTS
2.1 All materials shall be new of the best quality conforming to specifications. All works executed shall be to the satisfaction of the Project Manager.
2.2 Pipes and fittings shall be fixed truly vertical, horizontal or in slopes as required in a neat workmanlike manner.
2.3 Short or long bends shall be used on all main pipe lines as far as possible. Use of elbows shall be restricted for short connections.
2.4 Pipes shall be fixed in a manner as to provide easy accessibility for repair and maintenance and shall not cause obstruction in shafts, passages etc.
2.5 Pipes shall be securely fixed to walls and ceilings by suitable clamps at intervals specified.

2.6 Clamps, hangers and supports on RCC walls, columns & slabs shall be fixed only by means of approved made of expandable metal fasteners inserted by use of power drills.
2.7 All pipe clamps, supports, nuts, bolts, washers shall be galvanised MS steel throughout the building. Painted MS clamps & MS nuts, bolts & washers shall not be accepted.
2.8 Valves and other appurtenances shall be so located as to provide easy accessibility for operations, maintenance and repairs.
3 WATER SUPPLY SYSTEM
3.1 Contractor should study the site plan and the water supply systems one for domestic water supply.

Source
Water supply will be acquired from Municipal Corporation water mains (as available) to a service connection and collected in water storage tanks located underground.
The system has been connected to a gravity feed system from overhead tanks to all parts of the building
Domestic water supply shall be provided with cold water system only. Hot water provisions to kitchen and all toilets connected to a local electric hot water storage geyser
4 (CPVC) G.I. PIPES, FITTINGS & VALVES
4.1 all water supply pipes inside the toilet for domestic flushing and hot water supply shall be cpvc pipe as per is 15788 and class sdr 11
4.2 Solvent welded CPVC fittings etc. tees, elbows, couplers, unions, reducers, brushing etc. including transition fittings (connection between CPVC and metal pipes/G.I. ie. Brass adopters conforming to ASTM D-2846) shall be provided.
All pipes shall be fixed in accordance with layout and alignment shown on the drawings. Care shall be taken to avoid air pockets. G.I. pipes inside toilets shall run above false ceiling with vertical drop in wall chases for all fixtures. No pipes to run inside sunken floor as far as possible. Pipes may run under the ceiling or floors and other areas as shown on drawings.
all water supply pipes exposed in shafts and terrace for domestic flushing hot water supply shall be gi pipe as per is : 1239 and fittings conforming to is : 1879 (part I to X)
4.4 Joining Pipes & Fittings

Cutting
Pipes shall be cut either with a wheel type plastic pipe cutting or hacksaw blade and care shall be taken to make a square cut. All burrs should be removed for proper contact between pipe and fittings during jointing.
Solvent Cement Application
Only CPVC solvent cement conforming to ASTM-F-493 should be used for joining pipe with fittings. An even coat of solvent cement should be applied on the pipe end and a thin coat inside the fitting socket.
Assembly
After applying the solvent cement on both pipe and fitting socket, pipe should be inserted into the fitting socket within 30 seconds, and rotating the pipe ¼ to ½ turn while inserting so as to ensure even distribution of solvent cement with the joint. The assembled system should be held for 10 seconds (approximately) in order to allow the joint to set up.
Testing
The system should be hydrostatically pressure tested at 150 psi (10 Bar) for one hour. During pressure testing, the system should be fitted with water and if a leak is found, the joint should be cut out the replaced with new one.
4.5 Transition of Flow guard CPVC in metals
When making a transition connection to metal threads, special brass/plastic transition fitting (Male and female adapters) should be used. Plastic threaded connections should not be over torque.
Threaded sealants
Teflon tape shall be used to make threaded connections leak proof.
Solvent Cement
Only CPVC solvent cement conforming to ASTMF 493 should be used for joining pipe with fittings and valves.
Hangers and supports
For Horizontal runs, support should be given at 3 feet (90 cms) intervals for diameters of one inch and below and at 4 feet (1.2 m) intervals for larger sizes.

Supports should be as per the below mentioned table:

Size of pipe	20ºC	49ºC	71ºC	82ºC
mm	Ft.	Ft.	Ft.	Ft.
15 mm	5.5	4.5	3.0	2.5
20 mm	5.5	5.0	3.0	2.5
25 mm	6.0	5.5	3.5	3.0
32 mm	6.5	6.0	3.5	3.5
40 mm	7.0	6.0	3.5	3.5
50 mm	7.0	6.5	4.0	3.5

4.9 Anchor Fasteners

4.9.1 All pipe supports, hangers and clamps to be fixed on RCC walls, beams, columns, slabs and masonry walls 230mm thick and above by means of galvanised expandable anchor fasteners in drilled holes of correct size and model to carry the weight of pipes. Drilling shall be made only by approved type of power drill as recommend and approved by manufacturer of the anchor fasteners. Failure of any fastening devices shall be the entire responsibility and contractor shall redo or provide additional supports at his own cost. He shall also compensate the DPL for any damage that may be caused by such failures.

4.10 Unions

Contractor shall provide adequate number of unions on all pipes to enable easy dismantling later when required. Unions shall be provided near each gunmetal valve, stop cock, or check valve and on straight runs as necessary at appropriate locations as required and/or directed by Project Manager.

4.11 Flanges

Flanged connections shall be provided on pipes as required or where shown on the drawings, all equipment connections as necessary and required or as directed by the Project Manager. Connections shall be made by correct number and size of GI nuts, bolts & washers with 3 mm thick gasket. Where hot water connections are made insertion gasket shall be of suitable high temperature grade and quality approved by the Project Manager. Bolt hole dia for flanges shall conform to match the specification for C.I. sluice valve to I.S. 14846. and C.I. butterfly valve to IS: 13095.

4.12 Trenches

All water supply pipes below ground shall be laid in trenches with a minimum cover of 60 cms. The width and depth of the trenches shall be as follows:-

Dia of pipe	Width of trench	Depth of trench
15 mm to 50 mm	30 cms	75 cms
65 mm to 150 mm	45 cms	100 cms

4.13 Sand filling

G.I. pipes in trenches shall be protected with fine sand 15 cms all round before filling in the trenches.

4.12 Painting (Painting for CPVC pipes not required)

4.12.1 All pipes above ground shall be painted with one coat of red lead and two coats of synthetic enamel paint of approved shade and quality. Pipes shall be painted to standard colour code given in this documents or specified by Project Manager.

4.13 Pipe protection (Protection for CPVC pipes not required)

4.13.1 All G.I. pipes in wall chase /below floors or laid under ground shall be protected against corrosion by the application of two coats of bitumen paint covered with polythene tape and a final coat of bitumen paint.

4.13.2 G.I. waste pipes buried in ground or sunken slab shall be protected with multilayer bitumen membrane tape 3mm thick with a final coat of hot or cold applied bitumen. Pypkote or equivalent.

4.14 Valves

4.14.1 Ball Valves

Valves upto 50 mm dia. shall be screwed type Ball Valves with stainless steel balls, spindle, teflon seating and gland packing tested to a hydraulic pressure of 25 kg/cm2, and accompanying couplings and steel handles.(to BS 5351)

4.15 Butterfly Valves

4.15.1 Valves 50 mm dia and above shall be cast iron butterfly valve to be used for isolation. The valves shall be bubble tight, resilient seated suitable for flow in either direction and seal in both direction with accompanying flanges and steel handle.

4.15.2 Butterfly valve shall be of best quality conforming to IS: 13095.

4.16. Non Return Valve (Slim Type)

Where specified non return valve (swing check type) shall be provided through which flow can occur in one direction only. It shall be single door swing check type of best quality.

4.16.1 Each Butterfly and Slim Type Swing Check (NRV) Valve shall be provided with a pair of flanges screwed or welded to the main line and having the required number of galvanised nuts, bolts and washers of correct length.

4.16.2 Storage tanks Underground & Overhead Tank. (Accessories & Connections)
4.16.6 Storage tanks for water supply shall be in reinforced cement concrete built by the building Contractor.
4.16.4 Each tank shall be provided with lockable type manhole cover fabricated from M.S. sheets. Manhole covers shall be 450-500 mm dia and fully galvanised after fabrication or as approved by the Project Manager.
4.16.5 Non return valve horizontal / vertical as per IS : 5312
4.17 Storage Tanks
4.17.1 Underground
Underground storage tanks for water supply shall be reinforced cement concrete built by the building contractor.
Each tank shall be provided with lockable type manhole cover fabricated from M.S. sheet or standard cost iron tank covers. Manhole covers shall be 450-500 mm dia or as approved by local municipal authority.
4.18 Outlets and overflow
All nozzles for puddle flanges in RCC tank for inlet, outlet, overflow and scour etc. shall be provided by civil contractor or as given in the Schedule of Quantities. Further connections and accessories shall be provided under this contract.

4.19 Testing
4.19.1 All pipes, fittings and valves after fixing at site, shall be tested by hydrostatic pressure of 1.5 times the working pressure or 10 kg/cm2 whichever is more.
Pressure shall be maintained for a period of at least thirty minutes without any drop.
A test register shall be maintained and all entries shall be signed and dated by Contractor (s) and Project Manager.
4.19.2 In addition to the sectional testing carried out during the construction, Contractor shall test the entire installation after connections to the overhead tanks or pumping system or mains. He shall rectify all leakages and shall replace all defective materials in the system. Any damage done due to carelessness, open or burst pipes or failure of fittings, to the building, furniture and fixtures shall be made good by the Contractor during the defects liability period without any cost.
4.19.3 After commissioning of the water supply system, Contractor shall test each valve by closing and opening it a number of times to observe if it is working efficiently. Valves which do not effectively operate shall be replaced by new ones at no extra cost and the same shall be tested as above.
4.20 Measurement
CPVC or G.I. pipes above ground shall be measured per linear meter (to the nearest cm) and shall be inclusive ofall fittings e.g. coupling, tees, bends, elbows, unions, flanges and U clamps with nuts, bolts & washers fixed to wall or other standard supports.
Jointing with teflon tape, white lead and insertion gasket of appropriate temperature grade.
Cutting holes, and chases in walls, floors, any pipe support required for pipes below ground & making good the same.
Excavation, back filling, disposal of surplus earth and restoring the ground & floor in original condition.
Pipe Supports.
Fabricated and galvanised supports shall be measured by weight. Weight for each type of clamp shall be calculated on basis of the quantity of structural and MS used from the theoretical weight calculated on basis of the components theoretical weight of the sections.
4.21.1 Rate quoted for supports & hangers shall be inclusive of:-

a) Expandable anchor fastens.
b) Galvanising of all supports & hangers.
c) Cutting holes in walls, ceilings on floors and making good where permitted.
d) Nuts, bolts and washers for fixing and assembling.
e) Wooden/PVC pipe saddles for vertical or horizontal runs.

4.21.2 Valves
Gunmetal, cast iron, butterfly and non return valves and puddle flanges shall be measured by numbers and shall include wheels/caps, GI nuts, bolts, washers and insertion gasket.
4.21.3 Painting/pipe protection/insulation
Painting/pipe protection/insulation for pipes shall be measured per linear metre over finished surface and

shall include all valves and fittings for which no deduction shall be made. No extra payment shall be made for fittings, valves or flanges.
Thermoflex or Careflex thermal insulation tubing, a elastomeric flexible material having hermetic blister closed cell structure of expanded synthetic rubber over pipes of nominal bores and thickness 9mm Thick inside and 13mm for exposed pipe

EXTERNAL SEWERAGE & EXTERNAL STORM WATER DISPOSAL

1. SCOPE OF WORK

1.1 Work under this section shall consist of furnishing all labour, materials, equipment and appliances necessary and required to completely install all the drainage system as required by the drawings and specified hereinafter or given in the Schedule of Quantities.

1.2 Without restricting to the generality of the foregoing, the drainage system shall include:-

a) Sewer lines including excavations, pipe lines, manholes, drop connections and connections to the municipal or existing sewer.

b) Storm water drainage, excavation, pipe lines, manholes, catch basins and connections to the existing municipal storm water drain.

2. GENERAL REQUIREMENTS

2.1 All materials shall be of the best quality conforming to specifications and subject to the approval of the Engineer-in-Charge.

2.2 Drainage lines and open drains shall be laid to the required gradients and profiles.

2.3 All drainage work shall be done in accordance with the local municipal bye-laws.

2.4 Contractor shall obtain necessary approval and permission for the drainage system from the municipal or any other competent authority.

2.5 Location of all manholes, etc. shall be got confirmed by the Engineer-in-Charge before the actual execution of work at site. As far as possible, no drains or sewers shall be laid in the middle of road unless otherwise specifically shown on the drawings or directed by the Engineer-in-Charge.

3. EXCAVATION

3.1 Alignment and grade: The sewer pipes shall be laid to alignment and gradient shown on the drawings but subject to such modifications as shall be ordered by the Engineer-in-Charge from time to time to meet the requirements of the works. No deviations from the lines, depths of cutting or gradients of sewers shown on the plans and sections shall be permitted except by the express direction in writing of the Engineer-in-Charge.

3.2 Excavation in tunnels: The excavation for sewer works shall be open cutting unless the permission of the Engineer-in-Charge for the ground to be tunneled is obtained in writing. Where sewers have to be constructed along narrow passages, the Engineer-in-Charge may order the excavation to be made partly in tunnel and in such cases the excavated soil shall be brought back later on for refilling the trenches or tunnel.

3.3 OPENING OUT TRENCHES: In excavating the trenches, etc. The solid road metalling, pavement, kerbing, etc. And turf is to be placed on one side and preserved for reinstatement when the trenches or other excavation shall be filled up. Before any road metal is replaced, it shall be carefully sifted. The surface of all trenches and holes shall be restored and maintained to the satisfactions of the Engineer-in-Charge and of the owners of the roads or other property traversed and the Contractor shall not cut out or break down any live fence of trees in the line of the proposed works but shall tunnel under them, unless the Engineer-in-Charge shall order to the contrary. The Contractor shall grub up and clear the surface over the trenches and other excavations of all trees, stumps roots and all other encumbrances affecting execution of the work and shall remove them from the site to the approval of the Engineer-in-Charge.

3.4 OBSTRUCTION OF ROADS: The Contractor shall not occupy or obstruct by his operation more than one half of the width of any road or street and sufficient space shall then be left for public and private transit, he shall remove the materials excavated and bring them back again when the trench is required to be refilled. The Contractor shall obtain the consent of the Engineer-in-Charge in writing before closing any road to vehicular traffic and the foot walks must be clear at all times.

3.5 REMOVAL OF FILTH: All night soil, filth or any other offensive matter met with during the execution of the works, immediately after it is taken out of any trench, sewer or cess pool, shall not be deposited on to the surface of any street or where it is likely to be a nuisance or passed into any sewer or drain but shall be at once put into the carts and removed to a suitable place to be provided by the Contractor.

3.6 EXCAVATION TO BE TAKEN TO PROPER DEPTHS: The trenches shall be excavated to such a depth that the sewer shall rest on concrete as described in the several clauses relating there to and so that

the inverts may be at the levels given in the sections. In bad ground, the Engineer-in-Charge may order the Contractor to excavate to a greater depth than that shown on the drawings and to fill up the excavation to the level of the sewers with concrete, broken stone, graven or other materials. For such extra excavation and concrete, broken stone, gravel or other materials, the Contractor shall be paid extra at rates laid down for such works in the schedule, if the extra work was ordered by the Engineer-in-Charge in writing, but if the Contractor should excavate the trench to a greater depth than is required without a specific order to that effect in writing of the Engineer-in-Charge the extra depth shall have to be filled up with concrete at the Contractor's own costs and charges to the requirements and satisfactions of the Engineer-in-Charge.

3.7 REFILLING: After the sewer or other work has been laid and proved to be water tight, the trench or other excavations shall be refilled. Utmost care shall be taken in doing this, so that no damage shall be caused to the sewer and other permanent work. The filling in the haunches and up to 75 cms above the crown of the sewer shall consist of the finest selected materials placed carefully in 15 cms layers and flooded and consolidated. After this has been laid, the trench and other excavation shall be refilled carefully in 15 cms layers with materials taken from the excavation, each layer being watered to assist in the consolidation unless the Engineer-in-Charge shall otherwise direct.

3.8 CONTRACTOR TO RESTORE SETTLEMENT AND DAMAGES: The Contractor shall, at his own costs and Charges, make good promptly during the whole period the works are in hand, any settlement that may occur in the surfaces of roads, beams, footpaths, gardens, open spaces etc. Whether public or private caused by his trenches or by his other excavations and he shall be liable for any accidents caused thereby. He shall also, at his own expense and Charges, repair and make good any damage done to buildings and other property. If in the opinion of the Engineer-in-Charge he fails to make good such works with all practicable dispatch, the Engineer-in-Charge shall be at liberty to get the work done by other means and the expenses thereof shall be paid by the Contractor or deducted from any money that may be or become due to him or recovered from him in any other manner according to the law of the land.

3.9 DISPOSAL OF SURPLUS SOIL: The Contractor shall at his own costs and charges provide places for disposal of all surplus materials not required to be used on the works. As each trench is refilled the surplus soil shall be immediately removed, the surface properly restored and roadways and sides left clear.

3.10 TIMBERING OF SEWER AND TRENCHES:

a) The Contractor shall at all times support efficiently and effectively the sides of the sewer trenches and other excavations by suitable timbering, piling and sheeting and they shall be closed, timbered in loose or sandy strata and below the surface of the sub soil water level.

b) All timbering, sheeting and piling with their walling and supports shall be of adequate dimensions and strength and fully braced and strutted so that no risk of collapse or subsidence of the walls of the trench shall take place.

c) The Contractor shall be held responsible and will be accountable for the sufficiency of all timbering, bracings, sheeting and piling used as also for, all damage to persons and property resulting from improper quality, strength, placing, maintaining or removing of the same.

3.11 SHORING OF BUILDINGS: The Contractor shall shore up all buildings, walls and other structures, the stability of which is liable to be endangered by the execution of the work and shall be fully responsible for all damages to persons or property resulting from any accident.

3.12 Removal Of Water From Sewer, Trench Etc:

a) The Contractor shall at all times during the progress of the work keep the trenches and excavations free from water which shall be disposed of by him in a manner as will neither cause injury to the public health nor to the public or private property nor to the work completed or in progress nor to the surface of any roads or streets, nor cause any interference with the use of the same by the public.

b) If any excavation is carried out at any point or points to a greater width than the specified cross section of the sewer with its envelope, the full width of the trench shall be filled with concrete by the Contractor at his own expenses and charges to the requirements of the Engineer-in-Charge.

3.13 WIDTH OF TRENCH: The Engineer-in-Charge shall have power by giving an order in writing to the Contractor to increase the maximum width in respect of which payment will be allowed for excavation in trenches for various classes of sewer, manholes, and other works in certain lengths to be specifically laid down by him, where on account of bad ground or other unusual conditions, he considers that such increased widths are necessary in view of the site conditions.

3.14 Recommended Width Of Trenches at the Bottom Shall Be As Follows:-

1.	100 mm dia pipe	55 cms
2.	150 mm dia pipe	55 cms
3.	225-250 cms dia pipe	60 cms
4.	300 mm dia pipe	75 cms

Maximum width of the bed concrete shall also be as above. No additional payment is admissible for widths greater than Specified.

4. STONEWARE PIPES

4.1 Pipes

4.1.1 SW pipes for sewer pipe system shall be stoneware pipes conforming to I.S:651 as specified in schedule of quantities.

4.1.2 Fittings for the pipes shall be stoneware fittings and jointed with stiff mixture of cement and coarse sand as per BOQ item & manufacturer recomendation .

4.1.3 Jointing shall be done as per the manufacturers recommendation. The pipes and fittings must have matching dimensions for a perfect joint. Loose or excessively tight joints in the system shall not be accepted.
.

SW pipes shall be laying as per IS :4127.

4.2 Testing

a) All lengths of the sewer and drain shall be fully tested for water tightness by means of water pressure maintained for not less than 30 minutes. Testing shall be carried out from manhole to manhole. All pipes shall be subjected to a test pressure of at least 1.5 metre head of water. The test pressure shall, however, not exceed 6 meter head at any point. The pipes shall be plugged preferably with standard design plugs with rubber plugs on both ends. The upper end shall, however, be connected to a pipe for filling with water and getting the required head.

b) Sewer lines shall be tested for straightness by:

(i) Inserting a smooth ball 12 mm less than the internal diameter of the pipe. In the absence of obstructions such as yarn or mortar projecting at the joints the ball should roll down the invert of the pipe and emerge at the lower end,

(ii) Means of a mirror at one and a lamp at the other end. If the pipe line is straight the full circle of light will be seen otherwise obstruction of deviation will be apparent.

c) The Contractor shall give a smoke test to the drains and sewer at his own expense and charges, if directed by the Engineer-in-Charge.

d) A test register shall be maintained which shall be signed and dated by Contractor, Engineer-in-Charge and representative of Architects/Consultants (WAC Engineers).

4.3 Gully traps: Gully traps shall be of the same quality as described for SW pipes . Gully traps shall be fixed in cement concrete 1:5:10 mix and a brick masonry chamber 30x30 cms inside in cement mortar 1:5 with 15x15 cms grating inside and 30x30 cms CI cover as per standard drawing. Where necessary, sealed cover shall be replaced with C.I. grating of the same size (1 cement : 5 coarse sand: 10 stone aggregate 40 mm nominal size).

5. REINFORCED CEMENT CONCRETE PIPES

5.1 All underground storm water drainage pipes and where specified (other than those specified cast iron) shall be centrifugally spun Np2 class rcc pipe light duty as per is : 458. Pipes shall be true and straight with uniform bore, throughout. Cracked, warped pipes shall not be used on the work. All pipes shall be tested by the manufacturer and the Contractor shall produce, when directed a certificate to that effect from the manufacturer.

5.2 Laying: R.C.C. spun pipes shall be laid on cement concrete bed or cradles as specified and shown on the detailed drawings. The cradles may be precast and sufficiently cured to prevent cracks and breakage in handling. The invert of the cradles shall be left 12 mm below the invert level of the pipe properly placed on the soil to prevent any disturbance. The pipe shall then be placed on the bed concrete or cradles and set for the line and gradient by means of sight rails and bonding rods etc. Cradles or concrete bed may be omitted, if directed by the Engineer-in-Charge.

