Tender for Prequalification of Contractors

Part-1 (TECHNICAL BID)

Name of work	:	**CONSTRUCTION, ELECTRICAL AND PLUMBING WORK OF BANK OF BARODA BSVS BUILDING PLOT AT KHASRA NO. 201 OF REVENUE VILLAGE-BAMBORI, THE & DISTT-SAWAI MADHOPUR, RAJASTHAN.**
Employer /Client PLOT NO.	:	BANK OF BARODA ZONAL OFFICE, BARODA BHAWAN, 13, AIRPORT PLAZA, DURGAPURA,TONK ROAD, JAIPUR.
Project Architect PLOT	:	M/s PAHWA ARCHTECH SERVICES,202, PEARL TOWER, NO.-09, SAHKAR MARG,JAIPUR-15.

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NOTICE INVITING TENDER

M/s _____

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1. Name of work: - **Construction & Electrical, Plumbing work of Bank of Baroda BSVS building plot at Khasra No. 201,of Revenue Village-Bambori, Teh & Distt-sawai Madhopur (Rajasthan)**

2. Bank of Baroda, Zonal Office-Jaipur invites sealed tenders from eligible Indian firms for **"Prequalification of Contractors for Construction & Electrical, Plumbing work of Bank of Baroda BSVS building plot at Khasra No. 201,of Revenue Village-Bambori, Teh & Distt-sawai Madhopur (Rajasthan)**

3. The time for completion of the work shall be -10- **(Ten) months** inclusive of monsoon months from the date of start of work at site. Time is the essence of contract. The estimated cost of the work is Rs.2.23 Cr (Approx.). However, the estimated cost is given merely as a rough guide.

4. The Tender document is available for downloaded only from Bank's website www.bankofbaroda.com/tenders.asp for the period from 19.10.2022 to 10.11.2022. Tender shall not be issued by other means.

5. Each Tenderer has to ensure that the tender is downloaded in its original shape. No temptation with tender document is accepted and if found so, the bid shall be rejected immediately.

6. (i) **The Earnest Money Deposit (EMD) amounting to Rs. 2,23,000/-**(Rupees Two Lacs twenty three thousand only) in the shape of Demand draft/ Bankers Cheque drawn on a Scheduled or Nationalized Bank in favour of Bank of Baroda, payable at Jaipur only.

   (ii) No Tender will be considered which is not accompanied by Earnest Money Deposit (EMD) in the shape of Demand draft/ Bankers Cheque drawn on a scheduled or nationalized bank in favor of Bank of Baroda, payable at Jaipur which is to be lodged on the understanding that, in the event of the Tenderer withdrawing his tender before the expiration of three calendar months from the date fixed for receiving tenders or such other extended dates as determined. The Earnest Money will be forfeited, and on the understanding also that if the Tender is accepted, the Bond or Guarantee referred to in conditions of contract would be furnished when required. The Earnest Money will be returned to unsuccessful tenderers within three months after the date fixed for receiving tenders or at such earlier / later time as the tender may have been accepted by the Employer. The Earnest money will not bear any interest.

The contents of envelope should be as under:-

Envelope No. 1 (EMD):

Purpose	**Favoring**	**Amount (Rs.)**	**DD/Banker's Cheque payable at**
EMD (Refundable & Adjustable withSecurity Deposit)	Bank of Baroda	2,23,000/-	Jaipur

Envelope No. 2 (Technical Bid):

- Mandatory Information (strictly in the Bank's prescribed Proforma)
- Covering Letter
- Technical Bid (Each page duly signed and stamped).
- Drawings, (each page duly signed & stamped).
- Power of Attorney and authorization letter.
- CPM/PERT Chart
- Manpower Mobilization schedule.
- Additional Quality Assurance Program to what have been provided in tender
- Bio data of key personals & organization chart.

The Tenderer must submit the Mandatory Information strictly in Bank's Prescribed Performa. Technical Pre - qualification of the Tenderer will be based on the Mandatory Information and supporting documents submitted along with the tender documents, as well as Architect & Bank's scrutiny of the same and/or inspection of works carried out by the Tenderer. Bank reserves the right to accept or reject any tender without assigning any reason whatsoever.

7. Tender Bids received in any form other than mentioned above shall be disqualified. Sealed Tenders in the prescribed Tender format only addressed to the Zonal Manager, Bank of Baroda, Zonal Office- Jaipur, baroda bhawan, plot no.-13, airport plaza, durgapura tonk road, jaipur-302018 in two separate sealed covers (EMD), Technical Bid kept in one sealed envelope and super scribed with " Tender for Prequalification of Construction & Electrical, Plumbing work of Bank of Baroda BSVS building plot at Khasra No. 201,of Revenue Village-Bambori, Teh & Distt-Sawai Madhopur (Rajasthan)" shall be submitted at the designated Tender Box on or before 14:00 hrs on 10.11.2022.Tenders received late shall not be entertained.

Eligibility Criteria:-

I] Average Annual Turnover during the last -3- financial years, ending 31st March 2022, should be at least Rs.67.00 Lacs Cr which should not be in decreasing

II] Experience of having successfully completed similar works during last -5- years ending 31st March 2022 should be either of the following:-

A] Three similar completed works costing not less than the amount equal to 40% (i.e. Rs.90,00,000/-) of the estimated cost.

Or

B] Two similar completed works costing not less than the amount equal to 50% (i.e. Rs.1,12,00,000/-) of the estimated cost.

Or

C] One similar completed work costing not less than the amount equal to 80% (i.e. Rs.1,78,00,000/-) of the estimated cost.

The Contractor should submit Comprehensive Performance Certificate cum Work Completion Certificate along with concerned work order from the concerned employer in support of executing similar works failing which the tender shall be rejected.

III]Similar work means works having major portion of Civil (i.e. framed type RCC structure of Institutional/bank similar type of buildings of Similar nature) , including wood work, Plumbing, Electrical, Fire Fighting, Rain Water Harvesting, work of same nature /magnitude carried out for Public/private sector banks/PSU and govt organizations.

IV] In addition to above, the criteria regarding satisfactory performance of works, personnel, establishment. Details of infrastructure, equipment etc must be incorporated in the Technical bid.

IV) Tenderer should have their Main Activity as Civil, Electrical and plumbing work Contractor else tender shall be rejected.

8. Technical Bids will be opened in the office of **Zonal Manager, Bank of Baroda, Zonal Office-Jaipur, Baroda Bhawan, Plot no.-13, Airport plaza, Durgapura Tonk road, Jaipur-302018** on 10.11.2022 at 15:00 hrs in the presence of the tenderers or their authorized representatives who choose to be present. (Please note that blank paper price bid shall be issued to pre-qualified bidders only). No correspondence shall entertain in this regard.