5.3 Jointing: After setting out the pipes the collar shall be centered over the joint and filled in with tarred gaskin, so that sufficient space is left on either side of the collar to receive the mortar. The space shall then be filled with cement mortar 1:2 (1 cement: 2 fine sand) and caulked by means of proper tools. All joints shall

be finished at an angle of 45 degrees to the longitudinal axis of the pipe on both sides of the collars neatly.
5.4 Testing: All pipes shall be tested to a hydraulic test of 1.5 m head for at least 30 minutes at the highest point in the section under test. Test shall also be carried out similar to those for stoneware pipes given above .the smoke test shall be carried out by the Contractor, if directed by the Engineer-in-Charge, at the expense and charges of the Contractor. A test register shall be maintained which shall be signed and dated by Contractor,/Engineer-in-Charge and representative of Architects/Consultant.
6. CEMENT CONCRETE AND MASONRY WORKS (FOR MANHOLES AND CHAMBERS ETC.)
Materials
a) Water: Water used for all the constructional purposes shall be clear and free from oil, acid, alkali, organic and other harmful matters, which shall deteriorate the strength and/or durability of the structure. In general, the water suitable for drinking purposes shall be considered good enough for constructional purpose.
b) Aggregate for concrete: The aggregate for concrete shall be in accordance with I.S.383 and I.S. 515.in general, these shall be free from all impurities that may cause corrosion of the reinforcement. Before actual use these shall be washed in water, if required as per the direction of Engineer-in-Charge. The size of the coarse aggregate shall be done as per I.S.383.
c) Sand: Sand for various constructional purposes shall comply in all respects with I.S. 650 and I.S. 2116. It shall be clean, coarse hard and stone, sharp, durable, uncoated, free from any mixture of clay, dust, vegetable matters, mica, iron impurities soft or flaky and elongated particles, alkali, organic matters, salt, loam and other impurities which may be considered by the Engineer-in-Charge as harmful for the construction.
d) Cement: The cement used for all the constructional purposes shall be ordinary Portland cement or rapid hardening Portland cement conforming to I.S.269.
e) Mild steel reinforcement: The mild steel for the reinforcement bars shall be in the form of round bars conforming to all requirements of I.S. 432 grade I.
f) Bricks: Brick shall have uniform colour, thoroughly burnt but not over burnt, shall have plain rectangular faces with parallel sides and sharp right angled edges. They should give ringing sound when struck. Brick shall not absorb more than 20% to 22% of water, when immersed in water for 24 hours. Bricks to be used shall be approved by the Engineer-in-Charge.
g) Other materials: Other materials not fully specified in these specifications and which may be required in the work shall conform to the latest I.S.. All such materials shall be approved by the Engineer-in-Charge before use.
Cement concrete (plain or reinforced)
a) Cement concrete pipes bedding, cradles, foundations and R.C.C. slabs for all works shall be mixed by a mechanical mixer where quantities of the concrete poured at one time permit. Hand mixing on properly constructed platforms may be allowed for small quantities by the Engineer-in-Charge. Rate for cement concrete shall be inclusive of all shuttering and centering at all depth and heights.
b) Concrete work shall be of such thickness and mix as given in the Schedule of Quantities.
c) All concrete work shall be cured for a period of at least 7 days. Such work shall be kept moist by means of gunny bags at all times. All pipes trenches and foundations shall be kept dry during the curing period.
6.3 Masonry work: Masonry work for manholes, chambers, septic tanks, and such other works as required shall be constructed from Ist class bricks or 2nd class as specified in the Schedule of quantities in cement mortar 1:5 mix (1 cement: 5 coarse sand). All joints shall be properly raked to receive plaster.
6.4 Cement concrete for pipe support:
a) Wherever specified or shown on the drawings, all pipes shall be supported in bed all round or in haunches. The thickness and mix of the concrete shall be given in the Schedule of Quantities. Width of the bedding shall be as per Para 4.14.
b) Unless otherwise directed by the Engineer-in-Charge cement concrete for bed, all round or in haunches shall be laid as follows:-

	upto 1.5 m depth	upto 3 m depth	beyond 3 m depth
Stoneware / RCC pipes all round in haunches all round in open ground (no sub soil water)	(1:5:10)	(1:5:10)	(1:5:10)

R.C.C or S.W. All round in haunches in haunches in sub soil water	(1:3:6)	(1:3:6)	(1:3:6)
C.I. Pipes all round in haunches in haunches	(1:3:6)	(1:3:6)	(1:3:6)
R.C.C. Pipes all round all round all round or C.I. pipes	(1:3:6)	(1:3:6)	(1:3:6)

c) R.C.C. pipes or C.I. pipes may be supported on brick masonry or precast R.C.C. or in situ cradles. Cradles shall be as shown on the drawings.
d) Pipes in loose soil or above ground shall be supported on brick or stone masonry pillars as shown on the drawings.

7. MANHOLES AND CHAMBERS

7.1 All external sewerage collected through brick masonry rectangular mh and sw pipes and will go to brick masonry construction septic tank size 5 m × 2m × 1m (eff. Depth)

7.2 Sewage effluent from septic tank go to brick masonry construction soak pit 2.5 m dia and 3.0 m effective depth

7.3 Storm water will be collected through road gully chamber size 500 × 450 × 600 mm and disposed to existing storm water drainage network on site.

7.2 All manholes and chambers, etc. shall be supported on base of cement concrete of such thickness and mix as given in the Schedule of Quantities or shown on the drawings. Where not specified, manholes shall be constructed as follows:-

	Size of manhole (all dimensions internal clear in cms)			
	90x80	120x90	91 dia	122 dia
Type	Rect	Rect	Circular	Circular
Maximum depth	120	240	167	229
Average thickness of R.C.C slab	15	15	15	15
Size of cover and frame	61x45.5	50 dia	56 dia	56 dia
Weight of cover and frame	As per IS: 1726 requirements	As per IS: 1726 requirements	As per IS: 12592 requirements	As per IS: 12592 requirements

7.3 All manholes shall be provided with cement concrete benching in 1:2:4 mix. The benching shall have a slope of 10 cms towards the channel. The depth of the channel shall be full diameter of the pipe. Benching shall be finished with a floating coat of neat cement. (1 cement: 2 coarse sand: 4 stone aggregate 20 mm nominal Size)

7.4 All manholes shall be plastered with 12 mm thick cement mortar 1:3 (1 cement: 3 coarse sand) and finished with a floating coat of neat cement inside. Manhole shall be plastered outside as above but with rough plaster.

All manholes with depths greater than 1 m. shall be provided with 20 mm square plastic foot rests set in cement concrete blocks 25x10x10 cms in 1:2:4 mix 30 cms vertically and staggered.

7.6 All manholes shall be provided with SFRC covers and frames and embedded in reinforced cement concrete slab. Weight of cover, frame and thickness of slab shall be as specified in the Schedule of Quantities or given above .

8. MAKING CONNECTIONS

8.1 Contractor shall connect the new sewer line to the existing manhole by cutting the walls, benching and restoring them to the original condition. A new channel shall be cut in the benching of the existing manhole for the new connection. Contractor shall remove all sewage and water if encountered in making the connection without additional cost.

9. MEASUREMENT

9.1 Excavation

9.1.1 Measurement for excavation of pipe trenches shall be made per linear meter under the respective category of soil classification encountered at site.

a) Ordinary soil

b) Hard soil (hard moor & soft rock)
c) Hard rock requiring chiseling
d) Hard rock requiring blasting.

9.1.2 Trenches shall be measured between outside walls of manholes at top and the depth shall be the average depth between the two ends to the nearest cm. The rate quoted shall be for a depth up to 1.5 m or as given in the Schedule of Quantities.

9.1.3 Payment for trenches more than 1.5 m in depth shall be made for extra depth as given in the schedule of quantities and above the rate for depth up to 1.5 m.

9.1.4 Timbering and Shoring: Timbering and shoring as described above shall be measured per sq.m and paid for as per the type of timbering of shoring done at site and as per the relevant item in the Schedule of Quantities. Rate for timbering and shoring shall be for all depths and types of soil classifications including saturated soil.

Saturated Soil: No extra payment for pumping and bailing out water shall be made for excavation with an average depth of 1.5 m in saturated soil, surface water from rain falls or broken pipes lines, or sieves and other similar sources. An extra rate as quoted in the schedule of quantities shall be paid for excavation in saturated soil for pipe trenches above average depth of 1.5 m. No payment is admissible for water collected from surface sources and broken pipe lines or sewers.

Refilling, Consolidation and Disposal of Surplus Earth: Rate quoted for excavation of trenches shall be inclusive of refilling, consolidation and disposal of surplus earth within a lead of 200 m.

Stoneware Pipes/RCC/C.I. pipes: Stoneware R.C.C./C.I. pipes shall be measured for the finished length of the pipeline per linear metre .

a) Lengths between manholes shall be recorded from inside of one manhole to inside of other manhole.
b) Length between gully trap and manhole shall be recorded between socket of pipe near gully trap and inside of manhole. Rate shall include all items given in the schedule of quantities and specifications.

9.3 Gully Traps: Gully traps shall be measured by the number and rate shall include all excavation, foundation, concrete brick masonry, cement plaster inside and outside, C.I. grating and sealed cover and frame.

9.4 Cement Concrete for Pipes: Cement concrete in bed and all round or in haunches shall be paid per running metre between the outside wall of manholes at bottom of the trench. No additional payment is admissible in respect of concreting done for widths greater than specified, for shuttering or centering and concreting in sub soil water conditions.

Manholes:

a) All manholes shall be measured by numbers and shall include all items specified above and necessary excavation, refilling & disposal of surplus earth.
b) Manholes with depths greater than specified under the main item shall be paid for under "extra depth" and shall include all items as given for manholes. measurement shall be done to the nearest cm. Depth of the manholes shall be measured from top of the manhole cover to bottom of channel.

Making Connections: Item for making connection to municipal sewer shall be paid for by number and shall include all items given in the Schedule of Quantities and specifications.

INSTALLATION, COMMISSIONING & GUARANTEES

1. INSTALLATION

1.1. Contractor shall supply three copies of foundation drawings giving weight, vibration and other loads required for the proper designing of the foundations.

1.2. All equipment shall be installed in a true workman like manner true to level and grade in accordance with the best current practice.

1.3. Contractor shall employ sufficient and proper equipment for lifting and placing of heavy equipment and in a manner which shall not strain or cause damage to the existing structures. If any damage is done, the same shall be made good to the satisfaction of the Project Manager without any additional cost.

1.4. All equipment and pipes shall be painted with one coat of red oxide before dispatch to the site.

2. COMMISSIONING

2.1. On completion of the work in all its aspects, the contractor shall start up the equipment in a manner normally done for the continuous operation for a period of not less than 48 hours and shall rectify and adjust the equipment for leakages and balancing the system.

2.2. After satisfactory commissioning of the plant, the contractor shall conduct performance tests on the

equipment to satisfy the Project Manager that all equipment is performing to the rated outputs. Any or all equipments shall be rectified or replaced if the same is are not performing in accordance with the specifications.

3. GUARANTEES

3.1. On completion of the work contractor shall submit a guarantee covering the quality and performance of all materials supplied and installed under the contract. This guarantee shall cover each and every material whether manufactured by the contractor or not.

3.2. Contractor shall specify a suitable procedure to test the rated performance of the equipments and shall provide all necessary equipments, gauges etc. for conducting such tests.

3.3. The guarantee shall cover a period of one year from the date of installation and handing over.

4. COMPLETION

4.1. On completion of the job, the contractor shall hand over to the Project Manager the following:-

4.2 One flow chart drawn in ink on thick paper and mounted in a glass frame showing the flow diagram of the process including legend showing valves to be normally open or closed and instructions for back washing, operation and maintenance of chlorination & other chemical feeding pumps and other equipments.

4.3 Five sets of operating and maintenance instructions with spare parts list and their manufactures and/or suppliers.

4.4 Five sets of catalogues and drawings for all equipment supplied.

TECHNICAL INFORMATION

Please furnish full details separately

Technical data sheet shall be submitted by vendor / contractor of all electro mechanical items

Technical data sheet of all sanitary fixtures and fittings

Upvc pipe and fittings

Ss grating

Cpvc pipe

Gi pipe

Ball valve

Butterfly valve

Insulation

Non return valve

Motorized butterfly valve

Electric geyser

Drinking water cooler

Sw pipe

Rcc pipe

Mh cover

Cover and grating for gully trap

Cover and grating for road gully chamber

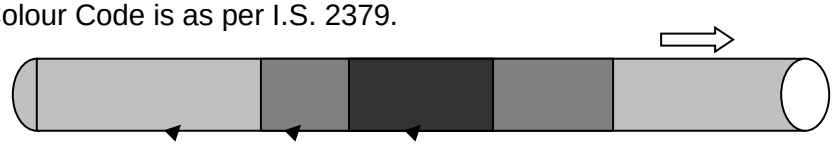
PVC tank

Orange colour safety foot rest

Standard fire man axe 20000 volts

PIPE COLOUR CODE

This Colour Code is as per I.S. 2379.



Ground Colour

1st Colour Band

2nd Colour band

Proportional width of band 4:1

Note:-Arrow indicating the direction of flow.

Pipe lines	Ground Color	1st Color	2nd Color
1. Drinking water (all cold water lines after filter)	Sea green	French blue	Signal red
2. Treated water (soft water)	Sea green	Light orange	
3. Domestic hot water	Sea green	Light grey	
4. Drainage Sewer /SWD	Black		
5. Fire services	Fire red		

This Color Code is as per I.S. 2379.

3. DESIGN AND CONSTRUCTION SPECIFICATION: FIREFIGHTING WORKS:

FIRE FIGHTINGSYSTEM

1. INTRODUCTION

(i) Type of the Building -- Assembly
(ii) Max. Heights of buildings -- less than 10 m in height.
(Categories as per NBC) -- Group D-1
(iii) References & Design Guideline Sources

(a) National Building Code of India - (Latest Edition, November 2016 -- Part-IV, Fire & Life Safety)
(b) I.S:3844-1989 - Code of practice for installation and maintenance of internal fire hydrants and hose reels on premises.

(c) I.S:13039-2011 - Code of practice for external hydrant system provision and maintenance.

(d) I.S:2190-2010 - Code of practice for selection, and maintenance of first aid fire extinguishers.

(e) I.S:15105:2016 – Code of Practice for Design and Installation of Fixed Automatic Sprinkler Fire Extinguishing System.

The proposed Building as per classification of the NB Code with a minimum requirement for building less than 10 M in height is as follows:-

Description	NBC 2016 Requirement	Provided
Hose Reel	Required	Provided
Down Comer	Required	Provided
Landing Valve	Required	Provided
Overhead Tank	Required 15+5KL	Provided 15+5 KL
Terrace fire pump	450 lpm	Provided 450 lpm

2. OVERHEAD STORAGE FIRE TANK

Overhead fire water tanks on the terrace will be provided as supplementary fire storage as per regulations. The tank will be 20 cum capacity on building as per requirement and connected to the fire mains to supply the entire grid in case of failure of pumps.

3. FIRE PUMPS

(i) Considering the occupancy of building, it is recommended to provide the following Fire Pumps:

- One no's Terarce fire Pump of 450 lpm capacity @ 35 mtr head

(iii) All fire pumps shall be with positive suction arrangements.

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

4. MATERIAL

- Mild steel class 'C' tubes confirming to IS: 1239/3589 shall be used in fire & sprinkler system . Fire Pumps shall be Kirloskar Make. MS Pipe shall be Tata / Jindal Hissar Make.

5. PORTABLE FIRE EXTINGUISHERS

The following type of portable fire extinguishers shall be provided at all levels of the buildings, at strategic locations as per requirements, generally to follow IS – 2190: 2010)

a) 6.0 kg. ABC Powder Type as per I.S: 15683 - 2006
b) 4.5 CO2 Type as per I.S:15683 -2006
c) 9.0 kg. ABC Powder Type as per I.S: 15683 – 2006
d) 22.5 kg CO2 Type as per IS : 2878
e) 50 Liter mechanical foam type as per IS : 13386
f) K-type fire extinguisher for kitchen area
g) Sand buckets.

5 SOME OTHER NECESSARY ITEMS

S.NO	ITEM	DESCRIPTION
1	Landing valve	1 NOS GUNMETAL
2	First aid fire hose reel	1 NOS
3	Rrl hose	2 NOS
4	Branch pipe	1 NOS
5	FIRE MAN AXE	1 NOS
6	FIRE HOSE CABINET	1 NOS
7	ORIFICE PLATE	1 NOS
8	PRESSURE GAUGE	AT SUCTIONA AND DISCHARGE OF PUMP AND AT EACH AIR VESSEL AND PRESSURE GAUGE
9	PRESSURE SWITCH	AT TERRACE FIRE PUMP
10	AIR CUSHION TANK	AT EVERY RISER OR DOWNCOMER
11	PRESSURE VESSEL	AT TERRACE FIRE PUMP

Fire Fighting System
Technical Specification

Work under this sub-head consists of furnishing all Labour, Materials, equipment and accessories necessary and required to completely install the Fire Fighting equipment etc., specified hereinafter and given in the Without restricting to the generality of the foregoing the work of Fire Fighting System shall include the followings:

Providing M.S. black steel (Class C) pressure pipe line main including Valves, Fire Hydrants, Excavation for Pipe, Laying of pipe, Painting of pipe and Making Connection to supply system.

Black Steel Pipe, Mains Laterals, Branches, Valves, Hangers and Appurtenances.

Hose Reels, Rubberized fabric lined hose pipes, Hose cabinets, Sprinkler heads and Landing Valves.

Portable Fire Extinguishers

Fire Fighting Pumps, diesel operated pumps, panels and all connected accessories including suction & delivery pipes.

Testing Commissioning and giving live demonstrations to the various Inspection Authorities and Obtain their "No Objection Certificate" (NOC) for occupation of the building.

General Requirements

All materials shall be of the best quality conforming to the Specifications and subject to the approval of the Engineer-in-Charge.
Pipes and Fittings shall be fixed truly Vertical, Horizontal or in slopes as required in a neat workman like manner.
Pipes shall be fixed in a manner so as to provide easy accessibility for repair and maintenance and shall not cause any obstruction in shaft, passage etc.
Pipes shall be securely fixed to walls and ceiling by suitable clamps at intervals specified. Only approved type of anchor fasteners shall be used for RCC ceilings.
Valves and other appurtenance shall be so located that they are easily accessible for operation, repairs and maintenance.

Pipes
All pipes within and outside the building in exposed locations and shafts including connections buried under floor shall be M.S. Pipes as follows:
Pipes 150 mm dia and below IS: 1239 (Class C) Heavy Class
Pipe 200 mm dia and above IS 3589 of thickness specified.
Pipe Fittings
Pipes and fittings means tees, elbows, couplings, flanges, reducers etc. And all such connecting devices that are needed to complete the piping work in its totality.
Fabricated fittings shall not be permitted for pipe diameters 50 mm and below.
When used, they shall be fabricated, welded and inspected in workshops under supervision of Engineer-in-Charge whose welding procedures have been approved by the TAC as per TAC rule 4102 for sprinkler system and applicable to hydrant and sprinkler system. For "T" connections, pipes shall be drilled and reamed. Cutting by gas or electrical welding will not be accepted.
Jointing
Screwed (50 mm dia pipes and below)
Joint for black steel pipes and fittings shall be metal-to-metal thread joints. A small amount of red lead may be used for lubrication and rust prevention. Joints shall not be welded or caulked. (With screwed MS forged fittings)
Welding (65 mm dia and above)
Joints between MS pipes and fittings shall be made with the pipes and fittings having "V" groove and welded with electrical resistance welding in an approved manner. Buried pipes will be subject to X Ray test from an approved agency as per the TAC norms at the cost of contractor. (With welded M.S. fittings heavy class with V-Groove). The welding machine shall be 3 Phase rectifier of required current and capacity. The vendor for welding will be approved by Engineer-in-Charge.
Flanges
Flanged joints shall be provided on:
Straight runs not exceeding 30 m on pipelines 80 mm dia and above.
Both ends of any fabricated fittings e.g. bends, tees etc. of 65 mm dia or larger diameter.
For jointing all types of valves, appurtenances, pumps, connections with other type of pipes, to water tanks and other places necessary and required as good for engineering practice.
Flanges shall be as per IS 6392-1971, Table 17/18 with appropriate number of G.I. nuts and bolts, half threaded of with 3 mm insertion neoprene gasket complete.
Unions
Provide Approved type of dismountable unions on pipes lines 65 mm and below in similar places as specified for flanges shall be provided.
Pipe Protection
All pipes above ground and in exposed locations shall be painted with one coat of Red Oxide Primer and two or more coats of Synthetic Enamel Paint of approved shade.
All black steel pipes under floors or below ground shall be provided with protection against corrosion by application of 100mm wide and 4mm thick layer of PYPKOTE/ MAKPOLYKOTE over the pipe, as per manufacturers specifications.
Pipe Supports
All pipes shall be adequately supported from ceiling or walls from existing/new inserts by Structural clamps fabricated from M.S. Structural e.g. Rods, Channels, Angles and Flats as per details given in drawings and specifications. All clamps shall be painted with one coat of red lead and two coats of black Enamel paint.

Where inserts are not provided, the Contractor shall provide anchor fasteners. Anchor fastener shall be fixed to walls and ceilings by drilling holes with Electrical drill in an approved manner as recommended by the manufacturer of the fasteners.

Testing

All pipes in the system shall be tested to a hydraulic pressure of 1.5 times of the working pressure or minimum of 15 kg/cm2 without drop in the pressure for at least 2 hours.

Rectify all leakages, make adjustment and retest as required.

Anchor Block

Contractor shall provide suitable cement concrete, anchor blocks of ample dimensions at all bends, tee connection and other places required and necessary for overcoming pressure thrusts in pipes. Anchor blocks shall be of cement concrete 1:2:4 mix (1 cement: 2 coarse sand: 4 stone aggregate 20 mm nominal size).

Valves, Gauge and Orifice Plates

Sluice Valves above 65 mm shall be of Cast Iron body and Bronze/Gunmetal seat. They shall conform to type PN 1.6 of IS:14846-2000, valves up to 65mm shall be of Gunmetal Full way Valve with wheel tested to 20 kg/cm2 class-II as per I.S: 778-1971. Valve wheels shall be of right hand type and have an arrow head engraved or cast thereon showing the direction for turning open and closing.

Non-return valves shall be of Cast Iron body and Bronze/Gunmetal seat. They shall conform to class of IS: 5312 and have flanged ends. They shall be swing check type in horizontal runs and lift check type in vertical runs of piping. They shall not be spring-loaded type.

Internal Hydrants

The Internal Hydrant outlet shall comprise “Single Headed Single Outlet Gunmetal Landing Valve” conforming to type ‘A’ of IS: 5290-1977. Separate valve on the head shall form part of the landing valve construction.

A cap with chain is provided on one head of the outlet. The hydrant will have an instantaneous pattern female coupling for connecting to Hose Pipe.

The Landing Valve shall be fitted to a Tee connection on the wet riser at the landing.

First-Aid Hose Reel Equipment

First aid hose reel equipment shall comprise reel, hose guide fixing bracket hose tubing globe valve, stopcock and nozzle. This shall conform to IS:884 - 1969. The hose tubing shall confirm to IS:1532-1969. The hose tubing shall be 20 mm dia and 36.5m long. The GM nozzle 5mm and globe valve shall be of 20 mm size.

The fixing bracket shall be of swinging type. Operating instructions shall be engraved on the assembly. This heavy duty mild steel and cast iron brackets shall be conforming to IS: 884 - 1969. The first-aid hose reel shall be connected directly to the MS pipe riser taken independently from ring. The Hose Reel shall be directly tapped from the Riser through a 25 mm dia pipe the drum and the reel being firmly held against the wall by use of dash fastners . The hose reel shall be swinging type (180 degrees) and the entire drum , reel etc shall be as per IS : 884 . The Rubber tubing shall be of approved quality and the nozzle shall be 5 mm dia shut off type .

Hose Pipes

Two numbers Hose Pipes shall be rubber lined woven jacketed and 63mm in dia. 15m long. They shall confirm to type A (Reinforced rubber lined) of IS:636 - 1979. The hose shall be sufficiently flexible and capable of being rolled.

Each run of hose shall be complete with necessary coupling at the ends to match with the landing valve or with another run of hose pipe or with branch pipe. The couplings shall be of instantaneous spring lock type. This shall be conforming to IS: 903.

Branch Pipes

Branch pipe shall be of Gunmetal 63 mm dia and be complete with male instantaneous spring lock type coupling for connection to the hose pipe. The branch pipe shall be externally threaded to receive the nozzle.

Nozzle

The nozzle shall be of Gunmetal 20 mm in (internal) diameter. The screw threads at the inlet connection shall match with the threading on the branch pipe. The inlet end shall have a hexagonal head to facilitate screwing of the nozzle on to the branch pipe with nozzle spanner.

End Couplings, Branch pipe, and Nozzles shall conform to IS:903 - 1985.

Two C.P hoses of 15m length with couplings shall be provided with each External (Yard) Hydrant. Two RRL hoses of 15m length, as specified, with couplings shall be provided with each Internal Hydrant. One nozzle

and one branch pipe with coupling shall be provided with each Yard Hydrant and Internal Hydrant.

Standard Fire Man Axe

Standard Fire Man Axe shall be insulated against 2000 Volts electricity current .

Hose Cabinet

The internal hose cabinet shall accommodate the Hose pipes, branch pipe, Nozzle First aid Hose Reel and Hydrant Outlets and shall be fabricated from 2 mm thick or 14 mm gauge MS/aluminium sheet. The overall size shall be 2100x1200x900 mm, or as specified in the Architectural details. This shall have lockable centre opening glazed doors as per the requirement and as per Architectural details. Where the niche for wet riser is provided with shutters, separate hose cabinet as above may be dispensed with.

The hose cabinet shall be painted red and stove enameled and woods FIRE written in front glazed portion.

Fire Brigade Inlet Connections

Fire Brigade Inlet connection of gunmetal shall be provided near the pump house and to the wet riser system as specified, for the following purposes:

Fire Brigade suction connection for fire static tank with provision of 100 mm dia foot valve. Fire brigade draw out connection shall be Gunmetal material and with male and female instantaneous coupling as per IS : 902 – 1974 .

Fire brigade inlet connection to fire static tank.

Fire brigade inlet connection to the wet riser system. Each connection shall be provided with similar dia of Sluice valve and Non return valve.

Fire Brigade inlet Connections shall be Cast iron body with gunmetal male and female instantaneous coupling conforming to IS : 904 .

The locations of this Fire brigade connection shall be suitably decided with the approval of Consultant/Landscape Architect and with a view that these are easily accessible to the fire brigade, without any possible Hindrance.

Portable Fire Extinguisher

Portable fire extinguishers shall be provided as per the drawing and shall confirm to IS:2190-2010.

Dry Chemical Powder type 9 Kg . as per I.S: 15683:2006

Dry Chemical powder type of 6 Kg. Capacity as per I.S: 15683:2006

CO2 type of 4.5 kg capacity as per I.S: 15683:2006.

CO2 type 22.5 kg capacity as per IS – 2878 : 1978

Mechanical Foam Type 50 Litre Capacity as per IS – 13386 : 1992

Orifice plate

Orifice plate made out of 6 mm thick stainless steel (Grade 304) with orifice of required size (Generally 80 x 50 mm shall be used) to be fitted between flanges and Landing valves of external and internal hydrants to reduce pressure at the outlet up to the level of 3.5 kg / sq cm . Pressure shall be reach 3.5 kg / sqcm at each and every hydrants available . Pressure shall not be exceed 7.0 kg / sqcm at any hydrants .

Pressure Gauge

Pressure gauge shall be 100 mm dia ms and pressure scale (0-16 kg / sqcm) . Pressure gauge shall be Installed on Internal Hydrants , External Hydrants , ACT (Air Cushion Tank) , Inspection Test Assembly , Individual Suction and Delivery of Centralized Fire Pumps , Terrace Fire Pumps etc .

Air Cushion Tank (Provided on the Top of Wet Riser & Sprinkler Riser)

Air Vessel shall be Provided on top of Wet Riser & Sprinkler Riser shall be fabricating from at least 8 mm thick mild steel to withstand the pressure . Air Cushion tank shall be 250 mm dia and 1200 mm height with 25 mm dia air release valve with 25 mm dia gunmetal gate valve . Air Vessel shall be of continuous welded construction type and galvanized to be IS : 4736 – 1968 . This shall be tested for 2 Times the Working Pressure .

Pressure Vessel (Provided in Fire Plant Room)

Pressure Vessel shall be Provided in Fire Plant Room shall be fabricating from at least 8 mm thick mild steel to withstand the pressure . Pressure Vessel shall be 450 mm dia and 2000 mm height with 25 mm dia air release valve with 25 mm dia gunmetal gate valve . Air Vessel shall be of continuous welded construction type and galvanized to be IS : 4736 – 1968 . This shall be tested for 2 Times the Working Pressure .

Pressure Vessel shall be Connected with Delivery Header and Required no of Pressure Switch shall be Provided on Pressure switch .Pressure Vessel shall be also provided with Terrace Fire Pump situated on each Residential Block .

Flow Switch

Flow Switch shall be Provided on each sprinkler tapping on each floor . Flow switch shall be the part of

Inspection and Testing Assembly .

Pressure Switch

Pressure Switch shall be Provided on Terrace Fire Pump Pressure Vessel .

Ball Valve

Ball Valve shall be of 25 mm dia and Forged brass material and withstand to the pressure 25 kg / sq cm. Ball Valve shall be provided internal hydrant to first aid hose reel connection.

Butterfly Valve

Butterfly valve shall be cast iron body and bronze / gunmetal seat with nuts, bolts, rubber gaskets etc. Butterfly Valve shall be PN 1.6 Pressure Rating. Butterfly valve shall be as per IS: 13095 .

Non Return Valve

Non Return valve shall be cast iron body and bronze / gunmetal seat with nuts, bolts, rubber gaskets etc. Non Return Valve shall be PN 1.6 Pressure Rating. Non Return valve shall be as per IS : 5312 .

Rubber Expansion Joint

Rubber Expansion Joint shall be with stand with the test pressure 16 kg / sqcm.

Suction Strainer

Suction Strainer shall be Y Strainer type and CI / MS body and bronze / gunmetal seat with nuts, bolts, rubber gaskets etc. Suction Strainer shall be PN 1.6 Pressure Rating. Suction Strainer shall be as per IS : 4038 .

Pumps

Work under this sub-head consists of furnishing all labour, materials, equipment and accessories necessary and required to completely install pumping system for various water supply services and water treatment as per drawings, specified hereinafter.

Without restricting to the generality of the foregoing, the work of

A) Terrace Fire Pump – Cap - 450 lpm,

Head - 35 M,

HP - 6 HP app

Nos - 1 Nos

Terrace Fire Pump 450 Lpm at 35 m head shall be provided on the Terrace

Motors for Electric Driven Pumps

Electrically driven pumps shall be provided with totally enclosed fan cooled induction motors.

Motors for fire protection pumps shall be at least equivalent to the horse power required to drive the pump at 150% of its rated discharge and head shall be 65 % of its rated head designed for continuous full load duty and shall be design proven in similar service. The Shut off head shall be Within 120 % of rated head .

Motors for fire pumps shall meet all requirements and specifications of the tariff advisory committee.

Motors shall be suitable for 415 volts, 3 Phase, 50 cycles A.C supply and shall be designed for 33OC ambient temperature. Motors shall conform to I.S: 325.

Motors shall be designed for two start system.

Motors shall be capable of handling the required starting torque of the pumps.

Contractor shall provide heating arrangements for the main fire pump motor to ensure that motor windings shall remain dry.

Air Vessel for Fire Pumps

Provide an air vessel fabricated from 10mm M.S. sheet with dished ends and suitable supporting legs, air vessel shall be provided with a 100mm dia flanged connection from pump, one 25mm dia drain with valve, one gunmetal water level gauge and 25mm sockets for pressure switches. The vessel shall be 450mm in dia and 2000 mm high and tested to 20.0Kg/cm2 pressure.

The fire pumps shall operate on drop of 1 Kg/cm2 pressure in the mains. The pump operating sequence shall be arranged in a manner to start the pump automatically but should be stopped manually by starter push buttons only.

NOTE: Contractor shall submit the plumbing and fire fighting shop drawings

4. DESIGN AND CONSTRUCTION SPECIFICATION: ELECTRICAL WORKS:

ELECTRICAL WORK

Source of Power:

The power will be provided from the existing system to the building panel as per requirement

LT Power Distribution:

LT Power from the Existing Main L.T. Panel building to MDB PANEL of multipurpose hall shall be brought through LT XLPE insulated Aluminum Armoured cables.

Sub main protection shall be provided by moulded case circuit breakers, which will discriminate with upstream protective devices. All switch boards shall be Form 3b construction and switching of incoming & outgoing circuits up to 100 amps shall be moulded case circuit breakers. Aluminium bus bar shall be provided for all power distribution panels

10 – 15% spare capacity over maximum demand shall be provided in all services including cables. All riser shafts/ openings at each floor shall be sealed and all floor wall penetration shall be sealed by using fire sealant as a fire protection measure. Main Distribution Boards and Sub-distribution Boards shall incorporate moulded case circuit breakers. Final distribution boards shall incorporate miniature circuit breakers of 10 KA minimum interrupting capacities (MCB) & residual current circuit breaker of 100 mA(RCCB).

Distribution boards shall be located in accessible positions to suit the area of each floor within the building. Sub Distribution Boards (SDB's) shall be located on area basis including metering system. Final Distribution Boards shall be fed from these MDB's & SDB's by means of either PVC insulated aluminiumarmoured cables or PVC insulated copper wires in appropriately sized MS/ PVC conduits. FRLS cables of appropriate size shall be provided for emergency systems like UPS, ventilation fans, etc.

Light & Power Wiring System:

The wiring in all the areas of the Building shall be provided with FRLS insulated flexible Copper Wiring in recessed / surface MS conduits. The wiring installations shall conform to IS-732:1963. The wiring for lights shall be with FRLS insulated flexible Copper Conductor wires of 1.5 sq. mm size and power wiring shall be carried out with 2.5/4.0/6.0 sq. mm FRLS flexible Copper Conductor wires. Colour Codes shall be maintained for the entire wiring installations, i.e. Red, Yellow and Blue for the phases, Black for the neutral and Green for earth.

All electrical wires shall run through one side of the corridor ceiling and communication / data wiring shall run through other side of the ceiling to keep distance between electrical and low current cables. Minimum distance between LV/LT cables would be kept as per stipulated norms in case electrical & data cables are running parallel to each other.

Lighting Control System for Common Area:

It is recommended that lighting fixtures in common area may be provided with centralized control from distribution boards. Keeping in view the flexibility and a practical means to conserve energy, general lighting in the common area shall have the lighting fixtures on two parallel circuits, in a 'staggered (alternate) pattern, so that lighting level is varied based on time & day.

Cable Support System:

The following shall be used for carrying wires / cables from the electrical distribution boards to loads:
PVC conduit wherever the conduit is buried in slab at the time of casting.
b. M.S conduits wherever the conduit runs exposed in ceiling space or chased in wall.
c. GI cable trays, G.I. raceways, MS Conduits for carrying multi conductor cables to workstations.
The fire partitions penetrations by raceways/cable trays shall be protected by approved sealing methods, maintaining the same fire resistance rating as the partition.

Lighting System for External Area:

Specification of External Light Fittings	Qty.
Flood light fitting suitable for 120 watt IP 66 LED having system lumen output of minimum 12000 lumens complete with all accessories and lamp	10 Nos.

Installation Work

Electrical Installation

Preparation of necessary Single line diagram (SLD), Power Distribution etc. of all electrical installation for each floor as well as electrical conduit/race way if required layout drawing of each room, corridor, verandas etc. as per requirement.

Submit Detailed Project Report including preliminary drawings to the Architect in respect of internal electrification considering all electrical requirements of all electrical loads such as luminaries , fans , electrically operated instruments required, HVAC etc. with distribution panels, distribution boxes showing their actual positions in drawings for incorporating suggested changes, additions and alterations and secure approval of the client.

Fire Detection & Alarm and Public Address System

To submit detailed design & drawings of fire detection & alarm system. The addressable analogue system . SLD of the total distribution system of Fire alarm, intelligent fire & smoke detection, public address system, control wiring etc shall be required. The drawing and design for actual position of smoke & heat detectors, MCP (manual call points), Hooter, Addressable Automatic control Panel as per fire department requirement,

The fire control room shall be showed on the drawing at ground floor level and as requirement of local fire authority.

Earthing System:

Considering the hazardous nature of electrical energy, safety measures in using this energy is of paramount importance. Earthing system shall be provided in accordance with Indian Standards IS-3043-1987 / BS 7430 and other statutory regulations.

All non current carrying metal parts forming the Electrical System shall be connected to the Earthing System as per the requirements of Indian Electricity Rules and local statutory requirements. The earthing system shall be so designed that the resistance of the earthing network shall be less than 1.0 ohm at any point of the system.

All the Cable Trays shall be provided with suitable size of 2 Nos. G.I. strip in full length. Separate Earthing shall be provided for Computers/UPS Network and entire earthing shall be insulated with PVC sleeve.

The Earthing System is proposed as follows:

Panel and other Equipment:

Distribution Boards Earthing : copper Wires

UPS Neutral Earthing : Copper

Lighting / Power Point : PVC Cu Wire

EPABX/Server etc: Copper

All earth pits shall be based on G.I. earth plate earthing to keep resistance for clean earth and for electrical system earth below one ohm. G.I. earth plate earthing has been considered provides clean earth and low resistivity values. All the earthing stations shall be connected to each other to make a common earthing electrode grid.

The above earthing electrical is indicative only. Bidder are directed to design the earthing detail of all system and same shall be approved during execution.

TECHNICAL SPECIFICATIONS FOR ELECTRICAL SERVICES
GENERAL REQUIREMENTS

GENERAL

To provide a complete electrical system for the distribution of electric power from the point of supply (SEB), HT/LT Panel to the utilization equipment, all as shown in the drawings and described in these specifications. The quantities mentioned in BOQ are tentative. It will be the bidder's responsibility to work out the exact quantities from drawings or from work site, which trade provides said equipment, materials, tools and labour.

SCOPE

The bidder shall supply, install and commission along with requisite spare, maintenance tools and tackles the following equipment and system in the Project. The scope also covers the detailed engineering and calculations of the various equipment/system mentioned hereunder and the same shall be approved by the Engineer-in-charge prior to execution of the job.

Conduiting for Fire Alarm and Public Address System

Distribution Boards / Sub-Distribution Board.

Complete internal building wiring as per specification.

Safety to personnel and equipment during both operation and maintenance.

Reliability of Service.

Minimum fire risk.

Ease of maintenance and convenience of operation.

Automatic protection of all electrical equipment through selective relaying system.

Electrical supply to equipment and machinery within the design operating limits.

Adequate provision for future expansion and modification.

Maximum interchange ability of equipment.

Fail-safe feature.

Suitability for applicable environmental factors.

This specification defines the basic guidelines to develop a suitable electrical system as necessary for the commercial complex. All data required in this regard shall be taken into consideration to develop a detailed engineering of the system. Site conditions as applicable are mentioned elsewhere.

Compliance with these specifications and/or approval of any of the Contractor's documents shall in no case relieve the Contractor of his contractual obligations.

All work to be performed and supplies shall be affected as a part of contract requires specific approval/ review of Engineer-in-charge or his authorized representative. Major activities requiring approval/ review shall include but not be limited to the following:

The engineering activities shall comprise the submission for approval of the following:

Basic engineering documents e.g. overall single line diagram, area classification drawing, overall cable layout, testing, type test report, guaranteed particulars of all equipment and maintenance manuals.

Quality assurance procedures.

Field testing and commissioning procedures.

Basic engineering calculations viz. load analysis; load flow, fault level calculations, and voltage drop calculations during motor start-up/re-acceleration etc.

Control and protection schemes.

Load sharing and annunciation scheme,

Sizing calculation for cable trays/cable trenches.

Area-wise illumination level calculation and preparation of power supply distribution drawing.

Calculation for earthing system and lightning protection.

The Contractor shall be responsible for:

Detailed co-ordination with other services, shop drawings for various electrical layouts such as equipment layout, lighting layouts, cabling layouts, earthing and lightning protection layouts, including equipment installation and cable termination details etc. prior to start of work.

Preparation of bill of materials for cabling, lighting, earthing and miscellaneous items etc.

Cable schedule.

Lighting/power panel schedule.

Interconnection drawing.

Protection co-ordination drawings/tables for complete power system.

Shop inspection and testing procedures.

Field testing and commissioning procedures.

Preparation of as built drawings for all services.
Any other work/activity which is not listed above however is necessary for completeness of electrical system.
CODES & STANDARDS
The design engineering manufacturing and the installation shall be in accordance with established codes, sound engineering practices, and specifications and shall conform to the statutory regulations applicable in the country. Contractor shall obtain all approvals from statutory authorities' e.g. Electrical inspector, pollution control boards, SEB as applicable before commissioning of electrical/DGs.
Indian Electricity Act.
Indian Electricity Rules.
Factory Act.
Pollution Control Act.
IS-732: Code of practice for electrical wiring installation system voltage not exceeding 650V.
IS-3043: Earthing.
IS-2309: Code of practice for the protection of buildings and allied structure against Lightning
IS-7689: Guide for control of undesirable static electricity.
IS-3716: Insulation co-ordination application guide.
IS-8130: Conductors for insulated electrical cables and flexible cords.
IS-5831: PVC insulation and sheath of electric cables.
IS-3975: Mild steel wire, strips & tapes for armouring cable.
IS-3961: Current rating of cables
IS-694:PVC insulated (heavy duty) electric cables for working. Voltage up to and including 1100 volts.
IS-424- 1475 (F-3): Power cable flexibility test.
IEC-439/IS-7098: Specification for cross linked polyethylene insulated PVC sheathed cable for working voltage up to 1.1 KV.
IS-1554: PVC insulated cables up to 1100 volts.
IS-10810: Test procedures for cables.
IS-6121: Cable glands.
IS-10418: Cable drums.
IEC-754(1): FRLS PVC insulated cable.
ASTM-D-2863: Standard method for measuring minimum oxygen concentration to support candle-like combustion of plastic (oxygen index).
ASTM-D-2843: Standard test method for measuring the density of smoke from burning or decomposition.
ASTM E-662/IEC 754(A) Standard test method for specific optical density of smoke generated by solid materials.
IEEE-383: Standard for type test class-IE, electric cables, field splicers and connections for power generation station.
IS 13947/IEC 947: Air circuit breaker/moulded case circuit breaker.
IS-8623: Specification for factory built assemblies of switch gear and control gear for voltage upto and including 1000vac/1200vdc
IS 1018: Switchgear and control gear selection/installation and maintenance
IS-1248: Direct acting indicating analogue electrical measuring instruments and testing accessories.
IS-13779: Digital measuring instruments and testing accessories.
IS-3156: Voltage transformer
IS-2705: Current transformer for metering and protection with classification burden and insulation.
IS -2147: Degree of protection provided by enclosures for low voltage.
PART I, II,III Switchgear and control gear
IS-3427: Metal enclosed switchgear and control gear
BS-162: Safety clearance
IS-3202: Code of practice for climate proofing of electrical equipment.
IS-375: Marking and arrangement for switchgear, bus bars, main connections and auxiliary wiring.
IS-722:Ac electric meters
IS-3231 /IEC-255: Electrical relays for power system protection.
IS-5082: Electrolytic copper/aluminium bus bars
IS-2834: Capacitors
IS-2713: Steel tubular pole

IS-335: Specification for insulating oil
IS-3837: Specifications for accessories for rigid steel conduit for electrical wiring.
IS-2026& 335: Distribution transformer
(PART I, II, III) GI/STEEL /PVC conduit pipe for electrical wiring.
IS-2274: Code of practice for electrical wiring installation system voltages exceeding 650 volts.
IS-6665: Code of practice for industrial lighting
IS-3646: Interior insulation part 1&2
IS-1944: Code of practice for lighting of public through fares.
IS-7752: Guide for improvement of power factor consumer's installation.
IS-13346: General requirement for electrical for explosive gas atmosphere.
IS-13408: Code of practice for the selection, installation and maintenance of electrical apparatus for use in potentially explosive atmospheres
IS-12360: Voltage and frequency for ac transmission & distribution system.
IS-5572: Classification of hazardous area for electrical installations.
IS-5571: Guide for selection of electrical equipment for hazardous area.
IS-4201: Application guide for Current Transformer
IS-4146: Application guide for Voltage Transformer
IS-10028: Code of practice for installation and maintenance of transformer
IS-8478: Application guide for on load tap changer
IS-10561: Application guide for power transformer
IS-1646: Code of practice for fire safety of buildings electrical installation
IS-3034: Code of practice for fire safety of industrial building-electrical generating and distribution station
IP-30: National electrical code (NEC) BIS publication.
IS-4722: Rotating electrical machines.
IS-4889: Method of determination of efficiency of rotating electrical machines.
IS-325: Three phase induction motors.
IS-4729: Measurement and evaluation of vibration of rotating electrical machines.
IS-900: Installation and maintenance of induction motors.
IS-4029: Air break switches.
IS-2208-9224: HRC cartridge fuses.
IS-2959: Contactors.
IS-9537: Rigid steel conduit.
IS-1030-1982: Specification for carbon steel castings for general engineering purpose.
IS-1601/ BS-649: Performance& testing of Internal Combustion (IC) engines for general purpose.
AIEE-606(1959): Recommended specification for speed governing of I.C. engine generator units.
BS-5514/IS-3046 8528(Part-2): Reciprocating IC engine driven A.C. generators.
Any other standard may be followed provided it is equivalent or more stringent than the standards specified above.
In case of any deviation /conflict of this specification with the codes & standards, the following order of precedence shall govern.
a) Specification, particular specification if any, and drawings.
b) Indian regulations/codes and standards.

SITE CONDITIONS

i)	Design ambient	Nurpur, Kangra Shimla
ii)	Relative Humidity	85% maximum
iii)	Site environment	Normal

DESIGN CRITERIA

I	Electrical Details of Incoming Supply	
a	Supply Voltage	11 KV as per SEB approved.
b	Fault level (sym.) at supply of point (designed)	350 MVA (to be confirmed from State Electricity Board by Tenderer).
c	Neutral Earthing	Solid Earthing
d	Voltage Regulation	+ 10%
e	Frequency Regulations	+ 3%
f	Combined	+ 10%

II	L.T. Power Distribution Systems	
a	Voltage	415 V / 240 V
b	Frequency	50 Hz
c	Neutral Earthing	Grounded
d	Short Circuit Fault withstand Capacity	10 KA - 50 KA (1 Sec.) as per B.O.Q. and specification.
III	Emergency Lighting (Battery Operated With Self Charger)	
a	Voltage	12 V, DC
b	Source	Mains/D.G. Set
IV	Control Supply for Electrical System :- The various supply voltage to be used in the control panels for main equipment are	
a	Spring Charge Motor	230 Volt A/C
b	Closing/Trip Coil	24 V DC / 230V AC
c	Alarm/ Indication/ Relay	24 V DC/ 230 V AC
d	Heaters	230 V AC
V	Power Supply Load Control / Distribution Panel.	433 V TPN / 240 V 1 phase A.C. (other supply if required shall be derived by package vendor
VI	Painting of Panel.	Powder coating of approved shade
VII	Painting of Cable Tray & Structure Steel.	Powder coated of approved shade

CABLE DETAILS

Internal Wiring.	Copper conductor PVC insulated 1.1 KV grade as called for in BOQ.
Power Cables (L.T.)	XLPE insulated Al. Armored Cable as per BOQ.
11 KV.	Aluminium conductor XLPE insulated armoured cable.
Grounding Conductor.	Copper/G.I. strip as per BOQ.
Lightning Conductor.	G.I. Strip.

ACCURACY CLASS OF METERS

a	Revenue Metres.	Class-0.5 or as per SEB approved.
b	Ammeter, Voltmeter and Other Instruments.	Class – I Digital / Analogue as per BOQ.

SECTION –1: PANELS

GENERAL

The contractor shall consider the following details in their scope of works no additional cost shall be paid, wherever required:

Supporting rigid steel framework.

Cubicle type, 14 gauge CRCA sheet steel enclosed.

Complete with interconnections and distribution bus bars.

Proper bonding to earth.

Painting/ lettering on Breakers and distribution boards, the location they serve, providing on each panel its circuit diagram.

Providing cable clamps / supports within distribution boards cable alley.

TPN ACB's / MCCB's shall mean 3 pole ACB's / MCCB's with adequate size of neutral link.