9. The successful Tenderer to whom the contract is awarded shall have to deposit as **"Initial SecurityDeposit"** (ISD), a further sum to make up 2% of the value of the accepted tender including the Earnest Money. The Initial Security Deposit shall have to be made within -14- days from the date of acceptance of tender, failing which the Employer at his discretion may revoke the letter of Acceptance and forfeit the Earnest Money deposited along with the tender.

a) Apart from the initial security deposit made as above, Retention Money shall be deducted from progressive running bills: -@ 8% of the gross value of work done subject to accumulation of the amount equal to **5% of contract value.**

After realization by deduction from the bill of the total retention as specified above, 50% of the Security Deposit will be due for release after issuance of Virtual Completion Certificate by the Architect & Bank.

The balance 50% of Security Deposit will be released to the firm within a reasonable period after the end of"**Defect liability period**" provided the firm has satisfactorily carried out & completed all the work, submitted all documents contractually called for and attended to all defects in accordance with the conditions of the contract. No interest is allowed on Security Money Deposit.

Further, if some dues to the Employer from the Contractor(s) have still to be recovered, the Employer reserves the right to withhold payment of so much of the Security deposit as in his opinion, represents the cost of the same.

10. The successful Tenderer, to whom the Letter of Acceptance is issued shall have to deposit a **Performance Bond** (as per terms given in the prescribed format as per Annexure "A "enclosed herewith) of Nationalized Bank other than Bank of Baroda for a sum amounting to Five Percent (5%) of the Contract Price and furnish the same in original to the Employer as guarantee for due performance of the Contract, within a period of - 14- days from the date of issue of Letter of Acceptance of the tender. The said Performance Bond shall be released after the Issuance of Virtual Completion Certificate by the Architect & Bank. The Employer shall be fully authorized to revoke the letter of Acceptance and forfeit the Earnest Money Deposit furnished along with the Tender, if the successful Tenderer fails to furnish the said Performance Bond within a period of -14- days as specified above. **The validity period of the said Bank Guarantee shall be up to defect liability period of the work.**

11. After the Letter of Acceptance is communicated to the successful Tenderer, the contract shall be deemed to be complete and binding upon the successful Tenderer and the formal written deed of agreement incorporating all the terms and conditions of Tender documents and letter of acceptance shall be drawn by the successful contractor with the Employer within -30- days period after issue of letter of acceptance. The contractor shall take all necessary steps to commence the work at Site by the Scheduled date of commencement i.e. within -15- days after the issue of Letter of Acceptance to him. Nothing shall prevent the client to enforce the contract even if the formal deed of agreement is not signed by both the parties of the contract.

12. All the above conditions including signed copy as acceptance of the Technical Bid shall form the conditionsof the contract also.

13. The employer /Bank does not bind itself to accept the lowest or any other tender and reserves to itself the authority to reject any or all the tenders received without assigning any reason.

14. The employer / Bank reserves to himself the right of accepting the whole or any part of tender and the Tenderer shall be bound to perform the same at the rate quoted.

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

16. Any further information required may be obtained from the following offices (during office hrs only):

i) Bank of Baroda

Chief Manager (Estate Management)
Bank of Baroda, 4th Floor, Baroda Bhawan
Plot No-13, Airport Plaza, Tonk Road Jaipur
0141-2727125 (O)

ii) Project Architect

Mr. Inder Pal Singh Pahwa

M/s Pahwa Archtech services,
202, pearl tower, plot no.-09, sahkar
marg jaipur-15, 9839068628(M)

Sd/-
Zonal Manager Bank of
Baroda, Zonal Office- Jaipur
18.10.2022

Mandatory information required for Prequalification of the bidder for

Tender for Construction & Electrical, Plumbing work of Bank of Baroda BSVS building plot at Khasra No. 201,of Revenue Village-Bambori, Teh & Distt-Sawai Madhopur (Rajasthan)

Important:

1. Please type or handwrite in capital letters.
2. Attach copies of the supporting documents.
3. Please use additional sheets if required.

Name of the Bidder :	
E-mail address :	
Telephone number office :	
Telephone number office :	
Fax no. :	
Address 1 :	
Address 2 :	
City :	
Pin code :	
Year of Establishment :	
Status of the Firm :	Proprietary/Partnership/Pvt. Ltd. /Pub. Ltd.
Names of the directors/Partners/proprietor :	
Name and address of the Bankers – 1 :	
Name and address of the Bankers – 2 :	
Name and address of the Bankers – 3 :	
Registration number and date with Registrar of Companies/Firms :	
PAN Card Number :	
GST Registration No :	
Average financial turnover during the last -3- years, ending 31st March 2022,	
2021-2022 :	
2020-2021 :	
2019-2020 :	
Request copies of the Audited Balance sheet :	
Current solvency certificate from your Banker for not less than Rs. Fifty Lac :	Attach copy.
Empanelment with the other Companies/PSUs	
Field of activities :	
Main Activity :	

Detail Description and value of work done (Performa 1) :

Detail Description and value of work in hand : (Performa 2)

List Number of Technical staff working in the organization :

List number of other staff working in the organization :

Have you in past carried out any works for Bank of Baroda or its subsidiaries? :

Have you been ever disqualified or levied penalty by the Bank in past for non fulfillment of the contractual obligations. If yes, please provide details in brief. :

Have you been ever been put on a holiday list or banned by any Public Sector Units? If yes please provide details in brief:

I/We confirm that to the best of our knowledge this information is authentic and accept that any deliberate concealment will amount to disqualification at any stage.

Seal and Signature of the Bidder/s.

Date:
Place:

Performa -1

Work costing not less than the amount equal to 40% (i.e. Rs.90,00,000/-) of the estimated cost.

S.No	Name of work /project with address	Name and full postal address of Owner	Contract amount	Stipulated time of competition	Actual time of completi on	Any other information. Actual amount of the project, if increased	Enclosed clients certificat e for satisfacto ry completio n
1							
2							
3							

Note :

1. Information has to be filled up specifically in this format .Please do not write any remark.
2. For certificates, the issuing Authority shall not be less than an executive in charge.

Performa -2

Work costing not less than the amount equal to 50% (i.e. Rs.1,12,00,000/-) of the estimated cost.

S.No	Name of work /project with address	Name and full postal address of Owner	Contract amount	Stipulated time of competition	Present status of the project.	Any other information.
1						
2						

Note:

1. Information has to be filled up specifically in this format .Please do not write any remark.

Performa -3

Work costing not less than the amount equal to 80% (i.e. Rs.1,78,00,000/-) of the estimated cost.