All MCB's /MCCB shall be of minimum KA breaking capacity as per CPWD General Specification Part-IV Substation
All motor feeders MCCBs shall be of motor duty.
Distribution panels shall be Powder Coated with Siemens gray paint shade no. RAL-7032 of IS-5 or as per direction of EIC.
Degree of protection for following type of distribution panel enclosure shall be as per IS: 13947-1993.
All MCCB's shall be provided with operating mechanism for door interlock.
Current density of aluminum shall be 0.8amp per sq.mm for rated current of bus bars and current density of copper shall be 1 sq.mm for 1.25 amps for rated current of bus bars.
Tinned copper earth bus shall be provided throughout the length of each board.
All measuring instruments (Meters) shall be of digital electronic with LED of approved make and compatible with BAS.
All hinged door shall be earthed through 2.5 sq. mm tinned braided copper wire.
All panels shall have provision of the following:
Pad locking of Switch board doors.
Pad locking of MCCB's handles in "OFF" Position.
Additional set of C.T.s, potential free contacts, connectors, contactors with wiring etc are to be provided for BAS including space required for various transducers in Main Switch Board sections. Only transducers shall be supplied by BAS contractor.
All MCB's used for protection of resistive and lightly inductive load shall be type "B" characteristic and inductive (motor) load shall be of type "C" characteristic and discharge lamps and UPS etc. shall be of type D characteristic.
All incoming and outgoing air circuit breakers shall be placed on middle portion of the vertical in single tier formation.
All PTs / control transformer shall be provided with centre tap earth secondary.
All DOL & Star-Delta Starters shall be provided with SPPR (single phase preventor relay) and 2 nos. of Aux. Contacts for Remote operation/monitor.
The Panel fabricator shall provide Al./ Copper Bus-bars link from Breakers wherever more than two nos. of cables are terminated in the breakers.
Readymade 16SWG Sheet steel Enclosure with cut out For MCBs
The breaking capacity of MCCB's are mentioned panel wise. All MCCB's shall be with thermal magnetic releases upto 250 amps and miroprocessor based above 250 amps capacity, unless specified otherwise.
Medium voltage switch boards/distribution boards, the combination of both these and components shall conform to the equipments of the latest revision including amendments of the following codes and standards.
The drawings, specification and BOQ complement each other and which is shown or called for one shall be interpreted as being called for on both. Material, if any, which may not have been specified but fairly required to make a complete assembly of switch gear as shown on the drawing, specifications shall be construed as being required and no extra charges shall be payable on this account.
CODES & STANDARDS
The design, manufacture and performance of equipment shall comply with all the currently applicable statues, safety codes, relevant Bureau of Indian Standards (BIS), British Standards (B.S.), International Dutro Technical Commission (IEC) Publication, NEMA, IDE & DEMA standard as amended upto date.
a) IS: 13947- 1993/IEC 60947-1989: Air circuit breaker/moulded case circuit breaker.
b) IS:3156 Voltage transformers.
c) IS:2705 Current transformers for metering and protection with classification Part-I, II burden and insulation & III 1964
d) IS:9224 Low voltage fuse and protection.
e) IS:3231 Specification for electrical relays for power system protection.
f) IS:8623 Specification for factory built assemblies of switchgear and control gear for voltage upto and including 1000-V AC/1200 V-DC.
g) IS:4237 General requirements for switch gear and control gear for voltage not exceeding gear.
h) IS:2147 Degree of protection provided by enclosures for low voltage switch gear and control gear.
i) IS:1018 Switchgear and control gear selection/installation and maintenance.
j) IS:1248 Direct acting electrical indicating instruments.
k) IS:375 Arrangement for switchgear, bus bars, main connections, auxiliary wiring and marking.

l) IS:2959 AC contactors for voltage not exceeding 1000V.
m) IS:5578 Guide for marking of insulated conductors.
n) IS:11050 Guide for forming system of marking and identification of conductors & apparatus terminal.
o) IS:1248 Direct acting indicating analogue electrical measuring instruments and Testing accessories.
p) IS:600 Code of practice for phosphating of iron & steel.

The board shall be metal enclosed single front, indoor, floor mounted, free standing type or wall mounting type as mentioned in BOQ. The panel shall be designed for a degree of protection of IP-55. However bus bar chamber shall have IP: 42 degree of protection incase bus bar rating exceed 1600 Amps. Keeping in view the operating height of the top switch 1750mm from finish floor. 400mm clear space shall be left throughout the panel at bottom. The cold rolled sheet steel will be of 2mm thick. The structure shall be mounted on a rigid base frame of folded sheet steel of minimum 3mm thickness and 75mm height.

All cutouts and covers shall be provided with synthetic rubber gaskets (preferably neoprene).

The panel shall be divided into distinct vertical sections each comprising of:

i) Complete enclosed bus bar compartment for running horizontal and vertical bus bars.
ii) Complete enclosed switchgear compartment one for each circuit for housing air circuit breaker, MCCB/MPCB with starters etc.
iii) Compartment for power and control cables of at least 300mm width covering entire height provided.
iv) The panel shall have sufficient space at least 20% of outgoing feeders for future use.

The front of each compartment shall be provided with hinged single leaf door with locking facilities. Panel shall be provided with suitable lifting facilities. Isolators and MCCB/ACBs and accessories shall be of fixed/drawout type as per BOQ.

Each feeder shall have compartmentalized or non-compartmentalized for MCB feeders only. Ri-tall type with separate construction cable entry shall be from top/bottom (3mm thick gland plate with suitable numbers & sizes of knockout holes (as called for in schematic/ fabrication drawings) shall be provided.

The panel shall be provided with three phase buses & neutral bus bars of high conductivity electrolytic copper/Aluminium sections throughout the length of the panel & shall be adequately supported and braced to withstand the stressed due to the short circuit current of 35 KA rms. for 1 sec. as called for in BOQ/Data Sheet. Maximum temperature rise of bus bars and bus bar connection while carrying rated current shall not exceed 40 Deg.C over an ambient temperature of 50 Deg.C. The Current density of Bus Bar shall be 0.8 Amp/mm2 for Aluminium and 1.25 Sq.mm/mm2 for copper.

The minimum clearance in air between phases for the entire run of the bus bar connections shall be 32mm minimum and phase to Neutral/earth for the entire run of the bus bar connections shall be 26mm minimum. Bus bars support insulators shall be made of non-hydroscopic non-combustible track resistant and high strength SMC or polyester fiberglass moulded material.

All bus bars shall be colour coded as per IS: 375.

Copper/G.I./Aluminium earth bus of suitable size shall be provided at the bottom of the panel throughout the length. Similarly suitable size of strip in each vertical section for earthing the individual equipment/accessories shall be provided and connected to main horizontal bus.

Sheet steel hinged lockable doors shall be interlocked with MCCB to prevent opening of the panel when MCCB is on position. Safety interlock with operating handle shall be provided.

Contactors shall be electromagnetic type with interrupted duty as per IS: 2959. The main contacts shall be of silver or silver alloy, provided with minimum 2 NO and 2 NC auxiliary contacts. The push button should be of shrouded type and each should be provided with 1 NO and 1 NC contact. Colour coding shall be as per IS: 6875 (Part-II).

GENERAL NOTE FOR ACBs/MCCBs/MCBs

Preferred Specification/Selection of Air Circuit Breaker and Moulded Case Circuit Breakers;

These should be confirmed entering into the agreements:-

(I) MCCBs: MCCBs should preferably be used for loads below 800 Amperes.

(1) Upto 160 A MCCBs shall be of > 20 Ka (Ics=Icu) at 433 V Short CKt. Current rating and should be Thermal Magnetic.

(2) From 200 A- 250 A MCCBs shall be of > 35 Ka (Ics= Icu) at 433 V Short Ckt. Current rating and should be Thermal Magnetic.

(3) From 300A onwards MCCBs shall be of > 50 Ka (Ics=Icu) at 433 V Short Ckt. Current rating and should be microprocessor based having over load and short circuit protection. If used as incomer should also have earth fault protection &

time delay. Earth leakage modules are not acceptable.
(II) ACBs: From 800 A onwards ACBs shall normally (MCCBs should be used judiciously for such loads) be used. These should have 50 Ka (Icu=Ics) Short Ckt. Current rating with microprocessor based overload, short circuit and earth fault protection at 415 volts, 50 Hz
ACB (IEC 60947-2; IS 13947)
The circuit breaker shall be of air break type in order to eliminate fire and explosion risk and shall comply with the IEC with a rupturing capacity of not less than 35 MVA at 415 volts or as specified elsewhere (The service short circuit breaking capacity shall be as specified and equal to the short circuit with stand value Ics = Icu). The breaker shall be provided with variable microprocessor based releases within built fault differentiation for integral over load, short circuit and earth fault & other protection as called for in BOQ, LED indication for type of fault, CT's for protection and measurement class as called for in BOQ, and LCD display of curves and parameters. Electrical endurance without maintenance shall be greater than 2000 cycles. Mechanical & electrical anti pumping devices shall be provided in breaker, as required.
The breaker shall have memory for logging history for type of fault, load, time & date and the Vendor shall mention in the data sheet for no. of loggings available in the breaker memory.
The breaker shall consist of a horizontal draw out pattern triple/four pole, fully interlocked, independent manual/motorized spring operated mechanism. The mechanism should be such that the circuit breaker is at all times free to open immediately. The trip coil is energized. Current carrying parts should be silver plated and suitable arcing contacts shall be provided to protect the main contact arc-chutes for each pole shall be provided and shall be lifted out for the inspection of main and arching contact.
Self-aligning cluster type isolating contacts shall be provided on breaker for interlocking protection metering and for any other purposes. The breaker should have 3 distinct positions - SERVICE/TEST/ISOLATED within the cubicle.
The ACB shall be with molded housing class II front fuse and shall be suitable for Isolation as per the annexure 7.1.2 in the standard.
Breaker shall be provided with automatic safety shutters to screen the main live contact when the breaker is withdrawn. The frame of the circuit breaker could be positively earthed when the breaker is racked into the cubicle.
The following safety arrangements shall be provided for the safety of the personnel to prevent mal-operation.
i) Interlock to prevent the truck from being withdrawn or replaced except in the fully isolated position.
ii) Interlock to prevent earth connection from being made by the earthing device except breaker is open.
iii) Interlock to prevent the breaker being closed unless it is fully raised.
iv) Interlock to prevent the breaker from being made alive without its rack in position.
Protection Releases
Self-powered & true RMS sensing microprocessor based release with following features.
Incomer ACB of Panels:
Long time short circuit protection with time delay. Instantaneous and earth fault protection with LCD display to show RMS current in all three phases, neutral (for 4pole) simultaneously. The other features of the release to be as under.
The release should display distinct fault indication for each type of tripping for faster fault diagnosis and reduce down time & should protect ACB from over temperature and Phase unbalance.
Release should provide contact wear indication in display no. of operation seen by the breaker for case of maintenance.
The release shall be self-diagnosis & should provide fault history including cause of fault as well as level of fault current. It should be possible to store minimum 20 last trip data with nonvolatile memory.
The protection setting of release should be accessible to change locally.
LCD display should be at least 4 line display and should be able to display current is all the 3 phases and neutral (4 pole) simultaneously.
For Outgoing ACB feeder:
Long time Short circuit protection with time delay (for discrimination), instantaneous. The other features of the release to be as under.
The release should have distinct fault indication for each type of tripping for faster fault diagnosis and reduced down time and shall protect ACB from over temperature and phase unbalance.
Operation counter
Alarm and warning indication
Type test certificate : The ACB's shall be type tested ad certified for coplion is to IS 13947/equivalent / EC

standard from Indian / Internation testing authority, supplier to submit certificate of the same.

MOULDED CASE CIRCUIT BREAKER (MCCB)

MCCB shall confirm to the latest IS13947-1993/IEC 60947. The Service Short Circuit Breaking Capacity (Ics at 415 VAC) should be as specified.

MCCB shall be Current Limiting and comprise of Quick Make – Quick Break switching mechanism & Double Break Contact system. The arc extinguishing device and the tripping unit contained in a compact, high strength, heat resistant, flame retardant, insulating molded case with high withstand capability against thermal and mechanical stresses. All MCCBs shall be capable of defined variable overload short circuit and earth fault adjustment with thermo- magnetic releases upto 250A and with electronic release above 250A onwards.

The Service Short Circuit Breaking Capacity (Ics at 415 VAC) should be as called for in BOQ and is the required minimum value for that feeders/ panel, however if the rating of feeder mentioned is not available, the contractor shall used next higher rating without any extra charges. The service short circuit breaking capacity shall be equal to ultimate breaking capacity of MCCB, i.e. Ics= 100%Icu

The trip command shall over ride all other commands. MCCB shall employ maintenance free double break contact system to minimize the let thru' energies and capable of achieving discrimination upto the full short circuit capacity of downstream MCCB. The manufacturer shall provide both the discrimination tables and let thru' energy curves. The MCCB shall not be restricted to Line/Load connections.

The handle position shall give positive indication of 'ON', 'OFF' or 'Tripped' thus qualifying to disconnection as per the IS/IEC indicating the true position of all the contacts. In case of 4 pole MCCB the neutral shall be defined and capable of offering protection upto full rating. The remote tripping coil should be of continuous duty. The general-purpose control switch shall be provided for ON/OFF Auto/Manual. The switch shall be provided with engraving plates on the front with the complete inscription.

The switch shall be normally a fixed control box type heavy-duty unit.

Indicating lamps shall be of the panel mounting, LED type and shall have execution plates marked with its function wherever necessary. The color of the lamp cover shall be red for 'ON' and green for 'OFF' indicating lamps shall be provided with series resistor. MCCB shall be provided with interlocking devise for interlocking the door of switchboard. Following shall be included if specified in the drawing or in the schedule of quantities:

Under voltage trip

Shunt trip

Alarm Switch

Auxiliary switch

CONTACTORS

The contactors should comply with the latest IEC947-4 and the corresponding IS13947-4 standards. They shall have UL and CSA approval. The contactors should be rated for AC3 duty at 415V and 50Hz. The contacts should be fast closing and fast opening type. The making and breaking capacity values of the contactors should be as follows (as per IEC947-4):

For AC3 Duty

Making Capacity equal to or more than 10 Ie

Breaking Capacity equal to or more than 8 Ie

For AC4 Duty

Making Capacity equal to or more than 12 Ie

Breaking Capacity equal to or more than 10 Ie

The contactors should be capable of frequent switching and should operate without derating at 600C for AC3 applications. They should be climate proof as standard .The coil of the contactor should have class H insulation to support frequent switching.

The rated voltage of the contactor shall be equal or superior at 690 V, and rated insulation voltage shall be 690 V. The rated impluse voltage of the contactor should be 8 KV.

The contactor should be modular in design with minimum inventory requirements and built in mechanically interlocked 1NO 1NC auxiliary contact up to 32A. They should be suitable for the addition of auxiliary contacts and other electrical auxiliaries without any compromise on the performance or the operation of the contactors .The contactors from 4 KW to 400 KW will be associated with the same auxiliary contact block range.

Wherever D.C control is required, the contactor should have wide range (0.7 to 1.25Uc) D.C coil with built in interference suppression as standard.

The control and power terminals should be at separate layers preferably with colour coding (black for power and white for control)
All contactors power connection will be finger safe (IP2X) as standard.
They should be capable of being integrated into automated system (PLCs etc.) without any interposing components in minimum operating conditions.
The thermal over load relay if used will be directly mounting under the contactor without any specific connections.

NAME PLATES & LABELS

i) Panel and all modules shall be provided with prominent engraved identification plates. The module identification designation. For single front switchboards, similar panel and board identification labels shall be provided at the rear also.

ii) All nameplates shall be of non-rusting metal or 3-ply lamicold, with white engraved lettering on black background. Inscription and lettering sizes shall be subject to MoHFW's approval.

iii) Suitable stenticilled paint marks shall be provided inside the panel/module identification of all equipments in addition to the plastic sticker labels. These labels shall be partitioned so as to be clearly visible and shall have the device number, as mentioned in the module wiring design.

PAINTING

All steel work shall be pretreated in tanks and finally powder coated of approved shade.

WIRING

Control and protective wiring shall be done with copper conductor PVC insulated 1100 volts grade multi-stranded flexible wire of 2.5sq.mm cross section. The colour coding shall be as per latest edition of IS: 375. Each wire shall be identified by plastic ferrule. All wire termination shall be made with type connection. Wire shall not be taped or splied between terminal points.
Terminal blocks shall preferably by grouped according to circuit function and each terminal block group shall have at least 20% spare capacity.
Not more than one wire shall be connected to any terminal block. All doorframe of L.T. switchboard shall be earthed with bare braided copper wire.

TESTING & INSPECTION

After completion of all work at the manufacturer's works the switchboards shall be inspected and tested in presence of Purchaser's representative. However, stage inspection may be carried out from time to time to check progress of work and workmanship. The following tests shall be carried out:

i) All routine tests specified in relevant Indian/British Standards shall be carried out on all circuit breakers.
ii) Test for protective relay operation by primary or secondary injection method.
iii) Operation of all meters.
iv) Secondary wiring continuity test.
v) Insulation test with 1000 Volts megger, before and after voltage test.
vi) HV test on secondary wiring and components on which such test is permissible (2 KV for one minute)
vii) Simulating external circuits for remote operation of breaker, remote indicating lights and other remote operations, if any.
viii) Measurement of power required for closing/trip coil of the breaker.
ix) Pick up and drop out voltages for shunt trip and closing coils.
x) CT Polarity test.

Vendor shall provide all facilities such as power supply, testing instruments and apparatus required for carrying out the tests. Required copies of test certificates for all the tests carried out alongwith copies of type test certificates and certificates from Sub-Vendor for the components procured from them are to be submitted before despatch of switchboards.

DRAWINGS AND INFORMATION

The Vendor shall furnish following drawings/documents in accordance with enclosed requirements:
i) General Arrangement drawing of the Switchboard, showing front view, plan, foundation plan, floor cutouts/trenches for external cables and elevations, transport sections and weights.
ii) Sectional drawings of the circuit breaker panels, showing general constructional features, mounting details of various devices, bus bars, current transformers, cable boxes, terminal boxes for control cables etc.
iii) Schematic and control wiring diagram for circuit breaker and protection including indicating devices,

metering instruments, alarms, space heaters etc.
iv) Terminal plans showing terminal numbers, ferrules markings, device terminal numbers, function etc.
v) Relay wiring diagrams.
vi) Equipment List.
Vendor shall furnish required number of copies of above drawings for Purchaser's review, fabrication of switch boards shall start only after Purchaser's clearance for the same. After final review, required number of copies and reproducible shall be furnished as final certified drawings.
The information furnished shall include the following:
i) Technical literature giving complete information of the equipment.
ii) Erection, Operation and Maintenance Manual complete with all relevant information, drawings and literature for auxiliary equipment and accessories, characteristics curves for relays etc.
iii) A comprehensive spare parts catalogue.
Tools
One complete set of all special or non-standard tools required for installation, operation and maintenance of the switchboard shall be provided. The manufacturer shall provide a list of such tools with his quotation.
Spares
The manufacturer/tenderer shall also supply a complete list of commissioning spares and tools. The same shall be included in the bid price. No extra payment shall be made on account of non-availability of spares during commissioning.
Quality Assurance
Quality Assurance shall follow the requirements of MoHFW as applicable.
Quality Assurance involvement will commence at enquiry and follow through to completion and acceptance thus ensuring total conformity to Purchaser's requirements.
Deviations
Deviation from specification must be stated in writing at the quotation stage.
In absence of such a statement, it will be assumed that the requirements of the specifications are met without exception.

EARTHING
All electrical equipment is to be earthed by connecting two earth tapes from the frame of the equipment to a main earth ring. The earthing ring will be connected via several earth electrodes. The cable armour will be earthed through cable glands. Earthing shall be in conformity with provision of rules 32, 61, 62, 67 & 68 of Indian Electricity Rules 1956 and as per IS-3843-1966.
The following shall be earthed:
3. L.T. Panels.
4. Non-current carrying metallic parts of electrical equipment such as switchgear, bus ducts, rising mains, panel boards, motor control centres, power panels, distribution boards, cable trays, metal conduits, welding sockets etc.
5. Generator & motor frames.
All fixtures, sockets outlets, fans, switch boxes and junction boxes etc. shall be earthed with PVC insulated copper wire as specified in item of work. The earth wires ends shall be connected with solderless bottle type copper lugs.
7. The third pin of Outlets on UPS shall be provided with a separate PVC insulated Cu. Wire (green with yellow stripe) as Isolated ground earth wire apart from the earthing of box.
The earth connections shall be properly made. A small copper loop to bridge the top cover of the transformer and the tank shall be provided to avoid earth fault current passing through fastened bolts, when there is a lightning surge, high voltage surge or failure of bushings.
The shop drawing for earthing system shall be prepared by the contractor and be got approved by MoHFW/Engineer-in-charge. The work shall be done in accordance with approved drawings.
All earth electrodes shall be given to a depth sufficient to reach permanently moist soil. Their location shall be marked and approval taken from Engineer-in-Charge before excavation for the same.
The earth electrodes shall be tested for earth resistance by means of a standard earth test ohms meter. All tests shall take place during the dry months, preferably after a protected dry spell.
The resistance between earthing system and the general mass of earth shall not be greater than 1 ohm.

The earth loop resistance to any point in the electrical system shall not be in excess of 1 ohm in order to ensure satisfactory operation of protective devices.
The resistance to earth shall be measured at the following: -
a) At each electrical system ground or system neutral ground.
b) At one point on each grounding system used to ground electrical equipment enclosures.
c) At one point on each grounding system used to ground wiring system enclosures such as metal conduits and cable seaths or armoured.
All earthing conductors shall be of high conductivity copper/ G.I. as per B.O.Q. and shall be protected against mechanical damage. The cross-sectional area of earth conductors shall not be smaller than half that of the largest current carrying conductor. However, the contractor shall use the sizes specified in the bill of quantities of the Tender.
Pipe Earth Electrode
G.I. pipe shall be of medium class and of the size and dia as specified in BOQ. G.I. Pipe electrode shall be cut tappered at bottom and provided with holes of 12mm dia drilled not less than 7.5cm from each other upto 2m of length from bottom. The electrode shall be burried in the ground vertically with its top not less than 20cm below ground level.
Plate Earth Electrode
The plate earth electrode shall consist of copper plate or G.I. plate as per item of work. The plate electrode shall be burried in ground with its faces vertical and top not less than 2.5m below Ground level. The plate shall be filled with charcoal dust and common salt filling, extending 15cm around it on all sides.
A watering pipe as specified in BOQ, of medium class G.I pipe shall be provided. The top of the pipe shall be provided with a funnel and a G.I. mesh screen for watering the earth. In the case of pipe electrode a removable plug shall be provided as per drawing. This will be housed in a masonry sump (with cement plastering) of not less than 40 cm square and 40 cm deep. A C.I. frame with hinged cover of 10mm thickness and locking arrangement shall be suitably provided over the sump. The earthing lead from electrode onwards shall be suitably protected from mechanical injury by a suitable dia medium class PVC/ HDPE pipe. The overlapping in G.I. strips in joints shall be rivetted with revets and welded in approved manner. The protection pipe within ground shall be burried at least 30 cm deep (to be increased to 60cm in case of road crossing and pavements). The portion within the building shall be recessed in walls and floors to adequate depth. In the case of plate earth electrode, two nos. 50mm x 6mm GI/Cu. Strip the earthing lead shall be securely bolted to the plate with two zinc passivated bolts, nuts, checknuts and washers. In case of pipe electrode, it shall be connected by means of a through bolt, nuts and washers and cable socket. Main earthing conductor is taken from the earth electrode with which the connection is to be made.
No earth pit shall be fixed within 2.5M of a wall of foundation. The location of the earth electrode will be such where the soil has reasonable chance of remaining moist. Effort shall be made to locate them in grass lawns or near flowerbeds or water taps. The distance between two earthing stations shall be at least 3.0 meters.
Testing and Commissioning
Testing and commissioning shall be done as per the programme/ instructions to be given by MoHFW's authorised representative. All testing equipments necessary to carry out the tests shall be arranged by the electrical Contractor.
Before the electrical system is made live, the electrical Contractor shall carry out suitable tests to the satisfaction of MoHFW that all equipment wiring and connections have been correctly done and are in good working condition and will operate as intended.
All tests shall be conducted in the presence of the MoHFW authorised representative by the electrical Contractor and shall be notified one week before tests are to take place.
All measurements shall conform to establish minimum acceptable test values. MoHFW's Engineer reserves the right to approve all test results before circuit or equipments are energised for the first time.

CABLES & WIRE
a) Wires
The design manufacture, testing and supply of single core LEAD FREE FRLS PVC insulated 1.1 KV grade multi-stranded twisted wires under this specification shall comply with latest edition of following standards.
IS : 3961 Current rating for cables.
IS: 5831 PVC insulation and sheath of electric cables.

IS : 694 PVC insulated cables for working voltage upto and including 1100 volts.
IEC: 754(i) FRLS PVC insulated cable.
Copper multi-stranded twisted conductor FRLS PVC insulated wires shall be used in conduit as per item of work.
The wires shall be colour coded R Y B, for phases, Black for neutral and Green for earth.
Progressive automatic in line indelible, legible and sequential marking of the length of cable in metres at every one metre shall be provided on the outer sheath of wire.
The material & insulation of wires shall be ROHS compliant (Reduction Of Hazardous Substance) and shall comply the following directives:
EU Directive 2002/95/EC Issued Jan 2003
EU Directive 94/62/EC and 2004/12/EC (amendment)
EU Directive 91/338/EEC
EU Directive 91/157/EEC & 98/101/EC (amendement)
b) Cables
The design, manufacture, testing and supply of the cable under this specification shall comply with latest edition of following standards:
IS: 8130 Conductors for insulated electric cables and flexible cords.
IS: 7098 XLPE insulation and sheath of electric cables.
IS: 3975 Mild steel wires, strips and tapes for armouring cables.
IS: 7098 Current rating of cables.
IS: 7098 XLPE insulated (heavy duty) electric cables for working voltage upto and including 1100 volts.
IS: 424-1475(F-3) Power cable-flammability test.
Specification for cross-linked polyethylene insulated XLPE sheathed cable for working voltage upto 1.1 KV.
Specification for XLPE insulated (heavy duty) electric cables for working voltages upto and including 1100 volts.
ASTM-D: 2863 Standard method for measuring the minimum oxygen concentration to support candle-like combustion of plastics (Oxygen Index).
ASTM-D: 2843 Standard test method for measuring the density of smoke from the burning or decomposition.
IEEE : 383 Standard for type of test Class-IE, Electric cables, feild splicers and connections for power generation station.
ASTME:662IEC:754(x) Standard test method for specific optical density of smoke generated by solid materials.
IS : 10418 Cable drums.
c) Technical Requirements:
The cables shall be suitable for laying in racks, ducts, trenches conduits and under-ground buried installation with uncontrolled back fill and chances of flooding by water.
They shall be designed to withstand all mechanical, electrical and thermal stresses under steady state and transient operating condition.
The aluminium/copper wires used for manufacturing the cables shall be true circular/sector in shape before stranding and shall be of uniformally good quality, free from defects. The conductor used in manufacture of the cable shall be of H2 grade.
The cable should withstand 25 KA for 0.5 sec with insulation armour insulated at one end. Bidder shall furnish calculation in support of capability to withstand the earth fault currents. The current carrying capacity of armour and screen (as applicable) shall not be less than the earth fault current values and duration.
The fillers and inner sheath shall be of non-hygroscopic fire retardant materials and shall be suitable for the operating temperature of the cable. Filler and inner sheath shall not stick to insulation and outer sheath.
Progressive automatic in line indelible, legible and sequential marking of the length of the cable in metres at every one metres shall be provided on the outer sheath of all cables and at every 5 metre ‘FRLS’ marking in case of ‘FRLS’ cables.
Strip/Wire armouring following method (b) mentioned in IS: 3975 shall only be acceptable. For single core cable aluminium wire armouring shall be used.
Allowable tolerance on the overall diameter of the cables shall be + 2mm.
The normal current rating of all XLPE insulated cables shall be as per IS: 7098.
A distinct inner sheath shall be provided by pressure extrusion process for all multicore armoured and unarmoured cables as per IS: 5831.

Outer sheath shall be provided by extrusion process as per IS: 5831
The breaking load of armour joint shall not be less than 95% of that armour wire. Zinc rich paint shall be applied on armoured joint surface.
In plant repairs to the cables shall not be accepted.
All the cables shall be supplied in non-returnable drums as per IS: 10418.
d)In Case of FRLS Cables
i) The outer sheath of cables shall have an oxygen index of not less than 29 as per ASIMD: 2863.
ii)The maximum acid gas generation by weight as per IEC: 754 (i) shall not be more than 20% for outer sheath material of all cables. Bidder shall also guarantee the maximum theoretical acid gas generation with 20% by weight of outer sheath.
iii) The cables outer sheath shall meet the requirement of light transmission of 40% (minimum and shall be tested as per ISTMD: 2843). In case the test for light transmission is conducted as per ASTME: 662. The bidder shall furnish smoke density values as per this standard and shall co-relate the anticipated light transmission when tested as per ASTMD: 2843.
iv) The cable shall pass the fire resistance test as per SS: 42, 41, 475 (I) and flammability test as per EEE: 383.
e)Inspection:
All cables shall be inspected on receipt of the same at site and checked for any damage during transit.
f) Joint in Cables
The contractor shall take care that the cables received at site are distributed to various locations in such a manner as to ensure maximum utilisation and avoidance of cable jointing. Cable shall be rechecked before cutting in lengths, where the joints are unavoidable, and the location of such joints shall be got approved from the MoHFW. The joints shall be done by qualified jointer strictly in accordance with manufacturer's instruction/drawings.
g)Joint Boxes for Cables
The cable joint boxes shall be of appropriate size suitable for type of cable of particular voltage rating.
h)Jointing of Cables
All straight through joints shall be done in epoxy mould boxes with epoxy resins. Straight through joints shall not be permitted unless the length of run is in excess of cable drum.
End terminations of cables more than 1.1 KV grade shall be done with epoxy mould boxed and epoxy resin. Cable glands shall be 1.1KV grade double compression type and made to tin plated heavy-duty brass casting and machine finished. Glands shall be of robust construction capable of clamping cable and cable armour, firmly without injury of cable.
All washers and hardwares shall be made of brass tinned. Rubber components used in the glands shall be made of neoprene of tested quality.
Cable lugs shall be tinned copper/aluminium solderless crimping type conforming to IS: 8309 suitable for aluminium or copper conductor.
Crimping of terminals shall be done by using Corrosion inhabitory compound, with crimping tool.
Fire resistant paint has to be applied 1 Metre on either side of cable joint.
The contractor shall liaise fully with all other contractors to achieve an efficient and properly coordinated installation where equipment has to be re-positioned due to lack of site liaison; no extra cost shall be incurred by the Engineer-in-charge.
i) Testing of Cables
Cables shall be tested at factory as per requirement of IS: 7098 Part-I. The tests shall incorporate routine tests, type tests and acceptance tests. Prior to laying of cables, following tests shall be carried out:
i) Insulation test between phases and phase to earth for each length of cable before and after jointing.
On completion of cable laying work, the following test shall be conducted in the presence of Engineer-in-charge/ MoHFW.
ii) Insulation resistance test (Sectional and overall) 1000/5000V depending upon the voltage grade of cable.
iii) Continuity resistance test.
iv) Sheathing continuity test.
v) Earth test.
j) Laying of Cable
The cable drum shall be placed on jacks before unwinding the cable. Great care shall be exercised in laying cables to avoid forming links. At all changes in directions in horizontal & vertical places, the cable shall be

bent with a radius of bend not less than 8 times the diameter of cable.
The cable of 1.1KV grade shall be laid not less than 750mm below ground level in a 375mm wide trench (throughout), where more than one cable is to be laid in the same trench, the width of the trench shall be increased such that the interaxial spacing between the cables except where otherwise specified shall at least be 150mm minimum or as per site requirements or as approved by the Engineer-in-charge. Where single core cables are used in multiphase systems, the cables shall be installed in trefoil where possible.
In case the cables are laid in vertical formation due to unavoidable circumstance the depth per tier shall be increased by 200mm (minimum). Cable shall be laid in reasonably straight line, where a change in direction takes place a suitable cur-vature shall be i.e. either 12 times the dia meter of the cable or the radius of the bend shall not be less than twice the diameter of the cable drum or whichever is less. Minimum 3-meter long loop shall be provided at both sides of every straight through joint & 3 meters at each end of cable or as directed at site.
Greater care shall be exercised in handling the cable in order to avoid forming 'Kinks'. The cable drum shall in-verbally convey on wheels and the cable unrolled in right direction as indicated on the drum by the manufacturer. The cable shall be pulled over rollers in the trench steadily and uniformly without jerks and strains.
Cables laid in trenches in single tier formation, 10 cms. All around sand cushioning is provided below and above the cable before a protective cover is laid. For every additional vertical tier. The 30cm of sand cushion are provided over the initial tier. The cable shall be protected by 2nd class bricks of size not less than 230x115x75mm, stone tiles/RCC curved channel be placed on top of the sand breadth wise for the full length of the cable and where more than one cable is to be laid in the same trench the brick shall cover all cables and project at least 8 cms. Over the outer sides of the end cables.
Filling of trenches shall be done after the sand cushioning and laying of tilesor bricks are carried out to the satisfaction of the Engineer-in-charge (Refer drawing). Back fill for trenches shall be filled in layer not exceeding 150 mm. Each layer shall be properly rammed & consolidate before laying the next layer.
PVC pipe shall be provided for all road crossing. The size of the pipe shall be according to the cable and a minimum 100mm dia. pipe shall be provided. The pipe shall be laid in ground with special arrangement and shall be cement jointed and concreting with 1:5:10 shall be made as per relevant IS with latest amendment.
Location of cables laid directly underground shall be indicated by cable marker at an interval of 30 meters & with change of direction. Aluminium strip cable tag of 20mm wide with engraved tag no. shall be provided at both ends of cable.
Where the cables are to be laid in ducts (pucca trenches) in side the building, they will have to be laid on MS rack/ on MS cable trays grouted in walls trenches. Cables sizing through floors shall be protected from mechanical damage by a steel channel to a height of one meter above the floor where cable pass through wall they shall be sleeved with PVC/steel conduit.
Where the cables are laid in open (in building) along walls, ceiling or above false ceiling, cable rack (ladder type) or cable tray shall be provided. The size of the cable tray or rack shall depend on the number of cables to pass over that rack. Cable tray/rack shall be properly supported through wall/ceiling according to the site conditions. Cable laid on tray & riser shall be neatly dressed &clamped at an interval of 1000 mm & 750mm for horizontal & vertical cable run respectively either side at each bend of cable. All power cables shall be clamped individually & control cables shall be clamped in groups of three or four cables. Clamps for multicore cables shall be fabricated of 25x3 GI flats. Single core power cable shall be laid in trefoil formation & clamped with trefoil clamps made of PVC/fibre glass.
Cable openings in wall/floor shall be sealed by the contractor suitably by hession tape & bitumen compound or by any other proven to prevent ingress of water.
After the cables are laid, these shall be tested as per IS and the results submitted to Engineer-in-charges/Engineer and in case the results found unsatisfactory, all the repairing/ replacing of cables will be done by the contractor free of charge.

k) Fire Seal System

i) All the floor/wall opening provided for cable crossing shall be sealed by fire seal system.

ii) The fire proof sealing system shall fully comply with the requirements of relevant IS/BS: 476 Part-B. The fireproof seal system shall have minimum one hour fire resistance rating.

iii) The fire proof seal system shall be physically, chemically, thermally stable and shall be mechanically secured to the masonary concrete members. The system shall be completely gas and smoke tight, antirodent and anti-termite.

iv) The material used in fireproof seal system shall be non-toxic and harmless to the working personnel.

v) Type of fireproof seal system shall be foaming type or flamemastic type compound or approved equivalent.

After laying and jointing work is completed, high voltage test should be applied to all cables to ensure that they have not been damaged during or after the laying operation and that there is not fault in the jointing. Cables for use on low and medium voltage system (1.1KV grade cables) should withstand for 15 minutes a pressure of 3000V DC applied between conductors and also between each conductor and sheaths. In the absence of pressure testing facilities it is sufficient to test for one minute with a 1000V insulation tester In case the test results are unsatisfactory the cost of repairs and replacements and extra work of removal & laying will be made good by the contractor.

Cable shall be installed so that separation shown in the table below are observed.

HV Cable (11 KV/ 33 KV)	- HV Cable (11 KV/ 33 KV)	50 mm
ELV & LV 230 V/433 V	- ELV & LV cable 230 V/433 V	Equal to the diameter of the bigger cable.
HV cables (11 KV/33 KV)	- ELV & LV cables 230 V/433 V	300 mm
LV cables 433 V	- Telephone/Instrument cable	350 mm
All cables	- All hot pipe work	200 mm

l) Quality Assurance

Quality Assurance shall follow the requirements of MoHFW as applicable. Quality Assurance involvement will commence at enquiry and follow through to completion and acceptance thus ensuring total conformity to Purchaser's requirements.

m) Deviations

Deviation from specification must be stated in writing at the quotation stage.

In absence of such a statement, it will be assumed that the requirements of the specifications are met without exception.

n) Spares for Commissioning Including Consumables

The manufacturer/tenderer shall also supply a complete list of commissioning spares and tools and consumables. The same shall be included in the bid price. No extra payment shall be made on account of non-availability of spares during commissioning.

CABLE TRAYS

Ladder type Cable tray – for Power Cables only

Cable trays shall be ladder type fabricated out of mild steel/slotted angles and flats of required width as per design. Bends shall be prefabricated. The cable tray shall be hot dip galvanized or primed and painted with powder coating as asked for in BoQ or as approved by MoHFW. The minimum weight of the zinc coating shall be 460 gm/sq.m and minimum thickness of coating shall not be less than 75 microns.

Perforated Cable tray – for Power Cables & Low current service both

The perforated cable trays are fabricated out of 1.6mm thick CRCA sheet steel having minimum 50mm depth or as called for in BOQ, hot dip galvanized or epoxy coated of approved shade. Perforations are maximum 10mm spaced at maximum 20mm distance. The cables shall be tied with the cable tray with nylon strip/ aluminium clamps/M.S. clamps as per requirements.

Suitable provision shall be made where a tray crosses expansion joints. The width of the tray shall allow for a suitable separation between cables the design shall allow for adequate bending radius for the sizes of cables. No sharp bend to be allowed in cable tray. Joints between sections shall be bolted.

The tray shall be suspended from the surface of the concrete slab by means of approved steel hangers spaced at a distance of not more than 125cms. Suitable bushes shall be provided where cables pass through apertures in the tray. Cables must be securely fixed to the tray with clamps or cable ties. In routing necessary barrier and spacing shall be maintained for cables of different voltages in case they lie side by side. Telephone cables shall cross the power cables only at about right angle and these two shall not run in close proximity. Full details of the tray shall be approved by the Engineer-in-charge before fabrication. Earth continuity shall be maintained between each section of cable tray and each total run of tray shall be effectively bonded to the nearest earth continuity 0conductor. All nuts and bolts used shall be of galvanised steel.

Depending on the size of cable trays space of 20-33% has to be maintained for future expansion.

Cable tray is manufactured to comply with the specifications of National Electrical Code (NEC) and National Electrical Manufacturer's Association (NEMA).

INTERNAL ELECTRICAL WORKS

A. Conducting (M.S Conduit)

All conduits shall be of heavy gauge solid drawn ERW welded manufactured out of 16 (1.6mm) gauge MS Sheet up to 32mm dia and of 14 (2 mm) gauge for sizes higher than this. Both inner and outer surfaces shall be smooth without burrs, dents and kinks. Conduits shall be black stove enameled inside and outside. The cross section of conduit shall be uniform throughout. The welding shall be uniform such that welded joints do not yield when subjected to flattening test. Welded joint shall not break when threaded or bent at an angle. Conduit shall conform to specifications of IS: 9537 (Part-II) and the capacity of conduits shall be in accordance with the standards and shall never be exceeded. The minimum size of the conduit shall be 20mm dia. Care shall be taken to ensure that all conduits are adequately protected while stored at site prior to erection and no damaged conduit shall be used.

B. PVC Conduit

All conduits shall be high impact rigid 2mm thickness PVC heavy duty type and shall comply with I.E.E. regulations for non-metallic conduit 2mm thick as per IS-9537/1983 (Part-III). All sections of conduit and relevant boxes shall be properly cleaned and glued by using epoxy resin glue and the proper connecting pieces. Inspection type conduit fittings such as inspection boxes, drawn boxes, fan boxes and outlet boxes shall be M.S. or otherwise mentioned. Conduit shall be terminated with adopter/PVC glands as required.

Accessories

Conduit accessories such as normal bends, unions, circular junction boxes and pull boxes, locknuts etc. shall be heavy gauge type and approved make. Conduit accessories shall conform in all respects to IS: 3837-1966 with latest amendment. Wherever several conduits are running together, adequately sized adoptable boxes common to all runs shall be used to avoid inserting inspection boxes in the individual run. Where it is necessary to segregate wiring metal filler shall be fixed with in the box.

Conduits shall be laid before casting in the upper portion of a slab or otherwise, as may be instructed or in accordance with approved drawings, so as to conceal the entire run of conduits and ceiling outlet boxes. Vertical drops shall be buried in columns or walls. Wherever necessary, chases will be cut by the contractor with the help of chase cutting m/c or by hand. Nothing extra shall be paid to the contractor on this account. In case of exposed brick/ rubble masonry work special care shall be taken to fix the conduit and accessories in position along with the building work. Sufficient depth of the chases will be made to accommodate the required number of conduits. The chase will be filled with cement, coarse sand mortar (1:3) and properly cured by watering for one week.

If a chase is cut in an already finished surface the contractor shall fill the chase and finish it to match the existing finish. Contractor must not cut any iron bars to fix conduits. Conduits shall be kept at a minimum distance of 100mm from the pipes of other non-electrical services. Where the conduit is to be embedded in a concrete member it shall be adequately tied to the reinforcement to prevent displacement during casting, conduits in chases shall be held by steel hooks of approved design at maximum of 100 cm centres. The embedding of conduits in walls shall be so arranged as to allow at least 12mm plaster cover the same. All threaded joints of conduit pipes shall be treated with some approved ‘preservative compound’ to secure protection against rust.

Suitable expansion joints fittings of approved make and design shall be provided at all the points where the conduit crosses the expansion joint in the building. (Preferably with Pilca metallic watertight conduits). Conduits shall cross at right angles of the joints only.

Separate conduit shall be used for:

1) Normal light, fan call bell
2) 16 A power outlets
3) Emergency Light Point
4) Fire alarm System
5) Computer Outlets
6) P.A System
7) Telephone system
8) TV Network
9) Or any other services not mentioned here.

Wiring for short extensions to outlets in hung ceiling or to vibrating equipments, motors etc. shall be installed in flexible conduits. Flexible conduits shall be formed from a continuous length of spirally wound interlocked wire steel with a fused zinc coating on both sides. The conduit shall be provided with approved type adoptor. A separate and accessible earth connection shall bond across the flexible conduit.

Conduit runs on surfaces shall be supported with metal 1.2 mm thick saddles, which in turn are properly secured on to GI spacer to the wall or ceiling. Fixing screws shall be with round or cheese head and of rust proof materials. Exposed conduits shall be neatly run parallel or at right angles to the walls of the building and shall be painted in color matching the adjoining area. Unseemly conduit bends and offsets shall be avoided by using better appearance. Cross cover of conduits shall be minimum and entire conduit installation shall be clean and with good appearance. For surface work, the boxes shall be raised back pattern type, designed for use with distance saddles to give clearance of 6mm between the back of conduit and the fixing surface.

Where conduits are run on steel work, they will be fixed by means of purpose made GI Caddy clips in manner meeting with the approval of the Engineer prior to the installation being carried out. Other methods of fixing may be agreed in special circumstances, but approval must first be obtained from the site engineer. The spacing of saddles shall be not more than 600mm centers for up to 32mm diameter conduits and at 750mm for conduit sizes of 40mm diameter and above in case of MS conduit and not more than 600 mm for PVC conduit. In addition, saddles shall be fixed at each side of any bend/Tee, or set at a distance of 200mm from the bend/Tee. The holes in the brickwork or concrete for fixing plugs shall be neatly drilled by means of a masonry drill of the appropriate size.

All the GI sheet steel /passivated boxes used for housing switches, plugs, fan regulator etc. shall be five sided conforming to IS: 5133 Part I-1969. Suitable size of boxes shall be provided a minimum of 2 adjustable fixing lugs on vertical sides. Suitable earth terminal inside each box shall be provided. All fixing lugs shall be threaded to receive standard machined chromium plated brass screws. Sufficient number of knockouts shall be provided for conduit entry. Conduits carrying wires of different circuit can terminate in common J.B having metal compartments. Necessary GI pull wires shall be inserted into the conduit for drawings wires. In case conduit pipe is required to cross any RCC beam special adopter boxes shall be provided for crossing & nothing shall be paid extra.

Where conduits are used for non-air-conditioned space to air-conditioned space or into a fan chamber or duct, a junction box shall be installed to break the continuity of such conduit at the point of entry or just outside and conduit shall be sealed around the conductors.

Particular care shall be taken during the progress of the work to prevent the ingress of dirt and rubbish such as plaster droppings into erected conduits. Conduit which has become so clogged shall be entirely freed from these accumulations or will be replaced. Screwed plastic or metal caps or turned wooden plugs shall be employed to protect all open ends. Plugs of waste wood, paper, cotton or other fibrous matter shall not be used. All unused conduit entries shall be blanked off in an approved manner and where conduits terminate in adaptable boxes, all removable box covers shall be firmly secured to provide complete enclosure. If considered necessary by the Engineer-in-charge, the conduits shall be swabbed out by drawing swabs of rag through the conduit to remove moisture prior to any cables being drawn in.

All conduit installations must be completed and erected in their totality before they are wired and must be fully rewireable from outlets to distribution boards or trunking systems etc. to which they connect. No wiring of any part of the installation shall be commenced until instructions are received to do so by the Engineer-in-charge at such time as he is satisfied that the wiring will not be damaged due to building operations. Conduits shall be installed so that they are self-draining in the event of ingress of moisture due to condensation or any other reason. A suitable drainage hole shall be drilled at the bottom of the lowest conduit box in every 9-meter of horizontal run.

PVC bush of good quality shall be used in each conduit termination in a switch box, draw box, lighting fixtures and circular junction boxes.

Exposed conduits running above false ceilings shall be suitably clamped independently along with the dropped ceiling. Perforated straphangers or twisted attachment shall not be acceptable. In no case shall raceways be supported or fastened to other pipe for repair and maintenance. They shall be arranged symmetrically and in the cost compact design, in no way unduly criss-crossing each other. Proper spacing shall be maintained when two or more conduits run side by side. The layout of the pipes shall be co-ordinated with other services if any. The junction boxes and conduits used in hazardous areas shall be flameproof type with cast iron construction complete with threaded covers. The conduit of each circuit or section shall be completed before conductors are drawn in. The entire system of conduit after erection shall be tested for mechanical and electrical continuity throughout and permanently connected to earth conforming to the requirements by means of special approved type of earthing clamp efficiently fastened to conduit pipe in a workman like manner for a perfect continuity between the earth and conduit.