S. No.	Name of work /project with address	Name and full postal address of Owner	Contract amount	Stipulated time of competition	Present status of the project.	Any other information.
1						

Note :

1. Information has to be filled up specifically in this format .Please do not write any remark

INSTRUCTIONS FOR TENDERERS

1. Before tendering, the tenderers, in their interest are advised to inspect and examine the site & its surroundings and satisfy themselves in respect of the site conditions as the Employer /Owner shall bear no responsibility for lack of acquaintance of the site and other conditions or any information relating thereto, on their part. The consequences of the lack of knowledge, as aforesaid, on the part of the tenderers shall be at their risk and cost.

2. Before tendering , the tenderers shall carefully examine the tender documents , general conditions of contract, special conditions of contract , specifications , Drawings & other matters referred to therein , the schedules and Bill of quantities and if there should be or appear to be any ambiguity in or discrepancy between any of these documents or between figured and measured dimensions and other aspects upon the Drawings, he should immediately refer the matter to the Architect/ Employer for clarification.

3. i) The Tenderer shall complete the annexed forms of tender, Schedules and Bill of Quantities with the prices and information called for therein, and shall sign and date each of the documents. The Tenderer shall initial each page of the Bill of Quantities, schedules, and conditions of contract duly stamped with Company's seal.

   ii) The Tender shall be signed by the person or persons so authorized by the Tenderer with signature duly witnessed. In case of a corporation, the Tender shall be signed by the Officers so authorized by the corporation with its seal duly affixed. Power-of-attorney in the name of the person signing the tender should be enclosed with the tender.

   iii) The Tender shall contain full address, Telephone nos., Fax no. for serving the Notices addendums required to be served to the tenderer in connection with the Tender.

   iv) The Tenderer shall prepare Man power mobilization schedule, PERT/CPM chart for the scheduled completion of the project and shall submit them along with the tender and shall be signed by the Officers so authorized by the corporation with its seal duly affixed.

4. The tender form and the documents attached to it shall not be detached one from the other, and no alteration or mutilation (other than filling in all the blank spaces) shall be made in any documents attached hereto. Any alterations or erasures to the entries in the attached documents shall be made by a separate letter otherwise it shall not be entertained.

   The tenderers should quote the rates in figures as well as in words, and amount in figures only tendered by them. The language for filling tender documents shall be English. The amount for each item should be worked out and the requisite total given.

   All rates shall be quoted on the proper form of the tender alone.

   Special care should be taken to write the rates in figures as well as in words and the amounts in figures only. The total amount should be written in figures. In case of figures, "Rs." Should be written before the figures of amount and "P" after the decimal figures, e.g. Rs.2.15 p. and in case of words, the word "Rupees" should precede and the word "Paisa" should be written at the end, unless, the rate is in whole rupees in which case it will end with the word "only". It should invariably be up to two decimal places.

   While quoting the rate in schedule of quantities, the word "only" should not be written in the next line.

5. Use of correcting fluid anywhere in tender documents is not permitted. Such tender is liable for rejection.

6. 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 rate 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 to 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 the 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.

7. If there are varying or conflicting provision made in any one document forming part of the contract, the accepting authority / Employer with regard to the mention of the document and his decision shall be final and binding on the contract.

8. Any error in description, quantity or rate in Schedule of quantities or any omission there from shall not violate 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.

9. An item rate tender quoting rates in terms of "percentage below / above will be summarily rejected.

10. The Contractor, whose tender is accepted, will be required to furnish by way of security deposit for the due fulfillment of his contract, such sum as detailed in Clause No. B -1 of the Special Conditions of Contract.

11. The Earnest Money Deposit of the Contractor whose tender is accepted is liable to be forfeited in full at the discretion of the Employer in case he does not remit the Initial Security Deposit (ISD) within the stipulated period and /or does not start the work by the stipulated date mentioned in the letter of award/work order.

12. The tender shall accompany the following information, schedules and drawings:

a. Full details of any special methodology or technique, the Contractor proposes to use to complete the construction within completion period. Full details of Testing Equipment and quality assurance programme shall also be furnished.

b. The Tenderers' proposals for supervising the work including the CV's of the various grades of technical supervisor personnel/ other Technical officers to be deployed.

c. Proposals for major construction facilities to be erected at site including workshops, offices, storage areas and testing laboratories.

d. List of proposed sub-contractors / associates along with their credentials in respect to trade of works.

e. True copy of License under Labor Regulations issued by the Competent Authority in favor of the Contractor.

f. The Tenderer shall attach to his tender a copy of documents, authenticated by notary, containing the constitution of the Company or Firm by which the Tender is submitted so as to show by what persons and in what manner a contract may be entered by the Company or Firm and what persons would be directly responsible for the due performance of the contract and can give valid receipt behalof the company or FirmThe Employer will not be responsible and will not pay for expenses which may be incurred or losses to person or property suffered by the Tenderer in connection with visits to an examination of the site and in the preparation of his tender for submission.

13. The Tenderer (whether or not he submits a tender) shall treat the details of the documents as secret and confidential.

14. The acceptance of tender will rest with the **Bank of Baroda, Zonal Office, Jaipur,** which does not bind itself to accept the lowest tender and reserves to itself the authority to reject any or all the tenders received without assignment of any reason.

15. The Employer reserves the right to accept the tender in full or in part and the Tenderer shall have no claim of revision of rates or other conditions whether his tender is accepted in part or in full.

16. All documents of the tender are to be read in conjunction with each other and rates quoted by the Tenderer shall take this aspect into consideration.

17. It will be the responsibility of the accepted Tenderer to keep liaison with the Employer/Architect till finalization of Letter of Acceptance or within validity period. No excuse whatsoever will be entertained for not having received the allotment letter/Letter of Acceptance through post or otherwise.

18. On acceptance of tender, the name of the accredited representative(s) of the Contractor who would be responsible for taking instructions from the Employer/Architect shall be communicated to the Employer/Architect by the Tenderer, in writing.

19. Income Tax,GST, labour Cess or any other Tax on materials or on finished work in respect of this contract whether in vogue or likely to be imposed in future, shall be payable by the Contractor and the Employer will not entertain any claim whatsoever in this respect at any claim whatsoever in this respect at any time. Rates should include all these taxes.

20. The Contractor shall give a list of his relatives, if any, working with the Bank / Architect along withtheir designations and address.

21. No employee of the Employer is allowed to work as a Contractors Employee for a period of two years after his retirement from the Employer's services, without the prior permission of the Employer. 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 the Employer as aforesaid before submission of the tender or engagement in the Contractor's service.