The conduit system shall be so laid out that it will obviate the use of tees, elbows and sharp bends. No

length of conduit shall have more than the equivalent of two-quarter bends from inlet to outlet. The conduit itself being given required smooth bend with radius of bends suiting to the site conditions but not less than 6 times overall diameter.
Outlet boxes shall be of heavy-duty sheet steel installed as to maintain continuity throughout. These shall be so protected at the time of laying that no mortar finds its way inside during concrete filling or plastering. For fluorescent fittings, the outlet boxes heavy duty shall be provided 300mm off centre for a 1200mm fitting and 150mm off centre for a 600mm fittings or as per B.O.Q.
Draw boxes of ample dimensions shall be provided at convenient points to facilitate pulling of long runs of cables. They shall be completely concealed with MS covers flush with plasterwork painted to match the wall. These boxes will be as few as possible and located where found suitable by the Engineer-in-charge.
Switch Boxes
The switch boxes shall be zinc passivated & shall not be less than 18 SWG thick or shall be as called for in BOQ. It will be so designed that accessories could be mounted on integral pedestals or on adjustable flat iron mounting straps with tapped holes by brass machine screw. Leaving ample space at the back and on the sides for accommodating wires and check nuts at conduit entries. These shall be attached to conduits by means of check nuts on either side of their walls. These shall be completely concealed leaving edges flush with wall surfaces. Earthing terminal inside box shall be provided.
Moulded plate switches screw less as specified in item of work shall be provided. No timber shall be used for any supports. Boxes, which come within concrete, shall be installed at the time of casting. Care shall be taken to fix the box rigidly so that its position is not shifted while concreting.
Wiring
All the wiring installation shall be as per IS: 732 with latest amendment. PVC insulated copper conductor cables as specified in bills of quantity shall be used for sub-circuit runs from the distribution boards to the points and shall be pulled into conduits. They shall be twisted copper conductors with thermoplastic insulations of 660/1100 volts grade. Colour Code for wiring shall be followed.
Looping system of wiring shall be used, wires shall not be jointed. Where joints are unavoidable, they shall be made through approved mechanical connectors with prior permission of the Engineer-in-charge. No reduction of strands is permitted at terminations. No wire smaller than 1.5 sq.mm shall be used and shall be as per B.O.Q. Wherever wiring is run through trunkings or raceways, the wires emerging from individual distributions shall be bunched together with cable straps at required regular intervals. Identification ferrules indicating the circuit and DB number shall be used for submains sub-circuit wiring. The ferrules shall be provided at both end of each submain and sub-circuit.
Where single-phase circuits are supplied from a three phase and a neutral distribution board, no conduit shall contain the wiring fed from more than one phase. In any one room in the premises where all or part of the electrical load consists of lights, fans and/or other single phase current consuming devices, all shall be connected to the same phase of the supply. Circuits fed from distinct sources of supply or from different distribution boards or through switches or MCBs shall not be bunched in one conduit. In large areas and other situations where the load is divided between two or three phase, no two single-phase switches connected to different phase shall be mounted within one box.
All splicing shall be done by means of terminal blocks or connectors and no twisting connection between conductors shall be allowed.
Industrial sockets shall be of moulded plastic BoQ and deeply recessed contact tubes. Visible scraping type earth terminal shall be provided. Socket shall have self-adjustable spring loaded protective cap. Socket shall have MCB/ELCB/RCCB as specified in the schedule of work.
Maximum number of PVC insulated 650/1100 V grade/copper conductor cable conforming to IS: 694-1990.

Conduit size	20mm		25mm		32mm		40mm		50mm		60mm	
Wire size in sq.mm.	S	B	S	B	S	B	S	B	S	B	S	B
1.50	7	5	12	10	20	14	-	-	-	-	-	-
2.50	6	5	10	8	18	12	-	-	-	-	-	-
4	4	3	7	6	12	10	-	-	-	-	-	-

Conduit size	20mm		25mm		32mm		40mm		50mm		60mm	
Wire size in sq.mm.	S	B	S	B	S	B	S	B	S	B	S	B
6	3	2	6	5	10	8	-	-	-	-	-	-
10	2	-	4	3	6	5	8	6	-	-	-	-
16	-	-	2	-	4	3	7	6	-	-	-	-
25	-	-	-	-	3	2	5	4	8	6	9	7

Notes:
The above table shows the maximum capacity of conduits for a simultaneous drawing in of cables.
The columns heads 'S' apply to runs of conduits which have distance not exceeding 4.25 m between draw in boxes and which do not deflect from the straight by an angle of more than 15 degrees. The columns heads 'B' apply to runs of conduit which deflect from the straight by an angle of more than 15 degrees.
Conduit sizes are the nominal external diametres.

DISTRIBUTION BOARDS & MCBs

General

Distribution boards shall be of standard make with MCBs as per approved make given. Distribution boards shall be constructed out of steel sheet all weld enclosure with double door IP42 protection and shall be powder coated. Ample clearance between the conductors of opposite pole, between conductors and sheet steel body shall be maintained in order to obviate any chance of short circuit. Removable conduits entry or knockouts plates shall be provided at top and bottom to facilitate drilling holes at site to suit individual requirements. Also on additional/separate adopter box of suitable length and size shall be provided to accommodate wires and cables. No. of conduits etc. and nothing shall be payable on this account. The MCBs shall be mounted on high-grade rigid insulating support and connected by electrolytic copper bus bars. Each incoming MCB isolator shall be provided with solderless cable sockets for crimping. Phase separation barriers made out of arc resistant materials shall be provided between the phases. Bus bars shall be colour coded for phase identification.
Distribution boards shall be recessed in wall nitch or if required mounted on the surface of the wall with necessary clamp bolts etc. The mounting height shall not exceed 1200mm from finished floor level.
Distribution board shall be provided with proper circuit identification nameplate and danger sticker/plate as per requirements.
All the distribution boards shall be provided with engraved nameplates with 'lighting', 'power' or 'UPS' with DB Nos., as the case may be. Each DB shall be provided with a circuit list giving details of each circuit. All the outgoing circuit wiring shall be provided with identification ferrules giving the circuit number & phase.
Each distribution board shall have a separate neutral connection bar and a separate earth connection bar mounted within the DB each having the same number of terminals as the total number of outgoing individual circuits from the distribution board. Conduit & cable armouring shall be bonded together & connected to the distribution board earth bar.
Where oversized cables are specified due to voltage drop problems, it shall be contractors responsibility to ensure that satisfactory terminal arrangements are provided without an extra cost.

Residual Current Circuit Breaker

RCCB shall be 4 pole 415 volts 50Hz, 30-300mA sensitivity. These shall be of approved make. The rating of the RCCB shall be as specified in BOQ. These shall be suitable for manual closing and opening and automatic tripping under earth fault circuit of 30-300mA as specified in item of work. The enclosure of the RCCB shall be moulded from high quality insulating material. The material shall be fire retardent, anti-tracking, non-hygroscopic, impact resistant and shall with stand high temperature. All parts of switching mechanism shall be non-greasing, self-lubricating material so as to provide consistent and trouble free operation. Operation of RCCB shall be independent of mounting position and shall be trip free type. The RCCB shall be protected against nuisance tripping by protective device.

Miniature Circuit Breaker

1. The MCB shall be current limiting type and suitable for manual closing and opening and automatic

tripping under overcurrent and short circuit. The MCB shall also be trip free type.
2. Single pole/three pole versions shall be furnished as required.
3. The MCB shall be rated for 10 KA/15 KA fault level.
4. The MCB shall be suitable for its housing in the distribution boards and shall be suitable for connection at the outgoing side by tinned cable lugs and for bus-bars connection on the incoming side.
5. The terminal of the MCBs and the open and close conditions shall be clearly and indelibly marked.
6. The MCB shall generally conform to IS: 8828. -1996
7. The MCB shall have 20,000 electrical operation upto 63A.
8. The MCB shall have minimum power loss (Watts) as per I.S./ IEC.

FIRE ALARM SYSTEM

1.1.0 GENERAL

A. This chapter of the specifications includes furnishing, installation, connection and testing of the microprocessor controlled, intelligent reporting fire alarm network equipment required to form a complete, operative, coordinated system. It shall include, but not be limited to, alarm initiating devices, alarm notification appliances, Network Fire Alarm Control Panels (FACP), Network Reporting Terminals (NRT), Network Liquid Crystal Display (NLCD), auxiliary control devices, annunciators, and wiring as shown on the drawings and specified herein.

B. The fire alarm system shall comply with requirements of IS:2189:1999 & 1996 NFPA Standard 72 for Protected Premises Signaling Systems except as modified and supplemented by this specification, or the stringent one of the two specification in case of any discrepancy. The system shall be electrically supervised and monitor the integrity of all conductors.

C. Fire Alarm System shall be integrated with P.A. system. A digitized pre-recorded voice message shall notify occupants that a fire condition has been reported. The message shall instruct the occupants with emergency instructions. Emergency manual voice override shall be provided.

D. The system and its components shall be Underwriters Laboratories, Inc. listed under the appropriate UL testing standard as listed herein for fire alarm applications and shall be in compliance with the UL listing for equivalent European standard EN54.

E. Each designated zone shall transmit separate and different alarm, supervisory and trouble signals to the Fire Alarm Control Room and designated personnel.

F. The FACPs shall be active/interrogative-type systems where each transponder is repetitively scanned, causing a signal to be transmitted to the fire alarm control panel node indicating that the transponder and its associated initiating device and notification appliance circuit wiring is functional. Loss of this signal at the FACP shall result in a trouble indication on both the FACP display and at the network display, as specified hereinafter for the particular input.

G. The system shall be arranged such that not less than 20 percent additional transponders may be inserted into any network communication loop.

H. The installing company shall employ technicians on site to guide the labours and to ensure the systems integrity.

1.2.0 SCOPE:

A. A new network intelligent reporting, microprocessor controlled fire detection and shall be compatible with PA system emergency voice alarm communication network shall be installed in accordance with the specifications and drawings.

B. Basic Performance:

Alarm and trouble signals from the FACP, NRT, and NLCD network nodes shall be digitally encoded by listed electronic devices onto a NFPA Style 9 looped multiplex communication system.

Alarm, trouble and supervisory signals from all intelligent reporting devices shall be encoded onto NFPA Style 6 (Class A) Signaling Line Circuits (SLC).

Initiation Device Circuits (IDC) shall be wired Class A (NFPA Style D). Connected by the SLC.

Notification Appliance Circuits (NAC) shall be wired Class A (NFPA Style Z). Connected by the SLC.

Power for initiating devices and notification appliances must be from the main fire alarm control panel, the transponder to which they are connected or to a Field Charging Power Supply (FCPS).

A single ground or open on any system signaling line circuit, initiating device circuit, or notification appliance circuit shall not cause system malfunction, loss of operating power or the ability to report an alarm.
Alarm signals arriving at the main FACP shall not be lost following a power failure (or outage) until the alarm signal is processed and recorded.
Digitized electronic signals shall employ check digits or multiple polling.
Transponder devices are to consist of low current, solid-state integrated circuits, and shall be powered locally from a primary power and standby power source.
F.A. System shall be integrated with P.A system & Car Calling system so that it can be used for Emergency evacuation under fire condition.

1.3.0 SUBMITTALS

A. General:

All substitute equipment proposed as equal to the equipment specified herein, shall meet or exceed the following standards. For equipment other than that specified, the contractor shall supply proof that such substitute equipment does in fact equal or exceed the features, functions, performance, and quality of the specified equipment. Two copies of all submittals shall be submitted to the Engineer-in-charge/Engineer for review.

B. Shop Drawings:

1. Sufficient information, clearly presented, shall be included to determine compliance with drawings and specifications.
2. Include manufacturer's name(s), model numbers, ratings, power requirements, equipment layout, device arrangement, complete wiring point-to-point diagrams, and conduit layouts.
3. Show equipment layout and main control panel, module layout, configurations and terminations.

C. Manuals:

Submit simultaneously with the shop drawings, complete operating and maintenance manuals listing the manufacturer's name(s) including technical data sheets.
Wiring diagrams shall indicate internal wiring for each item of equipment and the interconnections between the items of equipment.
Provide a clear and concise description of operation, which gives the information required to properly operate the equipment and system.
Approvals will be based on complete submissions of manuals together with shop drawings.

D. Software Modifications

Provide the services of a factory trained and authorized technician to perform all system software modifications, upgrades or changes. Response time of the technician to the site shall not exceed 2 hours.
Provide all hardware, software, programming tools and documentation necessary to modify the fire alarm network on site. Modification includes addition and deletion of devices, circuits, zones and changes to system operation and custom label changes for devices or zones. The system structure and software shall place no limit on the type or extent of software modifications on-site. Modification of software shall not require power-down of the system or loss of system fire protection while modifications are being made.

E. Certifications:

Together with the shop drawing submittal, submit a certification from the major equipment manufacturer indicating that the proposed supervisor of installation and the proposed performer of contract maintenance is an authorized representative of the major equipment manufacturer and trained on network applications. Include names and addresses in the certification.

1.4.0 DEFECT LIABILITY PERIOD:

A. All work performed and all material and equipment furnished under this contract shall be free from defects and shall remain so for a period of at least Three (3) year from the date of acceptance. The full cost of maintenance, labor and materials required to correct any defect during this Three (3) year period shall be included in the submittal bid.

1.5.0 POST CONTRACT MAINTENANCE:

A. Complete maintenance and repair service for the fire alarm system shall be available from a factory trained authorized representative of the manufacturer of the major equipment for a period of three (3) years after expiration of the guaranty.

B. As part of the bid/proposal, include a quote for a maintenance contract to provide all maintenance, tests, and repairs described below. Include also a quote for unscheduled maintenance/repair, including hourly rates for technicians trained on this equipment and response travel costs for each year of the maintenance period. Submittals which do not identify all post contract maintenance costs will not be

accepted. The rates and costs shall be valid for the period of three (3) years after expiration of the guaranty.
C. Maintenance and testing shall be as required by the Local Statutory Authority. A preventive maintenance schedule shall be provided by the contractor describing the plan for preventive maintenance of all devices and subassemblies requiring regular maintenance. The schedule shall include:
Systematic examination, adjustment and cleaning of all detectors, manual fire alarmstations, control panels, power supplies, relays, water flow switches and all accessories of the fire alarm system.
Each circuit in the fire alarm network shall be tested semiannually.
Each smoke detector shall be tested in accordance with the requirements of Indian Standards/ NFPA.
1.6.0 APPLICABLE PUBLICATIONS:
The publications listed below form a part of this specification. The publications are referenced in text by the basic designation only.
A. The fire alarm system shall comply with requirements of NFPA for protected premises signaling systems except as modified and supplemented by this specification. The system field wiring shall be supervised either electrically or by software-directed polling of field devices.
B. Underwriters Laboratories Inc. (UL) - USA: / EN - 54
C. Local and State Building Codes.
D. All requirements of the Authority Having Jurisdiction (AHJ).
1.7.0 APPROVALS:
A. The system must have proper listing and/or approval from the following nationally recognized agencies:

UL	Underwriters Laboratories Inc
FM	Factory Manual
ULC	Underwriters Laboratories Canada
CPWD	Central Public Work Department
BIS	Bureau of Indian Standards

EN 54 or Equivalent European Standards
B. The fire alarm control panel, network interface and all transponders shall meet the modular labeling requirements of Underwriters Laboratories, Inc. Each subassembly, including all printed circuits, shall include the appropriate UL modular label. Systems which do not include modular labels, which may require return to the manufacturer for system upgrades, and are not acceptable.
2.0 PRODUCTS
2.1 EQUIPMENT AND MATERIAL, GENERAL:
A. All equipment and components shall be new, and the manufacturer's current model. The materials, appliances, equipment and devices shall be tested and listed by a nationally recognized approvals agency for use as part of a protected premises protective signaling (fire alarm) system. The authorized representative of the manufacturer of the major equipment, such as control panels, shall be responsible for the satisfactory installation of the complete system.
B. All equipment and components shall be installed in strict compliance with each manufacturer's recommendations. Consult the manufacturer's installation manuals for all wiring diagrams, schematics, physical equipment sizes, etc. before beginning system installation. Refer to the riser/connection diagram for all specific system installation/termination/wiring data.
C. All equipment shall be attached to walls and ceiling/floor assemblies and shall be held firmly in place. (e.g., detectors shall not be supported solely by suspended ceilings). Fasteners and supports shall be adequate to support the required load.
2.2 CONDUIT AND WIRE:
A. M.S. Conduit:
1. Conduit shall be in accordance with the National Electrical Code (NEC), local and state requirements.
2. Where possible, all wiring shall be installed in conduit or raceway. Conduit fill shall not exceed 40 percent of interior cross sectional area where three or more cables are contained within a single conduit.
3. Cable must be separated from any open conductors of power, or Class 1 circuits, and shall not be placed in any conduit, junction box or raceway containing these conductors, per NEC Article 760-29.
4. Wiring for 24 volt control, alarm notification, emergency communication and similar power-limited auxiliary functions may be run in the same conduit as initiating and signaling line circuits. All circuits shall be provided with transient suppression devices and the system shall be designed to permit simultaneous operation of all circuits without interference or loss of signals.

5. Conduit shall not enter any FACP or any other remotely mounted control panel equipment or back boxes, except where conduit entry is specified by the FACP manufacturer.

The following specifications of Maharashtra Schedule of Rates shall be followed:-

WGMA/BW

2.2.1 Scope

Concealing of Rigid steel Conduits:

In walls / flooring:

Concealing of Rigid steel conduits and erecting in wall, flooring by making chases / grooves/ entries as per approved Method of Construction along with continuous earth wire and all required material including earth clips hardware such as 'U' nails, binding wire, fish wire; accessories such as MS junction / inspection boxes, check-nuts, flexible PVC pipe, drawing fish wires and making all piping rigid, refinishing the surface with cement mortar, removing debris from site.

Material:

Rigid Steel Conduits:

Rigid steel HG conduit minimum 20mm dia and 16 gauge, ERW grade duly processed for antirust treatment and painted with black enamel paint, accessories for rigid steel conduits such as check nuts, long bends, deep junction boxers for flooring, regular junction boxes for walls; of required ways all of the same make.

Earth continuity wire:

GI wire of 2.5 sq. mm GI earth clips 22 gauge, 100 mm width, for fixing earth wire along the conduits.

Junction boxes / Draw – in boxes:

Junction box shall be 5 sided with removable to plate and of suitable size to accommodate No. of entries; fabricated from 16 SWG CRCA sheet steel earth terminal duly treated with antirust treatment and painted with two coats of red oxide paint. There shall be knock out holes in required numbers and dia for entry of conduit of conduit pipes and arrangement to fix cover plates on it.

Hardware:

'U' nails, plumbing and general use nails of required sizes, washers, check-nuts, steel binding wire 20 gauge, GI fish wire, etc.

Method of Construction:

Concealing of Rigid Steel conduits:

General:

Work shall be done in co-ordination with civil work to suit final approved layout. Size of conduit shall be correct depending on number of wires to be drawn. (Table No. 1/1, for Steel conduits) Separate pipe shall be used for each phase in 1-ph distribution and for power and light distribution and also for wiring for other utilities like data, telephone, TV cabling, etc; for which the distance between pipes shall not be less than 300 mm or anti electrostatic partition is to be provided. Adequate use of conduit accessories shall be made at required locations. Entries in wall shall be at level of corresponding conduit with colour coding as per Table No. ¼ (For Visual identification) Flexible conduits shall be used at expansion joints. Erection shall be done as per the layout finalized with minimum sharp bends, with junction boxes at angular junctions and for straight runs at every 4.25 metre; in such manner so as to facilitate drawing of wires. All bending of conduits shall be done approved manner without changing the cross-section.

Concealing of Rigid Steel Conduits in walls/ flooring:

Chases shall be made in walls of adequate width with cutter and chiseling through it. Necessary finishing of the wall surface shall be done. Work in flooring shall not disturb RCC work, Conduits of adequate size shall be erected with use of appropriate accessories, and hardware like 'U' nails, etc. draw-in / inspection boxes shall be fixed with check-nut, flush with surrounding surface and earthed.

Testing:

Earth continuity:

Earth continuity shall be ensured at termination point of Earth wire, between the ends of metal conduit.

Mode of Measurement:

Measurement shall be carried out on the basis per running meter length of conduit.

WGMA/CC-

Scope:

Bunch of wires:

Providing specified wires and drawing them through provided conduits/ trunking and / or as directed with coated ferrules, harnessing the bunch of wires with necessary material when used in panel boards, duly connecting / terminating with lugs, and testing for safety and beneficial use.

Material:
Wires: in conduits/ trunking/ panel boards
Mains/ Sub- Main/ Circuit mains (comprising phase and neutral wires):
PVC insulated wire of specified size, minimum FR Grade insulation copper conductor of electrolytic tough pitch (ETP) grade having insulation of 1.1 kV grade, ISI marked of required colour coding as per Table No. 1/5.
Wires: Open
PVC insulated and PVC sheathed wire of specified size, minimum FR Grade insulation, copper conductor of electrolytic tough pitch (ETP) grade, having insulation of 1.1 kV grade, ISI marked of required colour coding as per Table No. 1/5.
Earth Continuity wire:
PVC insulated wire minimum FR Grade insulation, copper conductor of electrolytic grade, having insulation of 1.1 kV grade of green/ green yellow colour, ISI marked of required colour coding as per Table No. 1/5.
Lugs:
Copper lugs of appropriate size & type.
Other material:
Rubber grommet, bush, harnessing material, flexible conduit etc.
Method of Construction:
Bunch of wires:
Drawing of wires: General
Specified wires shall be drawn with adequate care. Correct colour coding as per Table No. 1/5 shall be used for phase, neutral and earth. Wires shall not have intermediate joint in between terminals of the accessories. Earth-wire and Return wire (neutral) of two different phases, shall not be drawn in single pipe. Wires shall be terminated in the terminals of accessories only, with appropriate type of size and lugs.
Drawing of wires: through PVC conduits.
Bush shall be used at pipe opening to protect wire insulation from getting damaged due to burrs/ sharp edges. Number of wires shall not exceed with respect to size of pipe as per Table No. 1/2.
Drawing of wires: through Rigid Steel conduits
Bush shall be used at pipe opening to protect wire insulation from getting damaged due to burrs/ sharp edges. Number of wires shall not exceed with respect to size of pipe as per Table No. 1/1.
Open wire bunch:
Open wires shall be erected with due care so as to avoid chances of any mechanical manner in panel boards or where ever necessary. For covering lead wires flexible conduit shall be used with gland as per necessity.
Testing:
Insulation resistance test:
All wiring shall be tested with 500V Megger between phases, phase – neutral and to Earth. IR value shall not be less than 1 M-ohm.
Earth continuity:
Earth continuity shall be ensured between termination points of Earth wire.
Polarity Test:
Test shall be carried out for ensuring the correct polarity in switch and plug.
Mode of Measurement:
Measurement shall be carried out on the basis per running meter length of single wire or bunch as specified.
Table 1/1
Maximum Number of single core 1.1 KV cables that can be drawn in Rigid steel Conduits

Size of cable mm2		Size of Conduit mm													
Nominal Cross Sectional area	No. and dia of wires	16		20		25		32		40		50		63	
		S	B	S	B	S	B	S	B	S	B	S	B	S	B
1.0	1/1.12 Cu	5	4	7	5	13	10	20	14						
1.5	1/1.4	4	3	7	5	12	10	20	14						
2.5	1/1.83 / 1.06	3	2	0	5	10	8	18	12						

	Cu														
4.0	1 / 2.24 7/ 0.85 Cu	3	2	4	3	7	8	12	10						
6	1 / 2.80 7 / 1.06 Cu	2		3	2	6	5	10	8						
10	11/3.55 Al 7 / 1.40 Cu			22		54	43	86	75						
16	7 / 1.70					2		4	3	7	6				
25	7 / 2.24							3	2	5	4	8	6	9	7
35	7 / 2.50							2		4	3	7	5	8	6
50	7 / 3.0 Al 19 / 1.80									2		5	4	6	5

Note 1: Cu – applicable to only copper cable; Al – applicable to only Aluminium Cable.
Note 2: The table shows maximum capacity of conduits for the simultaneous drawing of cables. The columns headed ‘S’ apply to straight runs of conduits which have distance not exceeding 4.25 m between draw in boxes and which do not deflect from straight by an angle more than 15o. The columns headed ‘B’ apply to bent runs of conduit, which deflect from the straight by an angle of more than 15o.
Note 3 : In case of inspection type draw in box has been provided and if the cable is first drawn through one straight conduit, then through the draw in box and then through the second straight conduit such system may be considered as that of straight conduit even if the conduit deflects through the straight by more than 15o.

Table 1/2
Maximum Number of single core 1.1 KV cables that can be drawn in Rigid Non-Metallic Conduits

Size of cable sq. mm2		Size of conduit mm					
Nominal cross sectional area	No. and dia of wires	16	20	25	32	40	50
1.0	1/1.12Cu	5	7	13	20		
1.5	1/1.4	4	6	10	14		
2.5	1/1.8 3/1.06 Cu	3	5	10	14		
4.0	1 /2. 24, 7/0.85 Cu	2	3	6	10	14	
6	1 /2.80 7/1.06 Cu		2	5	9	11	
10	11 /3.55 Al 7/1.40 Cu			4	7	9	
16	7/1.70			2	4	5	12
25	7/2.24				2	2	6
35	7/2.50					2	5
50	7/3.0 Al 19/1.80					22	53

Note 1: Cu- applicable to only copper cable; Al- applicable to only Aluminium cable.

Table No. 1/4
Colour Coding for Conduits in Wall entry

Conduit For	Colour
Light/ Power Circuit	Black

Security wiring	Blue
Fire Alarm wiring	Red
Low voltage circuits	Brown
UPS circuits	Green

Table 1/5
Colour code of Wires

Type	Colour
Phase	Red, yellow, Blue
Neutral	Black
Earthing	Green

B. Wire:
All fire alarm system wiring must be new, unless specified herein.
Wiring shall be in accordance with local, state and national codes (e.g., NEC Article 760) and as recommended by the manufacturer of the fire alarm system. Number and size of conductors shall be as recommended by the fire alarm system manufacturer, but not less than 1.5 sq.mm. for initiating device circuits and signaling line circuits for notification appliance circuits.
All wire and cable shall be listed and/or approved by a recognized testing agency for use with a protective signaling system.
Wire and cable not installed in conduit shall have a fire resistance rating suitable for the installation as indicated in NFPA 70 (e.g., FPLR).
Wiring used for the signaling line circuit (SLC) shall be twisted and shielded and installed in conduit unless specifically accepted by the fire alarm equipment manufacturer.
All field wiring shall be completely supervised.
2.3 FIRE ALARM CONTROL PANELS AND FIRE CONTROL ROOM:
2.3.1 The Fire Alarm Control Panel shall be as per Section 7.33 of IS: 2189.
2.3.2 Each network FACP shall contain a microprocessor-based central processing unit (CPU). The CPU shall communicate with and control the following types of equipment used to make up the system: intelligent addressable detectors, addressable modules, Panel modules including initiating circuit, control circuits, transponders, local and remote operator terminals, printers, annunciators, emergency voice communication systems, and other system controlled devices.
Each FACP on the network shall perform the following functions:
It shall Supervise and monitor all intelligent addressable detectors and monitor modules connected to the system for normal, trouble and alarm conditions.
It shall supervise all initiating signaling and notification circuits throughout the facility by way of connection to monitor and control modules.
It shall detect the activation of any initiating device and the location of the alarm condition. Operate all notification appliances and auxiliary devices as programmed. In the event of CPU failure, all SLC loop modules shall fallback to degrade mode. Such degrade mode shall treat the corresponding SLC loop control modules and associated detection as conventional two-wire operation. Any activation of a detector in this mode shall automatically activate associated Notification Appliance Circuits.
It shall visually and audibly annunciate any trouble, supervisory, security or alarm condition on operator's terminals, panel display, and annunciators.
When a any of the following condition is detected and reported by one of the system initiating devices or appliances:
i. Fire Alarm Conduits
ii. Trouble Confirmation
iii. Supervisory Card
iv. Security Alarm
v. Pre Alarm
Then the following functions shall immediately occur:
The FACP alarm LED on the FACP shall flash.
A local piezo-electric indication for the event signal for the event in the FACP shall sound a distinctive Signal.
The 640-character LCD display on the local FACP node and on the network displays shall indicate all

information associated with the fire alarm condition, including the type of alarm point, and its location within the protected premises. This information shall also be displayed on the network reporting terminal.
Printing and history storage equipment shall log the information associated with the fire alarm control panel condition, along with the time and date of occurrence.
All system output programs assigned via control-by-event interlock programming to be activated by the particular point in alarm shall be executed, and the associated system outputs (alarm notification appliances and/or relays) shall be activated on either local outputs or points located on other network nodes.

2.3.3 General FACP Configuration & Operation

Each FACP node shall include a full featured operator interface control and annunciation panel which shall include a backlit 640 character Liquid Crystal Display (LCD), individual, color coded system status LEDs, and an alpha-numeric keypad for field programming and control of the node.
All programming or editing of the existing programming in the system shall be achieved without special equipment or interrupting the alarm monitoring functions of the fire alarm control panel.
FACP nodes shall be designed so that it permits continued local operation of remote transponders under both normal and abnormal network communication loop conditions. This shall be obtained by having transponders operate as local control panels upon loss of network communication.
FACP nodes shall be modular in construction to allow ease of servicing. Each CPU and transponder shall be capable of being programmed on site without requiring the use of any external programming equipment. Systems which require use of external programmers or change of EPROMs are not acceptable.
The CPU and associated equipment are to be protected so that they will not be affected by voltage surges or line transients including RFI and EMI.
Each transponder and peripheral device connected to the FACP node CPU shall be continuously scanned for proper operation. Data transmissions between network nodes, FACP CPUs, transponders, and peripheral devices shall be reliable and error free. The transmission scheme used shall employ dual transmission or other equivalent error checking techniques. Failure of any transponder or peripheral device to respond to an interrogation shall be annunciated as a trouble condition.
The FACP shall be able to provide the following software and hardware features:

1. Pre- Signal and Positive Alarm Sequence: The system shall provide means to cause pre-alarm signals to only sound in specific areas with a delay of the alarm from 60 to up to 180 seconds after start of alarm processing. In addition, a Positive Alarm Sequence selection shall be available that allows a 15-Second time period for acknowledge an alarm signal from a fire detection/initiating device. If the alarm is not acknowledged within 15 seconds, all local remote outputs shall automatically immediately.
2. Smoke Detector Pre-Alarm indication at control panel: To obtain early warning of incipient or potential fire conditions, the system shall support a programmable option to determine system response to real-time detector sensing values above the programmed setting. Two levels of Pre-Alarm indication shall be available at the control.

Alert: It shall be possible to set individual smoke detectors for pre-programmed pre-alarm thresholds. If the individual threshold is reached, the pre-alarm condition shall be activated.
Action: if programmed for action and the detector reaches a level exceeding the pre-programmed level, the control panel shall indicate an action condition, Sounder bases installed with either heart or smoke detectors shall automatically activate on action Pre-Alarm level, with general evacuation on alarm level.

3. The system shall be integrated with P.A. System Car Calling system for Emergency evacuation under fire.
4. Each FACP node shall be capable of providing the following features:

a) Block Acknowledge for Trouble Conditions.
b) Rate Charger Control
c) Control-By-Time (Delay, Pulse, time of day, etc.)
d) Automatic Day/Night Sensitivity Adjust (high/low)
e) Device Blink Control (turn of detector LED strobe)
f) Environmental Drift Compensation (selectable ON or OFF)
g) Smoke Detector Pre-alarm Indication at Control Panel
h) NFPA 72 Smoke Detector Sensitivity Test
i) System Status Reports
j) Alarm Verification, by device, with tally
k) Multiple Printer Interface
l) Multiple CRT Display Interface

m) Non-Fire Alarm Module Reporting
n) Automatic NFPA 72 Detector Test
o) Programmable Trouble Reminder
p) Upload/Download System Database to BMS
q) One-Man Walk Test
r) Smoke Detector Maintenance Alert
s) Security Monitor Points
t) Alpha-numeric Pager Interface
u) On-line or Off-line programming

The configuration features & peripherals of FACP shall be given below:-

Doc1	Standard Data Sheet
Item	Floor Fire Alarm Panel
Purpose	Automatic fire detection and alarm
Interconnection	Peer to peer networked floor Panels
Type	Solid state micro-processor based analogue addressable
Loop capacity	6 Loop card slotes
	Loop cards as per floor requirement
Compatibility	Photo electric smoke sensors Loop isolators Loop sounders Loop manual call points Loop input monitoring cards RS 485 cards for networking & RS 232 cards for printer & CRT Convention devises
No of devices	Each loop shall be able to cater to minimum as per IS or manufacturer standard
Operation Voltage	15 V to 28 V DC, 3 amps
Input Voltage	230 V AC, 1 Ph 50HZ, 0.75 amps.
Standby battery charging	28 V DC, 1.5 A
Wiring	2 core 1.5 mm2, copper, PVC insulated, twisted, screened wires in concealed conduits wherever available & in other places by surface cable for notification loop, sounder loop, RS 232 & RS485 communication
Loop wire monitoring	Open circuit Short circuit Earth Leakage Device removed Wrong Device
Communication	To remote repeater panel through proprietary protocol over RS 485 link
Outputs	2 X programmable sounders on panel 1 X Fire Contact 1 X Fault Contact
Printer	24 character built in printer
Communication port	RS 485 RS 232
Selectable Features	Common sounders coincidence alarm RMC Fire
	RMC Fault Zone walk test

	Control Output
	Output delay Alarm counter Alarm Counter
	Alarm verification Sounder silence
Dialing Time	4second per loop for 127 devices, 3 second per loop for MCPs
Software	Firmware Field configuration programmable
Memory	EPROM non volatile for 600 event memory storage
Configuration	Power supply module
	CPU
	memory extension module
	memory buffer module
	printer interface module
	LCD ineterface module
	relay driver module
	1 no. 80 column external printer
	1 no. menu driven membrance switch keyboard
	1 set control switches
	1 set operator push buttons
	Loop cards
	Remote terminal unit connection port
	LCD display & driver module
Connectivity	To proprietary protocol compatible to analogue addressable detectors of type
LCD display	4 X 160 character alpha numeric LCD auto back-lit with occurrence of event or manual override
Display Format	Alarm/pre-alarm/fault/isolation
	Alarm & event acknowledge
	Commands/report/programming
	Time/day/date
Power supply	SMPS
Back up power supply	As per clause 7.5 of IS 2189
Power pack	SMF lead acid / Nicd 24 V DC 30 AH
Test features	Panel self test
	LCD test
	Fault test
	Detector test
	Battery fault
	Internal hooter test
	External hooter test
Control facility	Scroll/next
	Alarm silence
	Fault silence
	Lamp evacuate
	System reset
	LCD back Lighting
	Trouble Silence
Indications	System normal
	Priority 1 Alarm
	Priority 2 Alarm
	Fault
	Alarm Silence

	Power ON
	Battery ON
Event report	Type
	Address
	Location
	Time/day/date
	Date
	Time
Zone recording	In order of occurrence regradless of alarm priority
	Print Interrupt of occurrence of fresh event & on its record resume print
Testing facility	Possible with digital and analogue input and output digital simulation from panel through software
	Under maintenance mode testing possible with balance system in normal operation
Fire pattern	No alarm issue for short duration
	Quick response for fast smoke build up
	Early detection and suitable modification for of alarm level for dirt accumulation
	Programmed output actuation
	Access protection through 4 levels of pass words
	Hardware security lock
	Detector sensitivity adjustment and display of set value
	Disable/isolate detectors/ interface units
	Single button operation front panels keys
Software facility	Individual detector
	Sensitivity setting
	Trending
	Adjustable dual alarm thresholds
	Pre alert warning
	Cross zoning
	Alarm verifications
	Input/ output assignment
	Event history indexing
Local Sounder	Yes
Panel Sounder output	1 no. rated for 1 Amp.
Surge withstand	As per IEEE 472 for mains, input/ output/loops, 7 kv discharge on panel electronics except LCD display
Ambient	From (-) 5 deg. C to (+) 45 deg C Max.
Humidity	15% to 95% non condensing
Mounting	Wall/ floor
Enclosure	1.6mm sheet steel, dust and vermin proof to IP 55
Enclosure treatment & painting	Degreased, de-rusted, pickled, rinsed, phosphattized, putty finished. Double primer and final epoxy painted FIRE RED shade
Front doors	Hinged and lockable with transparent visor for viewing LEDs etc.
Cable Entry	From both top & bottom, through 2 mm thick removable gland plate

2.4 Network Repeater Panel (NRP)

A network control annunciator shall be provided to display all system intelligent points. The NRP shall be capable of displaying all information for all possible points on the network.

Network display devices which are only capable of displaying a subset of network points shall not be suitable substitutes.
The NRP shall include a minimum of 640 characters, backlit by a long life, solid state LCD display. It shall also include a keypad. Additionally, the network display shall include ten soft-keys for screen navigation and the ability to scroll events by type. i.e. Fire Alarm, Supervisory Alarm, Trouble, etc.
The network control annunciator shall have the ability to display up to eight events in order of priority and time of occurrence. Counters shall be provided to indicate the total number of events by type.
The NRP shall mount in any of the network node fire alarm control panels. Optionally, the network display may mount in a back box designed for this use.
The NRP shall include long life LEDs to display Power, Fire Alarm, Pre-Alarm, Security Alarm, System Trouble, Supervisory, Signals Silenced, Disabled Points, Other (non-fire) Events, and CPU Failure.
The network control annunciator shall include a Master password and up to nine User passwords. Each password shall be up to eight alpha-numeric characters in length. The Master password shall be authorized to access the programming and alter status menus. Each User password may have different levels of authorization assigned by the Master password.
The NRP shall allow editing of labels for all points within the network; control on/off of outputs; enable/disable of all network points; alter detector sensitivity; clear detector verification counters for any analog addressable detector within the network; clear any history log within the network; change the Time/Date settings; initiate a Walk Test.
For time keeping purposes the NRP shall include a time of day clock.
The configuration, features & peripherals of the Repeater panel shall be given below:-

Doc 2	STANDARD DATA SHEET
Item	Network Repeater Panel
Purpose	Repeat indication
Compatibility	With networked analogue addressable floor fire alarm panel through proprietary communication protocol
Type	Solid state micro-processor based
Communication	By 2 core RS 485 twisted pair screened with networked floor fire alarm analogue addressable panels
Distance maximum	Up to 2 Km from nearest networked floor addressable fire alarm panel. Connection to system by tee off / spur / daisy chained
Power Supply	From power supply unit or from nearest floor addressable fire alarm panel.
Operating Voltage	15 V to 28 V DC
Monitoring	Panel power disconnection
	Floor / Loop / Zone indication LEDs (50 nos)
	Select keys for point addresses in display zone
	Fire
	Fault
	Disabled
	Accept / Reset / Silence / Sound alarm
	Control key for current Fire / Fault / Disabled status
Power consumption	100 mA mains fail state
	250 mA nominal
	350 mA max. draw
LCD display	Back lit, Alphanumeric, 4 line 160 character display
Data interface	RS 485 serial bus driver board
Mounting	Suitable for both surface & recess mounting
Enclosure	1.8 mm sheet steel, dust and vermin proof
	Hinged lockable double door
Ambient	From(-) 5o C to (+) 450 C Max
Humidity	15 % to 95 % non condensing

Paint	Degreased, de - rusted, pickled, rinsed, phosphatized expoxy painted in FIRE RED paint
Local sounder	Yes

2.5 Water flow Indicators:

Water flow Switches shall be an integral, mechanical, non-coded, non-accumulative retard type.

Water flow Switches shall have an alarm transmission delay time, which is conveniently adjustable from 0 to 60 seconds. Initial settings shall be 30-45 seconds.

All water flow switches shall come from a single manufacturer and series.

Water flow switches shall be provided and connected under this section but installed by the mechanical contractor.

Where possible, locate water flow switches a minimum of one (1) foot from a fitting, which changes the direction of the flow and a minimum of three (3) feet from a valve.

2.6 Sprinkler and Standpipe Valve Supervisory Switches:

Each sprinkler system water supply control valve riser, zone control valve, and standpipe system riser control valve shall be equipped with a supervisory switch. Standpipe hose valves, and test and drain valves shall not be equipped with supervisory switches.

PIV (post indicator valve) or main gate valves shall be equipped with a supervisory switch.

The switch shall be mounted so as not to interfere with the normal operation of the valve and adjusted to operate within two revolutions toward the closed position of the valve control, or when the stem has moved no more than one-fifth of the distance from its normal position.

The supervisory switch shall be contained in a weatherproof aluminum housing, which shall provide a 25 mm conduit entrance and incorporate the necessary facilities for attachment to the valves.

The switch housing shall be finished in red baked enamel.

The entire installed assembly shall be tamper proof and arranged to cause a switch operation if the housing cover is removed, or if the unit is removed from its mounting.

Valve supervisory switches shall be provided and connected under this section and installed by mechanical contractor.

2.7 Non-Alarm Input Operation

Any addressable initiating device in the system may be used as a non-alarm input to monitor normally open contact type devices. Non-alarm functions are a lower priority than fire alarm initiating devices.

Combo Zone: - A special type code shall be available to allow water flow and supervisory devices to share a common addressable module. Water flow devices shall be wired in parallel, supervisory devices in series.

2.8 SYSTEM COMPONENTS - ADDRESSABLE DEVICES

2.8.1 Addressable Devices - General

Addressable devices shall use simple to install and maintain decade, decimal Address Switches. Devices shall be capable of being set to an address in a range from 001 to the maximum address provided by SLC loop.

Addressable devices, which use a binary address setting method, such as a Dip switch, are not an allowable substitute.

Detectors shall be intelligent (analog) and addressable, and shall connect with two wires to the FACP Signaling line circuit.

Addressable smoke and thermal detectors shall provide dual alarm and power/polling LEDs. Both LEDs shall flash under normal conditions, indicating that the detector is operational and in regular communication with the control panel, and both LEDs shall be placed into steady illumination by the control panel, indicating that an alarm condition has been detected. If required, the LED flash shall have the ability to be removed from the system program. An output connection shall also be provided in the base to connect an external remote alarm LED.

The fire alarm control panel shall permit detector sensitivity adjustment through field programming. Sensitivity shall be automatically adjusted by the panel on a time-of-day basis.

Using software in the FACP, detectors shall automatically compensate for dust accumulation and other slow environmental changes that may affect their performance. The detectors shall be listed by UL as meeting the calibrated sensitivity test requirements of NFPA Standard 72, Chapter 7 or EN 54.

The detectors shall be ceiling-mount and shall include a separate twist-lock base with tamper proof feature. Base shall include a sounder base with a built-in (local) sounder rated at 85 DB minimum, a relay base and an isolator base designed for Class A applications.

The detectors shall provide a test means whereby they will simulate an alarm condition and report that

condition to the control panel. Such a test may be initiated at the detector itself (by activating a magnetic switch) or initiated remotely on command from the control panel.
Detectors shall also store an internal identifying type code that the control panel shall use to identify the type of device (Photoelectric, Thermal& Photo-thermal).
Detectors will operate in an analog fashion, where the detector simply measures its designed environment variable and transmits an analog value to the FACP based on real-time measured values. The FACP software, not the detector, shall make the alarm/normal decision, thereby allowing the sensitivity of each detector to be set in the FACP program and allowing the system operator to view the current analog value of each detector.
A magnetic test switch shall be provided to test detectors and modules. Detectors shall report an indication of an analog value reaching 100% of the alarm threshold.

2.8.2 Programmable Electronic Exit Point Directional Sounders

Electronic sounders shall operate on 24 VDC nominal. Electronic sounders shall be field programmable without the use of special tools, at a sound level of at least 90 dBA measured at 10 feet from the device. It shall be capable to broadcast preprogrammed Voice Message also and shall be flush or surface mounted as shown on plans. It shall produce broad-band directional sound to guide occupants to safe exists even in complete darkness.
Strobe lights shall meet the requirements of the ADA, UL Standard 1971, be fully synchronized, and shall meet the following criteria: The maximum pulse duration shall be 2/10 of one second.
Strobe intensity shall meet the requirements of UL 1971.
The flash rate shall meet the requirements of UL 1971.

2.8.3 Addressable Pull Box (manual station)

Addressable pull boxes shall, on command from the control panel, send data to the panel representing the state of the manual switch and the addressable communication module status. They shall use a key operated test-reset lock, and shall be designed so that after actual emergency operation, they cannot be restored to normal use except by the use of a key.
All operated stations shall have a positive, visual indication of operation and utilize a key type reset.
Manual stations shall be constructed of Lexan with clearly visible operating instructions provided on the cover. The word FIRE shall appear on the front of the stations in raised letters, 1.75 inches or larger.

2.8.4 Intelligent Multi-Co-Operative Sensing Photoelectric Smoke Detector (As required)

The detectors shall use the photoelectric (light-scattering) principal to measure smoke density and shall be in position to work in advance multi Co-Operative Sensing, on command from the control panel, send data to the panel representing the analog level of smoke density.
Photo- electric Fire Alarm detector having photo electric smoke sensor and thermal sensor incorporated and shall send individual smoke sensitivity and temperature operation to panel having following technical specifications: -

Operating Temperature - 0 to 50oC
Humidity - 10 to 95%
Smoke sensor sensitivity - 0.2% to 3.7% per foot of smoke Obstruction
Smoke sensor Air velocity - 0-610 m/min

2.8.5 Intelligent Thermal Detectors (As required)

Thermal detectors shall be intelligent addressable devices rated at 135 degrees Fahrenheit (58 degrees Celsius) and have a fixed rate-of-rise element rated at 15 degrees F (9.4 degrees C) per minute. It shall connect via two wires to the fire alarm control panel signaling line circuit.

2.8.6 Intelligent Multi Criteria (Photo- Thermal) Acclimating Detector

The intelligent multi criteria Acclimate detector shall be an addressable device that is designed to monitor a minimum of photoelectric and thermal technologies in a single sensing device. The design shall include the ability to adapt to its environment by utilizing a built-in microprocessor to determine its environment and choose the appropriate sensing settings. The detector design shall allow a wide sensitivity window, no less than 1 to 4% per foot obscuration. This detector shall utilize advanced electronics that react to slow smoldering fires and thermal properties all within a single sensing device.
The microprocessor design shall be capable of selecting the appropriate sensitivity levels based on the environment type it is in (shops, manufacturing, kitchen etc.) and then have the ability to automatically change the setting as the environment changes (as walls are moved or as the occupancy changes).
The intelligent multi criteria detection device shall include the ability to combine the signal of the thermal sensor with the signal of the photoelectric signal in an effort to react hastily in the event of a fire situation. It

shall also include the inherent ability to distinguish between a fire condition and a false alarm condition by examining the characteristics of the thermal and smoke sensing chambers and comparing them to a database of actual fire and deceptive phenomena.
The detector shall have Isolator modules to automatically isolate wire-to-wire short circuits on an SLC Class A or Class B branch. The isolator module shall limit the number of detectors that may be rendered inoperative by a short circuit fault on the SLC loop segment or branch. At least one isolator module shall be provided for each floor or protected zone of the campus.
If a wire-to-wire short occurs, the isolator module shall automatically open-circuit (disconnect) the SLC. When the short circuit condition is corrected, the isolator module shall automatically reconnect the isolated section.