22. The tender for work shall remain open for acceptance for a period of three (-3-) calendar months from the date of opening of Price Bid. If any Tenderer withdraws his tender before the said period, the Employer shall be at liberty to forfeit the Earnest Money paid by the Tenderer.

23. The tender for the work shall not be witnessed by a Contractor or Contractors who himself / themselves has / have tendered or who may and had / have tendered for the same work. Failure to observe this condition would render tenders of the Contractors tendering as well as witnessing the tender liable to summary rejection.

24. It will be obligatory on the part of the Tenderer to tender and sign the Tender documents for all the component parts and to enter into an agreement for each component with the competent authority in the Bank, after the work is awarded.

25. No payment for the work done will be made unless the contract is signed by the contractor.

26. The contractor shall comply with and give all notices required under any law, rule, regulations or bye laws of parliament, state legislature or local authority relating to works. The contractor shall before commencing the execution of work issue a certificate to the bank / architect / consultant that he has obtained all the permission registrations and give all the notices as are required to be obtained or give in under law.

27. I / We hereby declare that I / We have read and understood the above instructions for the guidance of the Tenderers.

Witness : Signature of Tenderer

Address : Address :

Date :

II

FORM OF TENDER &
APENDIX

FORM OF TENDER

To,

The Zonal Manager, Bank of Baroda, Zonal Office- Jaipur, Baroda Bhawan, Plot No.-13, Airport plaza, Durgapura Tonk road, Jaipur-302018

Sub: Construction & Electrical, Plumbing work of Bank of Baroda BSVS building plot at Khasra No. 201,of Revenue Village-Bambori, Teh & Distt-Sawai Madhopur (Rajasthan)
.

Sir,

1. Having visited the site & examined the drawings, conditions of contract, special conditions of contract, general specifications and detailed specifications, schedules and bill of quantities for the construction of the above named works, we offer to construct, complete and maintain the whole of the said works in conformity with the said drawings, conditions of contract, specifications, schedules and bill of quantities for the sum stated in bill of quantities of this tender document or such other sum as may be ascertained in accordance with the said conditions hereto annexed.

2. We undertake to commence, complete & deliver the whole of the works comprised in the contract within 12- calendar months, reckoning the date of commencement on the 15th day of the issue of acceptance of our Tender or handing over of possession of site whichever is later.

3. We have independently considered the amount of liquidated damages shown in the Appendix hereto and agree that it represents a fair estimate of the loss likely to be suffered by you in the event of the works not being completed in time.

4. A sum of Rs.**2,23,000**/- (**Rupees Two Lacs Twenty three thousand Only**) is being deposited as Earnest Money Deposit in the shape of Demand draft/ Bankers Cheque drawn on a scheduled or nationalized bank in favour of Bank of Baroda, payable at Jaipur. In conformity to article 5 (I) & (ii) of the Notice Inviting tender is enclosed with Tender Envelop No. 1.

5. We agree to abide by this tender for the period of 90 days from opening of envelope 3 or extension there of as required by the Employer from the date fixed for receiving the same and it shall remain binding upon as and may be accepted at any time before the expiry of that period..

6. If our tender is accepted, we will, within a period of fourteen days from the date of issue of Letter of acceptance, deposit a further sum to make up 2% of the value of the accepted tender including the Earnest Money as Initial Security deposit failing which the Employer at his discretion may revoke the letter of Acceptance and forfeit the Earnest Money deposited along with the tender. We will deposit a performance bond (as per terms given in the prescribed format as per Annexure "A") of Nationalized Bank other than Bank of Baroda for a sum amounting to Five Percent (5%) of the contract price and furnish the same in

original to the Employer as guarantee for due performance of the Contract, within a period of fourteen days from the date of issue of Letter of Acceptance of the tender. The said performance bond shall be released after the Issuance of Virtual Completion Certificate by the Architect. **The validity period of the Guarantee shall be up to defect liability period of the work.** The Employer shall be fully authorized to revoke the Letter of Acceptance and forfeit the Earnest Money Deposit furnished along with the Tender, if the successful Tenderer fails to furnish the said performance bond within a period of -14- days as specified above.

7. I/We expressly agree that, unless and until a formal written deed of agreement is prepared and executed this tender together with your written acceptance thereof shall constitute a binding contract between us and nothing shall prevent you from enforcing the contract upon us.

8. We understand that if our tender is accepted, we are to be jointly and severally responsible for the due performance of the contract till the job is completed & handed over to the employer after obtaining all certificates & clearances & connections from authorities like C form D form completion, electrical connection etc which shall be our responsibility. The due fees for this shall be paid/ reimbursed by the employer after producing actual receipts / challan duly certified by Architect.

9. We understand that you are not bound to accept the lowest or any tender and reserve to itself the authority to reject any or all the tenders received without assignment of any reason.

10. We also enclose herewith all the Tender documents duly signed by us in acceptance of the General and Special Terms & Conditions, Specifications, Drawings, Details, Schedules & Bill of Quantities with our offered rates filled in for various items of the works in support of our offer.

11. I/We also furnish herewith appendix to form of tender duly signed by us in acceptance of what is setout therein.

12. I/We have understood the relevant clauses of conditions of the contract pertaining to the provisions of Prime Cost Sums and Provisional Sums and further agree that in case of any doubt or difference of interpretation of those provisions, the decision of the Employer / Architect/ Engineer shall be final and conclusive.

13. I/We also furnish herewith Man power mobilization schedule, PERT/CPM chart and other documents mentioned in the check list to form of tender duly signed by us in acceptance of what is set out therein.

_____

Dated_____day of_____20____.