2.8.7 Two-Wire Detector Monitor Module

Addressable monitor modules shall be provided to connect one supervised IDC zone of conventional 2-wire smoke detectors or alarm initiating devices (any N.O. dry contact device).
The IDC zone may be wired for Class A or B (Style D or Style B) operation. An LED shall be provided that shall flash under normal conditions, indicating that the monitor module is operational and in regular communication with the control panel.
For difficult to reach areas, the monitor module shall be available in a miniature package and shall be no larger than 2-3/4 inch x 1-1/4 inch x 1/2 inch. This version need not include Style D or an LED.

2.8.8 Addressable Control Module

Addressable control modules shall be provided to supervise and control the operation of Lifts, sprinkler, switch gears etc., one conventional NACs of compatible, 24 VDC powered, polarized audio/visual notification appliances. For fan shutdown and other auxiliary control functions, the control module may be set to operate as a dry contact relay.
The control module NAC may be wired for Style Z or Style Y (Class A/B) with up to 1 amp of inductive A/V signal, or 2 amps of resistive A/V signal operation, or as a dry contact (Form-C) relay. The relay coil shall be magnetically latched to reduce wiring connection requirements, and to insure that 100% of all auxiliary relay or NACs may be energized at the same time on the same pair of wires.
Audio/visual power shall be provided by a separate supervised power loop from the main fire alarm control panel or from a supervised, UL listed remote power supply.
The control module shall be suitable for pilot duty applications and rated for a minimum of 0.6 amps at 30V DC.

2.9 EXECUTION

2.9.1 INSTALLATION:

Installation shall be in accordance with the NEC, NFPA 72, local and state codes, as shown on the drawings, and as recommended by the major equipment manufacturer.
All conduit, junction boxes, conduit supports and hangers shall be concealed in finished areas and may be exposed in unfinished areas. Smoke detectors shall not be installed prior to the system programming and test period. If construction is ongoing during this period, measures shall be taken to protect smoke detectors from contamination and physical damage.
All fire detection and alarm system devices, control panels and remote annunciators shall be flush mounted when located in finished areas and may be surface mounted when located in unfinished areas.
Manual Pull Stations shall be suitable for surface mounting or semi flush mounting as shown on the plans, and shall be installed not less than 42 inches, nor more than 48 inches above the finished floor.

2.9.2 TYPICAL OPERATION:

Actuation of any manual station, smoke detector, heat detector or water flow switch shall cause the following operations to occur unless otherwise specified:
Activate all programmed speaker circuits.
Actuate hooter units until the panel is reset.
Light the associated indicators corresponding to active speaker circuits.
Release all magnetic door holders to doors to adjacent zones on the floor from which the alarm was initiated.
Where required, return all elevators to the primary or alternate floor of egress.
A smoke detector in any elevator lobby shall, in addition to the above functions, return all elevators to the primary or alternate floor of egress.
Smoke detectors in the elevator machine room or top of hoistway shall return all elevators in to the primary or alternate floor. Smoke detectors or heat detectors installed to shut down elevator power shall do so in

accordance with ANSI A17.1 requirements and be coordinated with the electrical contractor.
Duct type smoke detectors shall, in addition to the above functions, shut down the ventilation system or close associated control dampers as appropriate.
Activation of any sprinkler system low-pressure switch, on valve tamper switch, shall cause a system supervisory alarm indication.
2.9.4 TEST
The service of a competent, factory-trained engineer or technician authorized by the manufacturer of the fire alarm equipment shall be provided to technically supervise and participate during all of the adjustments and tests for the system.
Before energizing the cables and wires, check for correct connections and test for short circuits, ground faults, continuity, and insulation.
Close each sprinkler system flow valve and verify proper supervisory alarm at the FACP.
Verify activation of all flow switches.
Open initiating device circuits and verify that the trouble signal actuates.
Open signaling line circuits and verify that the trouble signal actuates.
Open and short notification appliance circuits and verify that trouble signal actuates.
Open and short (wire only) network communications and verify that trouble signals are received at network annunciators or reporting terminals.
Ground initiating device circuits and verify response of trouble signals.
Ground signaling line circuits and verify response of trouble signals.
Ground notification appliance circuits and verifies response of trouble signals.
Check alert tone and prerecorded voice message to all alarm notification devices.
Check installation, supervision & operation of all intelligent smoke detectors using walk test.
Each of the alarm conditions that the system is required to detect should be introduced on the system. Verify the proper receipt and the proper processing of the signal at the FACP and the correct activation of the control points.
When the system is equipped with optional features, the manufacturer's manual should be consulted to determine the proper testing procedures. This is intended to address such items as verifying controls performed by individually addressed or grouped devices, sensitivity monitoring, verification functionality and similar.
2.10 FINAL INSPECTION:
At the final inspection, a factory-trained representative of the manufacturer of the major equipment shall demonstrate that the system functions properly in every respect.
2.11 INSTRUCTION & SEQUENCE OF OPERATION:
Instruction shall be required for operating the system. Hands-on demonstrations of the operation of all system components and the entire system including program changes and functions shall be provided. The contractor and/or the systems manufacturer's representatives shall provide a typewritten "Sequence of Operation."

PUBLIC ADDRESS SYSTEM CUM VOICE EVACUATION SYSTEM
The public address system with microphone and amplifier of adequate capacity with 2 Nos. manual selector switches for selecting between:
(a) alarm or public address system
(b) Alert tones or Evacuation tones to all the channels.
The amplifier shall work on A.C. or 24 VDC power supply separate from that of the fire alarm panel. Master control for adjustment of volumes shall be provided. The amplifier unit shall have complete protection against over loads, short circuits and wrong battery polarity. The amplifier shall have hum and noise level better than 60db.
Speakers with line impedance transformers (at speaker end) shall be connected to amplifier. This will be integrated with panel and shall be capable of announcing pre-recorded messages.
A Message Unit shall be provided having up to 30 seconds of pre-recorded emergency messaging.
The message contained in the message unit shall be recordable in the field.
The Public address system shall be provided with a separate full battery back-up and suitable chart.

LIFT OF APPROVE MAKES

1. ELECTRICAL WORKS		
S.No	**Description**	**Make/manufacturer**
1.	Cable Jointing kit / HT termination Kit	Reychem/Xicon/3M
2.	Cable lugs & gland	Dowel/Jhonson/Gripwell/Comex/Hex/Comet
3.	Cable tray/ Race ways / Floor trunking / wall channels	RM CON/CTM ENGINEERING/MEM
4.	Capacitors with harmonic filters	Epcos/L&T/Neptune/Siemens/(Siepan) /Schneider/ABB/ C & S
5.	Ceiling /Exhaust/Wall fans	Crompton/Usha/Orient/Bajaj/Havells/Rallison
6.	Chemical Earthing	JMV LPS Ltd/Pragati Electrocom
7.	Coaxial wires	Finolex/Delton/Skytone/Anchor/L&T/Beldon
8.	Colour Monitor	Samsung/LG/Sony/Panasonic
9.	Compression gland and lugs/thimbles	Dowel/Comet/Gripwell
10.	Contactors	ABB/L&T/Schneider/GE/Siemens/Legrand/ C & S
11.	Control Cables	Polycab/Paramount/ Havells,/ Finolex /KEI
12.	Control fuse base with HRC fuse / HRC Fuse	L&T/GE/Siemens/ABB/Alstom/ C & S
13.	Copper control cable (FRLS)	Havell's/RR/Cables/Polycab/Finolex/Skytone/NiccoRallision
14.	Crimping lugs/thimbles	Dowells/Hex/Commet
15.	CT/PT's	L&T/AEI/Kappa/C&S/CGL/Kappa/AE
16.	Cubical type Synchronizing & capacitor control panel (Bolted / Folded fabrication)	L&T/ABB/Schneider/RishControl/Shivalic
17.	Cubicle type fuse unit/RMU	Siemens/L&T/ABB/Schneider/Eaton
18.	Data/Telephone/TV Outlets	SYSTEMAX/Belden/Simone/MK/Legrand/Havells
19.	DB's / Pre wired DB's	Havells/C&S/Indo Asian/Legrand/L&T/ Schneider/ABB/Siemens/Eaton
20.	DG Set- Alternator	Stamford/Kirlosker/Caterpillar/Crompton
21.	DG set Assembler	Koel green/Jakson Engineers/Caterpiller/Sterling generators ltd./Perkins/Sudhir Gensets
22.	Diesel engine	Kirloskar/Cummins, Mitsubishi, Perkins, Ashok Leyland, Volvo, Catterpiller
23.	Digital lighting control system	Aura dimming/Relux controls/Lightolier control/Effectron/Philips/Schneider.
24.	Digital Numerical Relays	L&T/ABB/Siemens/Schneider/GE/Areva

25.	DWC HDPE Pipe	DURA-LINE/REX/CARLON/EMTELLE
26.	Energy / Digital meters	Enercon/Socomec/L&T/Rishabh/Secure/Trinity/Schneider Electric/Havells/HPL/GE, Siemens/ABB/Conzerv
27.	Feeder pillars, Meter cubicle Panels, Floor panels for upto 400A i/c switchgear	ABB/L&T/Siemens/Schneider
28.	Fiber Optic Cable	Sterlite Industries/Finolex/Belden/Delton/Skytone/Paramount/Legrand
29.	Fire extinguisher	Ceasefire/Exflame/Minimax
30.	FRLS - PVC/Aluminum / copper 1.1 KV grade /cables & wires	Havells/Polycab/KEI/RR Kable
31.	G.I./Cu. Strip & earthing material	Bharati, Indiana, Slotco
32.	Hand gloves & rubber mat	Premierpolyfim Ltd/Polyelectrosafe/Challenger/Electromat/Safe Hold
33.	HRC Fuse	Siemens/L&T/ABB/Schneider/GE
34.	HT / LT Cables(XLPE,PVC)	Havells/Polycab/Finolex/KEI/Paramount/RR KABEL
35.	Indicating Lamp(LED)	BCH/L&T/Siemens/Schneider
36.	Indicating lamps	BCH/L&T/Siemens/Emco/ Schneider
37.	Industrial socket outlets	CAPE/ABB/L&T/Legrand/Siemens/Neptune
38.	Insulated rubber Mat	Premier Polyfilm Ltd/Polyelectrosafe/Challenger/Electro Mat/Safe Hold
39.	Insulators	Jaya Shree/Modern/IEC/WSI
40.	Intelligent detectors & hooters & accessories	Notifire/Honeywell/Ravel/Eaton
41.	Intelligent fire alarm panel	Notifire/Honeywell/Ravel/Eaton
42.	Inverter	Microtek , Luminous , Su-Kam, Riello
43.	Isolators	Siemens/L&T/ABB/GE/Legrand/ C & S
44.	Jointing kit	Reychem/Xicon/Birla 3M
45.	Light Fixtures lamps & fittings	Bajaj/Philips/Wipro/SYSKA/Havells,
46.	Lightning Arrestors	CAPE/LPI/ Indelec/Eternity Energia solution
47.	LT panels / APFC panel	NEPTUNE/RISHA CONTROL/SHIVALIC/ APPLICATION CONTROL PANEL/ADVANCE
48.	Indicating lamps	BCH/L&T/Siemens/Emco/ Schneider
49.	Industrial socket outlets	CAPE/ABB/L&T/Legrand/Siemens/Neptune
50.	Insulated rubber Mat	Premier Polyfilm Ltd/Polyelectrosafe/Challenger/Electro Mat/Safe Hold
51.	panels / APFC panel	NEPTUNE/RISHA CONTROL/SHIVALIC/ APPLICATION CONTROL PANEL/ADVANCE

52.	MCBs / RCCB/Isolaters / RCBO / Change over switch	Legrand/Schneider/Siemens/ABB/L&T/ C & S
53.	MCCB with variable Microprocessor based (O/C, S/C, E/F) / Thermo magnetic releases	Legrand/Schneider/Siemens/ABB/L&T/ C & S
54.	Measuring Instruments (Analog Meter)	L&T/AE/MECO/SOCOMEC
55.	Measuring instruments (Digital type)/ MFM/KWH meter	L&T/Ducati/Conzerv/Secure/Siemens/ Neptune
56.	Modular switches, socket outlets and wiring accessories with moulded cover plate	MK (Honeywell)/Siemens/Legrand/L&T (Oris)/Havells (Crab tree-Athena)
57.	MPCB	Legrand/Schneider/Siemens/ABB
58.	MS Conduit	RM CON/BEC/AKG
59.	MS Conduit accessories	RM CON/BEC/AKG
60.	Multi-function Meter	L&T/AB/Socomec/Siemens/Schneider/ Ducati
61.	Occupancy Sensors/Lighting Control System	Phillips/Schneider/Legrand/Wipro/GE/ C&G
62.	Overload relay single phase preventer	ABB/L&T/GE/Siemens/Areva
63.	Panel accessories	L&T/Rishab/Siemens/BCH
64.	Power Capacitor	L&T(Meher)/EPCOS (Siemens)/DUCATI/Schneider/Legrand
65.	Programmable timer (self-powered electronic digital)/Astronomer	L&T/Siemens/Hager/MDS/Legrand/Eat on
66.	Protective relays (Microprocessor based compatible with PC & PLC)	Siemens/L&T/ABB/GE/Areva
67.	Push buttons	Siemens/L&T/ABB/Schneider/C&S/BC H
68.	PVC conduit & Accessories	VPLIndia/Polypack/BEC/AKG/Norpac/ RMG Steel
69.	PVC Insulated copper wire 1.1 KV grade (FRLS)	Havells/Polycab/Finolex/KEI/RR Cable/Rallison
70.	Relay / Contractors/timers / starters and Control Panel	Siemens/L&T/Schneider/ABB/Legrand
71.	Selector switch	Siemens/L&T/BCH
72.	Street Light including Poles & Light Fixtures	Philips/Bajaj/Wipro/Havells/C&S
73.	Tap-off, Splitter box	Zinwell/Novatron/Catvision
74.	Telephone tag block/Jack Panel/Face Plate	Krone/Phoenix/Wago/Beldon/Panduit/ Huwaei
75.	Telephone/Data Wires	Bonton/Delton/Polycab/Legrand
76.	Terminal strip	Connect well/Phoenix/WAGO
77.	Termination Kits	Raychem/Birla/3M
78.	UPS	Emerson , Riello, Eaton
79.	Voltmeter and ammeter	AE/Meco/Universal/Rishab/Yokins
2. FIRE ALARM SYSTEM		
Note: All fire alarm components/ Panels shall be UL listed & confirm to		

NFPA standard.		
S. No.	**Details of equipment/ material**	**Make/ Manufacturer**
1.	Intelligent Addressable Fire Alarm System	Bosch, Notifier, Ravel, Siemens, Eaton
2.	Intelligent Addressable Fire Alarm Detectors, Hooters, Manual Call Point UL Listed,Talkback	Bosch, Notifier, Ravel, Siemens, Eaton
3.	Data Cables	Molex/ Awaya/ Delton
4.	Switches	Clipsal/ Crabtree/ Legrand/Havells
5.	Cable TV Cables	Skytone/ Bonton/ Finolex/ Delton
6.	Termination Control Cable	Dowell's/ Elemex/ Wago/ Phoenix
7.	Cable Tray/Raceway	RM CON/CTM ENGINEERING/MEM
8.	Control Cable	RR Cable/ Bonton/ Havells/ Polycab/ Finolex
9.	Photo Chromatic Switch	Bajaj/ Wipro/Phillips/L&T
10.	Splitter Box	Shyam Antenna/ CAT vision or equivalent
11.	Panic Button	Eureka Forbes/Fire Pro or equivalent
12.	Intelligent Addressable Response Indicator	Morlay/Seimens Finder/Notifier/ Ravel/ Honeywell
13.	Fibre Optic	Belden/Simone/ Schneider/Dlink/Paramount
14.	Change Over Switch	Socomec/HPL/ L&T
15.	Luminaires	Philips/ Surya / Bajaj/ Wipro
16.	Mica Tape Cable	Bonton,Skytone,Radox,FRTEK
3. LV Package/PA System		
S. No.	**Details of equipment/ material**	**Make/ Manufacturer**
1.	PA Speaker	Bosch/ Honeywell/Bose/Ravel
2.	Amplifier	Bosch/ Honeywell/Bose/Ravel
3.	CD Player	Bosch/ Honeywell/Bose/ Ravel
4.	RG 6,RG 11/Wire	Belden/ Skytone/ Bonton/ Finolex
5.	CAT 6 Wire/Accessories -Jack panel , Face Plate	Huwavei/ Belden / Panduit/ Ststemax / Simone
6.	Speaker Wire	Bonton/Delton/Polycab

Note: - Contractors have to take approval from Engineer in charge / Consultants before placing of order of any required materials from the above mentioned approved makes. If any required materials (as per BOQ / Extra items) not available in above list Engineer in charge /Consultants can add the make / Brand in list at any stage, decision will be final and binding on contractors. If any doubt about listed makes / Brand Engineer in charge may amend the list at any stage, decision will be final and binding on contractors.

5. Tender Drawings

Soil Investigation Report

Government of Himachal Pradesh

RTDC
(A Government of Himachal Pradesh Undertaking)

Ropeways and Rapid Transport System Development Corporation HP Ltd.

प्रदूषण मुक्त यातायात के लिए हिमाचल की पहल

U.S. CLUB SHIMLA-172001
HIMACHAL PRADESH

TENDER DOCUMENT FOR

Construction of Indoor Sports Hall in PEB with LGSF Structure including water supply, drainage, sanitary installation, internal & external electrical installations, firefighting, fire alarm system and all other related works on Engineering, Procurement and Construction (EPC) contract mode at Nurpur, Kangra (Himachal Pradesh)

Tender Number: ……
Date: 01/06/2021
Project Cost: Rs. 525 Lacs

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Volume-II
FINANCIAL PROPOSAL
Section-IX

1	Letter of Transmittal for Financial Bid
2	Summary of Cost
3	Payment Terms

Chief General Manager
Ropeways and Rapid Transport System Development Corporation HP Ltd

Sub: Financial Bid for ……...

Dear Sir,

With reference to your tender document of subjected work, I/we, having examined the Bidding Documents and understood their contents, hereby submit my/our Bid for the aforesaid works. The Bid is unconditional and unqualified.

1. I / We acknowledge that the RTDC will be relying on the information provided in the BID and the documents accompanying the BID for selection of the Contractor for the aforesaid Work, and we certify that all information provided in the Bid are true and correct; nothing has been omitted which renders such information misleading; and all documents accompanying the BID are true copies of their respective originals.
2. The BID Price has been quoted by me / us after taking into consideration all the terms and conditions stated in the NIT, draft Agreement, our own estimates of costs and after a careful assessment of the site and all own the conditions that may affect the Work cost and implementation of the works.
3. I/ We acknowledge the right of the Authority to reject our BID without assigning any reason or otherwise and hereby waive, to the fullest extent permitted by applicable law, our right to challenge the same on any account whatsoever.
4. In the event of my/ our being declared as the Selected Bidder, I/we agree to enter into a Agreement in accordance with the draft that has been provided to me/us prior to the BID Due Date. We agree not to seek any changes in the aforesaid draft and agree to abide by the same.
5. I / We shall keep this offer valid as period specified in the NIT.
6. I / We hereby submit our financial BID and offer BID Price excluding GST as filled in excel format file of Summary Sheet of financial bid for undertaking the aforesaid Work in accordance with the Bidding Documents and the Agreement.

Yours faithfully,

Date:

(Signature, name and designation of the Authorized signatory)

Place:

Name and seal of Bidder

Summary of Cost

Particular	Total Quoted Cost in Figure (Including GST) (Rs.)	Total Quoted Cost in Words (Including GST) (Rs.)
Engineering, Procurement and Construction of Indoor Sports Hall at Nurpur, Kangra (Himachal Pradesh) in PEB Structure		
Total amount in Figures (Rs.):		
Total amount in words (Rs.):		

Note:-

- The quoted cost filled in Summary of Cost, by bidders, should include all associated costs with the project including any out of pocket / mobilization expenses/ Custom duty (if any) , Buildings and other construction workers welfare cess, TDS, taxes (including GST) if any applicable as per Govt. terms, shall be paid by the Contractor. The Goods and Services Tax (GST) shall not be paid extra over quoted cost
- The RTDC shall be performing all its duties of deduction TDS and other deduction on payment made to the contractor as per applicable legislation in force on the date of submission of bid or to be newly / amended introduced during the execution of the Contract.
- The tenderer shall quote cost up to zero decimal and as well as in words. In case of any discrepancy rate quoted in words shall prevail.
- The payment will be made in percentage as per the schedule of stage wise payment

PAYMENT TERMS

The Stage wise Payments shall be made in **Percentage of the Total quoted Cost** of works as quoted by the bidder/ contractor. The "**STAGE OF CONSTRUCTION"** for each component shall be as per the details below.

Mainly Payment will be made after completion of particular "**STAGE OF CONSTRUCTION"** as per the detail in the **Scope of Work** in compliance of all the conditions mentioned in the Tender Document. If any stage of construction is completed partially, then payment will be made on pro- rata basis, if agreed by Engineer- in-charge and RTDC. The pro-rata percentage will be analyzed by the Engineer- in-charge and RTDC and no dispute in this regard will be entertained

The main scope of work for each component shall be governed as detailed in "SECTION of SCOPE OF WORK" of the tender document and final payment shall be made accordingly, to the Contractor.

The works mentioned in column no. 2 of Stage of Construction, are milestone for progress of work. Percentage mentioned in column no. 3 are to facilitate the payment to contractor after completion of particular stage of construction. Percentage mentioned against particular Stage of Construction may not be actual cost of that particular stage of construction. The final 100% payment, depicts the total cost of work as per the scope of work and in compliance with all conditions mentioned in tender document.

If any works mentioned in the payment terms is not executed, then payment will be deducted as per the provision in Latest HPSR/DSR-2018 for scheduled items and Market Rate analysis for Non Schedule items.

Payment and time Schedule for Construction work:

S.No.	Stage of Construction	% Cumulative Cost of Construction	Time Period for Construction (in Days)
1	2	3	4
1	On submission of IIT/ NIT vetted Structural drawings, GFC drawings, shop drawings and fabrication drawings	1.5	30
2	On completion of Anti termite works and PCC work including excavation for foundation in all respect and as per the Scope of Work	5.0	45
3	On completion of all Foundation Work as per the scope of work	10.0	75
4	On casting of columns and plinth beams upto plinth level all complete (sub-structure complete).	20	95
5	Supply and Installation of PEB Structure including deck slab, ms staircase,	40.0	115

	principal rafter , purlins etc (Super structure) all complete over the RCC work.(Sub-structure)		
6	Roofing sheet along with Under deck insulation and External and internal LGSF-walls installation works.	55	135
7	On complete installation of plumbing including installation of Rain water pipe and sanitary fixture & fittings, firefighting, electrical wiring , installation of door/windows, false ceilings etc.as detailed in scope of work along with its connection from nearest electric pole.	80	155
8	On completion of External/ internal finishing works including painting, polishing, flooring etc; including electrical fixtures, fittings, and other balance work which are not included in above stage of construction / payment terms but in the scope of work of contractor as per section of scope of works	95	210
9	Handing over of the Indoor Sports Hall with full satisfaction of Engineer-in-charge/ client	100.0	228