Signature_____in the capacity of _____

duly authorized to sign tenders for and on behalf of _____

_____

(IN BLOCK CAPITALS)

WITNESS:

Signature_____ Address of Tenderer _____

Name _____ _____

Occupation _____ _____

Address _____ _____

APPENDIX TO FORM OF TENDER

1. Earnest Money of contractor	: Rs.2,23,000/- (Rupees Two Lacs Twenty three thousand Only) in the shape of Demand draft/ Bankers Cheque drawn on a scheduled or nationalized bank in favour of Bank of Baroda, payable at Jaipur
2. Release of Earnest Money	: Successful Tenderer – Earnest Money shall form a part of Total Security Deposit Unsuccessful tenderers- The earnest money will be returned to unsuccessful Tenderers within three months after the date fixed for receiving tenders or at such earlier / later time as the tender may have been accepted by the Employer. The Earnest money will not bear any interest.
3. Initial Security Deposit	: 2% of the value of the accepted tender value including the Earnest Money
4. Amount of performance bond	: 5% of contract price in the form of bank guarantee or Guarantee (as per annexure "A"). **The validity period of the Guarantee shall be up to defect liability Period of the work.**
5. Period of commencement	: 15 (Fifteen) days from the date of issue of letter of acceptance or the date of handing over of site whichever is later.
6. Time of Completion	: 10 (Ten) months from the date of Commencement inclusive of monsoon months.
7. Liquidated damages for delay	: 1.00 %(One Percent) of Gross contract value per week or part thereof calculated on daily basis subject to a Maximum 10.00% of contract value.
8. Limit of liquidated damages	: 10**.00 % (Ten percent) of Contract Value**
9. Defects Liability /Maintenance Period	: 365 days from the date of issue of virtual completion certificate.
10. Specification of work	: Latest Specifications of CPWD
11. Mobilization Advance	: 10% (Ten percent) of contract amount against irrevocable bank Guarantee from any nationalized bank other than Bank of Baroda. A simple interest rate of 15% shall be applied in the said amount. 100% of the amount plus the interest amount shall be recovered from first -3- running bills proportionately.
13. Payment of Materials at Site. (Secured advance)	: Up to 75 %(Seventy Five Percent) of Net value of Materials brought at site and as decided by the Employer/ Architect shall be adjusted as & when materials are utilized on the work.
14. Minimum Amount of Interim/ Running account bill	: Minimum amount certified by Architect, Employer shall be Rs 50,00,00,0/-(Please note that maximum 80% of the contract value is payable to contractorbefore final bills)

15. Frequency of submitting Interim/ Running Account Bill	:	Once in -2- months (Amount wise gap between two runnings Bills is to be maintained)
16. Period of certification of Interim/running	:	Architect – within -7- working days (from date of receiving from contractor)
17. Payment of Interim/ running account bill	:	100% after -15- days from certification of bill from Architect .
18. Retention Money from Interim/Running Account bills	:	8% (Eight percent) of Interim/Running Account bill till accumulation of amount equal to 5% of Contract Value
19. Refund of Security Deposit	:	50% Security deposit which includes (Earnest Money + Initial Security Deposit+ Retention Money) Shall be Payable after 15 days of issue of virtual completion Certificate to the contractor & rest 50% shall be paid after Completion of Defect Liability Period.
20. Extra Items	:	To be executed only after written permission from the Client (after realization of quotation with Market rates)
21. Documents to be submitted by contractor for: payment		Initial Security Deposit, Performance Bank Guarantee, Indemnity Bond,Insurance Policies, Labour License, Contract Agreement, Bank Details

Dated_____day of_____20_____.

Signature_____in the capacity of _____

Duly authorized to sign tenders for and on behalf of _____

_____

(IN BLOCK CAPITALS)

Address of Tenderer _____

_____

III

FORM OF AGREEMENT, FORMS OF BANK GUARANTEES AND INDEMNITY BOND

FORM OF AGREEMENT
(On Stamp paper of Rs. 500/-)

ARTICLE OF AGREEMENT made at Jaipur this_____day of Two Thousand_____between Bank of Baroda , **Bank of Baroda, Zonal Office- Jaipur, Baroda Bhawan, Plot no.-13, Airport plaza, Durgapura Tonk road, Jaipur-302018** through its constituted attorney hereinafter called "Employer" (which expression shall include its successors and assigns wherever the contract meaning shall so require or include its successors & assigns wherever the contract meaning shall so require or permit) of the one part and M/s. _____) hereinafter called the "Contractor " of the other part (which expression unless repugnant to the context thereof shall include his assigns, successors, legal representatives, etc.)

17. WHEREAS the Employer is desirous of having provided and getting executed, completed and maintain certain works for **"Construction & Electrical, Plumbing work of Bank of Baroda BSVS building plot at Khasra No. 201,of Revenue Village-Bambori, Teh & Distt-Sawai Madhopur (Rajasthan)"**

as mentioned, enumerated or referred to the Documents forming part of the "TENDER" and acceptance , copies of all of which hereto annexed are designed to form part of this contract and are included in term "CONTRACT" wherever herein used.

AND WHEREAS the Employer accepted the tender of the contractor for the provisions of execution, completion & maintenance of work under defect liability period of the said work.

AND WHEREAS the contractor has agreed with the Employer to execute complete and maintain during the defect liability period subject to the conditions and instructions set forth herein (hereinafter referred to as "the said conditions") the works, shown upon the documents forming part of the contract as stated hereinafter, on the item rate basis & as set forth, amounting to the contract sum of Rs. _____
(hereinafter referred to as "the said contract amount /Price/Sum").

NOW THESE PRESENTS WITNESSETH AND IS HEREBY AGREED AND DECLARED AS FOLLOWS:-

1. In this agreement, words and expressions shall have the same meaning as are respectively assigned tothem in the documents hereinafter referred to.

2. The following documents shall be deemed to form and be ready and construed as part of this agreement:

a. The said tender and Appendix
b. Form of Tender
c. General conditions of Contract
d. The Special Conditions of Contract.
e. Specifications
f. The Schedules
g. Preamble to bill of quantities and priced bill of quantities as accepted.

h. The letter of Acceptance

3. Contractor shall not claim any escalation in contract rate for rise in prices of materials/labour etc. during the completion of work and shall complete the work at contracted rate within for project period of 12 (Twelve) Months including Monsoon season from the date of commencement of work. In case of extension in the time period for execution of the contract beyond Project period of 12 (Twelve) Months including Monsoon season, for the reasons of delay attributed to the contractor. Banks decision in this respect shall be final and binding on the contractor.

4. It has been understood by the parties hereto that the EMPLOYER will have right to make reasonable changes in the drawings and designs during the progress of the construction works without prejudice to the CONTRACT. Notwithstanding anything to the contrary contained in any of the Annexure hereto the CONTRACTORS shall commence the work on_____and shall complete the same on or before -------- --- and the time shall be the essence of the CONTRACT.

5. The CONTRACTORS do hereby agree to pay such sums as may be due to the EMPLOYER for the service rendered or material supplied by the EMPLOYER to the CONTRACTORS, if any, as set out in the CONTRACT.

6. The contractors do hereby agree that the amount of liquidated damages specified in conditions of contract / special conditions of contract represents a genuine and fair estimate of the loss likely to be suffered by the EMPLOYER in the event of the works not being completed in time.

7. It is specifically and distinctly understood and agreed between the EMPLOYER and the CONTRACTORS that the CONTRACTORS shall have no right, title or interest in the site made available by the EMPLOYER for the execution of the works or in the building, structures or works executed on the said site by the CONTRACTORS in the goods articles, materials etc. brought on the said site (unless the same specifically belongs to the CONTRACTORS) and the CONTRACTORS shall not have or deemed to have any lien or charge whatsoever for unpaid bills and it will not be entitled to assume or retain possession or control of the site or structure and the EMPLOYER shall have an absolute and unfettered right to take full possession of the site and to remove the CONTRACTORS, their servants, agents and materials belonging to the CONTRACTORS lying on the site.

8. The CONTRACTORS shall be allowed to enter upon the site for execution of the works only for the purpose of executing the contract work and shall not have any claim, right, title or interest in the site or the structures erected thereon and shall not enter upon at anytime without assigning any reason.

9. The materials including sand, gravel, stone, loose earth, rock etc. dug up or excavated from the said site shall, unless otherwise expressly agreed under the CONTRACT, exclusively belong to the Employers and the CONTRACTORS shall have no right or claim over the same and such excavation and materials shall be disposed off as per the instructions of the EMPLOYER.

10. The dispute or difference if any, relating to this agreement or any document appended hereto shall be settled by arbitration under the provisions of Indian Arbitration & Conciliation Act, 1996.

11. In consideration of the payment to be made by the employer to the contractor for the work to be executed by him, the contractor does hereby agree with the employer to provide, execute & complete the said work on or before the date mentioned in the time schedule of completion of work attached to the tender documents strictly as per the contract agreement and shall maintain the same at his own cost during the defects liability period , thereafter perform all such aspects and things in the contract mentioned or described or which are to be implied thereafter or may be reasonable necessary for the completion of the said works and at the time and the manner subject to the terms and conditions or stipulations mentioned in the contract.

12. In consideration of the due provisions, execution and completion of the said works the Employer does hereby agree with the contractor that the employer will pay to the contractor the respective amount for the work actually done by him and such other sums as may become payable to the contractor under the contract. Such payment to be made at any such time & in such manner as provided for in the agreement.

13. All disputes arising out of or any way connected with this agreement shall be deemed to have arisen in Sawai Madhopur and only the courts in Sawai Madhopur shall have jurisdiction to determine the same.

14. The several parts of this contract have been ready by/to us and fully understood by us.

15. IN WITNESS WHEREOF, the parties have caused their respective common seals to be here unto affixed (or have here unto set their respective hands and seals) the day and the year first above written, SIGNED SEALED AND DELIVERED BY THE

1. SAID	SAID
NAME_____	NAME _____
ON BEHALF OF THE CONTRACTOR	ON BEHALF OF THE EMPLOYER
2. SEAL	SEAL
3. ADDRESS	ADDRESS
In Presence of :	
NAME	NAME
ADDRESS	ADDRESS

ANNEXURE - "A"

PERFORMANCE BOND

(See Clause 5)

18. WHEREAS the BANK OF BAORDA, through the Zonal Manager, Bank of Baroda, Zonal Office- Jaipur hereinafter called the Employer has awarded the contract **Construction & Electrical, Plumbing work of Bank of Baroda BSVS building plot at Khasra No. 201,of Revenue Village-Bambori, Teh & Distt-Sawai Madhopur (Rajasthan)**

in favour of M/s_____(contractor), and WHEREAS the contractor is bound by the said contract to submit to the Employer a performance bond for a total Amount of _____we, _____ (indicate the name of the bank) at the request of _____contractor (s) do hereby undertake to pay to the Employer an amount not exceeding Rs._____against any loss or damage caused to or suffered or would be caused to or suffered by the Employer by reason of any breach by the said contractor (s) of any of the terms or conditions contained in the said Agreement.

2. We_____(indicate the name of the bank) do hereby undertake to pay the amounts due and payable under this guarantee without any demur, merely on a demand from the Employer stating that the amount claimed is due by way of loss or damage caused to or suffered by the Employer by a reason of breach by the said Contractor(s)'s of any of the terms or conditions contained in the said agreement by reason of the contractor (s)'s failure to perform the said agreement. Any such demand made on the Bank shall be conclusive as regard the amount due and payable by the bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs. _____.

3. We undertake to pay to the Employer any money so demanded not withstanding any dispute or disputes raised by the Contractor(s) /Supplier(s) in any suit or proceeding pending before any court or Tribunal relating thereto our liability under this present being absolute and unequivocal.

The payment so made by us under this bond shall be a valid discharge of our liability for payment there under and the contractor(s)/ Supplier(s) shall have no claim against us for making such payment.

4. We,_____(Indicate the name of bank) further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said agreement and that it shall continue to be enforceable till and all the dues of the Employer under or by virtue of the said agreement have been fully paid and its claims satisfied or discharged or till Employer certifies that the terms & conditions of the said agreement have been fully and properly carried out by the said contractor (s) and accordingly discharges this guarantee. Unless a demand or claim under this guarantee is made on us in writing on or before the _____ _____We shall be discharged from all liability under this guarantee thereafter.

5. Should it be necessary to extend the guarantee on account of any reason whatsoever, we undertake to extend the period of the guarantee on the request of the employer till such time as may be required by the employer. The decision of the employer in this respect shall be final & binding on us.

6. We,_____(indicate the name of bank) further agree with the Employer that he shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms & conditions of the said agreement or to extend time of

performance by the said contractor (s) from time to time or to postpone for any time or from time to time any of the powers exercisable by the Employer against the said contractor(s) and to forbear or enforce any of the terms & conditions relating to the said agreement and we shall not be relieved from our liability by reason of any such variation , or extension being granted to the said contractor (s) or for any forbearance, Act or commission on the part of the Employer or any such matter or thing whatsoever which under the law relating to sureties would, but for this provision , have effect of so reveling us. Unless for unforeseen bona fide reason there is a delay due to failure of contractor for some construction of labor required for execution of work, any variation of extension to be granted to the contractor shall be considered on the recommendation of Architect/ Engineer by the employer subject to payment of penalty on daily basis as jointly determined by the Employer/ Architect/ Engineer.

7. This guarantee will not be discharged due to the change in the constitution of the employer or the Contractor (s) / Supplier (s).

8. We, (the name of bank) lastly undertake not to revoke this guarantee during its currency except with the previous consent of the Employer in writing.

Dated the_____day of _____

For_____
(Indicate the name of bank)

Annexure "B"

FORM FOR BANK GUARANTEE TO COVER MOBILISATION ADVANCE
(On banks letter head with adhesive stamp)

To

_____

_____

_____

_____

Dear Sirs

19. Whereas BANK OF BARODA, Zonal Office, Jaipur (hereinafter referred to 'EMPLOYER' which expression shall include its successors and assigns) has awarded to M/s_____(hereinafter called "the contractor" which expression shall include its successors and assigns) the work **"Construction & Electrical, Plumbing work of Bank of Baroda BSVS building plot at Khasra No. 201,of Revenue Village-Bambori, Teh & Distt-Sawai Madhopur (Rajasthan)"** under and in terms of a Contract as evidenced by a Letter of Acceptance of Tender No._____dated_ issued by BANK OF BARODA to the Contractor, hereinafter called the "said contract" which expression shall include any formal contract executed subsequent thereto or in suppression thereof and all amendments and / or modifications therein or in terms of the said advance as herein stipulated.

AND WHEREAS the "Employer" has agreed to advance the contractor, interalia, a sum of Rs._____(Rupees _____ only) hereinafter called the "said advance" which expression shall include any and all further amounts advanced by the "Employer" to the contractor with reference of the said contract by the contractor upon the condition, interalia, that the said advance for the time being outstanding shall without prejudice to any other mode of recovery available to the "BANK OF BARODA" be recoverable by the "BANK OF BARODA" by deduction from the gross accepted amount of any running account bill and the final bill of the contractor commencing from the Third Running Account bill and the final bill of the contractor commencing from the Third Running Account bill of the contractor , and meanwhile , the said advance shall be secured by an undertaking from a bank as hereinafter appearing.

NOW, THEREFORE, THESE PRESENTS WITNESSETH that in consideration of the premises aforesaid, and at the request of the contractor. We_____(hereinafter called the "Bank") so as to bind ourselves and our successors and assigns DO HEREBY irrevocably undertake to pay the owner at _____forthwith on first demand in writing without protest or demure or proof a satisfaction and without reference to the contractor any and all amounts demanded from us by the "Employer" with reference to this undertaking upon an aggregate limit of Rs. _ (Rupees_____only) and interest thereon at the rate hereinabove provided.

We_____(Name of bank) further agrees with the employer that the

"Employer" shall have the fullest liberty without reference to the Bank and without affecting in

any way the liberty of the bank under this undertaking, at any time / or to extend time for performance of the said contract and/or payment of the said advance in whole or part or to postpone for any time and/or payment of the said advance in whole or part or to postpone for any time and / or payment of the said advance in whole or or part to postpone for any time and or from time to time any of the said obligations of the contractor and or rights, remedies or powers exercisable by the "BANK OF BAORDA" against the contractor and either to enforce or forebear from enforcing any of the terms and conditions of or governing the said contract and/ or the said advance , or the securitized , if any, or any of them available to the "BANK OF BARODA" and the bank shall not be released from its liability under these presents and the liability of the Bank shall remain in full force and effect notwithstanding any exercise by the "BANK OF BARODA" of the liberty with reference to any or all the matters aforesaid or by reason of time being given to the contractor or any other for bearance, or omission on the part of the "BANK OF BARODA" or any indulgence by the "BANK OF BARODA" to the contractor or of any other act matter of thing whatsoever which under any law could (but for this provision) have the effect of releasing the Bank from its liability hereunder or nay part thereof.

ii) It shall not be necessary for the "BANK OF BARODA" to proceed against the contractor before proceeding against the bank and the undertaking herein contained shall be enforceable against the banks as Principal Debtor notwithstanding the existence of any security for any indebtedness of the contractor to the "BANK OF BAORDA" (including relative to the said advance or for security deposit) and notwithstanding that any such security shall at the time when claims is made against the Bank hereunder , be outstanding or unrealized.

iii) As between the Bank and the "BANK OF BAORDA" for the purpose of this undertaking the amount claimed or demanded by the "BANK OF BAORDA" from the bank with reference to this undertaking shall be final and binding upon the bank as to the amount payable by the bank to the "BANK OF BARODA" hereunder.

iv) The liability of the Bank to the "BANK OF BARODA" under this undertaking shall remain in full force and effect notwithstanding the existence of any difference or dispute between the contractor and the "BANK OF BARODA" or otherwise however touching or affecting these presents of the liability of the contractor to the "BANK OF BAORDA" notwithstanding the existence of any instructions or purported instructions by the contractor or any other person to the bank not to pay or for any cause withhold defer payment to the "BANK OF BARODA" under these presents, with the intent that notwithstanding the existence of such difference, dispute or instructions , the Bank shall be and remain liable to make payment to the "BANK OF BAORDA" in terms thereof.

v) This undertaking shall not be affected by any change in our constitution or that of the contractor of the "BANK OF BAORDA" or any irregulatories in the exercise of borrowing powers by or on behalf of the contractor.

vi) This undertaking shall be valid for all claims / demands made by the "BANK OF BAORDA" to or upon the midnight of_____20 _ provided that the bank shall upon the written request of the "BANK OF BARODA" to extend this guarantee by a further six months.

vii) The bank both hereby declare that Sh._____who is the _____ (designation) of the Bank is authorized to sign this undertaking on behalf of the Bank and to bind the Bank thereby.

Note: Bank guarantee can be furnished by the contractor of nationalized bank other than Bank of Baroda.

Yours faithfully,

For _____

Name _____

Designation_____

Dated :-

Common seal

Annexure - C

(PROFORMA)
FORM OF INDENTURE FOR SECURED ADVANCE

THIS INDENTURE made the _____ day of _____ 20 between _____ (hereinafter called the contractor which expression shall where the context so admits or implies be deemed to include its executors; administrators and the assigns) on one part and _____ (hereinafter called the EMPLOYER which expression shall where the context so admits or implies be deemed to include its successors in office and assigns) on the other part.

WHEREAS by an agreement No. _____ dated_____(hereinafter called the said agreement) the contractor has agreed _____

AND WHEREAS the contractor has applied to the_____that he may be also allowed advance on the security of materials absolutely belonging to him and brought by him to the site of the works, as he has undertaken to execute at rates fixed for the finished work (inclusive of the cost of materials and labor and other charges) and whereas the_____has agreed to advance to the contractor an amount up to Rs._____(Rupees _____ _____ only) on the security of the quantities and other particulars of the materials on the security of which the advance or advances are made as detailed in the secured advance account forming part of the running account bill preferred from time to time and signed by the contractor for the said work.

NOW THIS INDENTURE WITNESSETH that in pursuance of the said agreement and in consideration of amounts aggregating to the sum of Rs._____(Rupees _____ _____only) on or after the execution of these presents paid to the contractor by the_____(The receipt whereof the contractor hereby acknowledge) Contractor doth hereby covenant and agree with the _____ _____and declare as follows :

1. That the said sum aggregating to Rs._____(Rupees _____ _____only) so advanced by the _____ _____to the contractor as aforesaid shall be used by the contractor in or towards expediting the execution of the said works and for no other purpose whatsoever.

2. That the materials detailed in the said running Account bills which have been offered to and accepted by the _____ as security are absolutely the contractor's own property and free from encumbrances of any kinds and the contractor will not make any application for or receive a further advance on the security of materials which are not absolutely his own property and free from encumbrances of any kind and the contractor hereby agreed to materials which are not absolutely his own property and free from encumbrances of any kind and the contractor hereby agreed to indemnify the _____ against all claims to any material in respect of which an advance has been made to him as aforesaid.

3. That the materials detailed in the said Running Account bills (hereinafter called the said materials) shall be used by the contractor solely for the execution of the said works in accordance with the directions of the Employer / Architect and in terms of the said agreement.

4.That the contractor shall make at his own cost all necessary and adequate arrangement for the proper watch, safe custody and protection against all risk of the said materials and that until used in construction as aforesaid , the said materials shall remain at the site of the said works in the contractor's custody and on his own responsibility and shall at times be open to inspection, by the event of the said materials or any part thereof being stolen , destroyed or damaged , the contractor will forthwith replace the same with other materials of like quality or repair and make good the same as required by the Architect/ Employer.

5.That the said materials shall not on any account be removed from the site of the said work except with the written permission of the employer or an officer authorized by him on that behalf of employer.

6. Provided that if any intermediate payments are made to the contractor on account of works done, then on the occasion of each such payment the employer will be at liberty to make recovery from the contractor's bill for such payments by deducting there from the value of the said materials that has not been made previously, the value for this purpose being determined in respect of each description of materials at the rates at which the amounts of the advances made under these presents were calculated.

7. That if the contractor shall at any time make any default in the performance or observance in any of the terms and provisions of the said agreement , the total amount of the advantage or advances that may still be owing to the Employer together with the interest thereon at twelve percent per annum from the date of repayment will with all costs, charges , damages and expenses incurred by the employer in the recovery thereof or the enforcement of the security or otherwise by reason of the default of the contractor shall become payable by the contractor and the contractor hereby covenants and agrees with the employer to pay the same respectively to him accordingly.

8. That the contractor hereby gives charge of all the said materials till the repayment to the employer of the said sum amounting to Rs._____(Rupees_____only) and all costs /charges damages and expenses payable under these presents, provided always and it is hereby agreed and declared that notwithstanding anything in the said agreement and without prejudice to the powers contained therein if and whether the money owing shall not be paid in accordance herewith , that may at any time thereafter adopt all or any of the following courses the employer may deem best:

a) Seize and utilize the said materials or any part thereof in the completion of the said works on behalf of the contractor in accordance with the provisions in that behalf contained in the said agreement debiting the contractor with the actual cost of effecting such completion and the amount due in respect of advance under these presents and crediting the contractor with the value of work done as if he had carried it out in accordance with the said agreement and the rates thereby provided. If the balance is against contractor he is to pay the same to employer on demand.

b) Remove and sell by the public auction the seized materials or any part thereof and out of the moneys arising from the sales retain all the sums aforesaid repayable to the Employer under these presents and pay over the surplus (if any) to the contractor.

c) Deduct or any part of the money owing out of the security deposits or any sum due to the contractor under the said agreement.

9. That in the event of any conflict between the provisions of these presents and the said agreement, the provisions of the said agreement shall prevail and in the event of the dispute or difference arising over the construction of effect of these presents the settlement of which has not been hereinbefore expressly provided for the same shall be referred to arbitration as provided in the said agreement.

IN WITNESS WHERE OF_____and _____by the order and under the direction of the_____having hereunto set their respective hands the day and year first above written.

Signed, sealed and delivered by the
Said contractor in the presence of :

Witness :

Signature :

Name :

Address :

Signed by the order and direction

of_____in the presence of :

Witness :

Signature :

Name :

Address

Annexure – "D"
(PROFORMA)
On Rs. 100/- Stamp paper
FORM OF INDEMNITY BOND

KNOW all men by these presents that I/We_____do hereby execute indemnity Bond in favor of :

_____
having their Registered Office at _____
_____and amongst other offices at No. _____and M/s. _____ having their office at _____ on this _____ day of _____20.

WHEREAS the _____ have appointed _____ as the civil contractors for their proposed building at _____and M/S_____as their Architects / Engineers.

THIS DEED WITNESS AS FOLLOW :

I/We_____hereby do indemnify and same harmless (1)_____and
(2) M/s_____against and from:

1) Any third party claims, civil or criminal complaints/ liabilities , site mishaps and other accidents or disputes and / or damages occurring, or arising out of any mishaps at the site due to faulty work , negligence , faulty construction and / or for violating any law, rules and regulations in force, for the time being while executing/ executed civil works by me / us;

2) Any damages, loss or expenses due to resulting from any negligence or breach of duty on the part of me/us or any sub-contractor/s if any, servants or agents.

3) Any claim by an employee of mine/ours or of sub - contractors if any, under the workmen compensation act and Employers Liability Act, or any other law, rules and regulations in force for the time being and any acts replacing and .or amend the same or any of the same as may be in force at the time and under any law in respect of injuries to persons or property arising out of and in the course of the execution of the contract work and/or arising out of & in the course of employment of any workmen / employee.

4) Any act or omission of mine /ours or Sub-contractor/s if any , our / their servants or agents which may involve any loss, damage , liability , civil or criminal action.

IN WITNESS WHEREOF THE_____has set his / their hands on this day of_____20_.

SIGNED AND DELIVERED BY THE
AFORESAID_____
IN THE PRESENCE OF WITNESS

1)

2)

IV

GENERAL CONDITIONS OF CONTRACT

GENERAL CONDITIONS OF CONTRACT

A. Definitions & Interpretations

In the contract (as here in under defined) unless, it is otherwise repugnant to the text, the definition of the following words & expressions shall have the meaning hereunder assigned except otherwise specified:-

i) "Site" means the lands and other places on, under, into, or through which the works are to be executed or carried out and any other lands or places provided by the Employer for the purpose of the works together with such other places as may be specifically designated in the contract as forming part of the site. (I.e. **Sawai Madhopur,Rajasthan**

ii) The expression "work" or "works" shall unless there be something either in the subject or context repugnant to such construction be construed and taken to mean the works to be executed in accordance with the contract or parts thereof as the case may be and shall include all temporary, or permanent, original, additional, altered or substituted works as required for the performance of the contract.

iii) "Drawings" means the drawings referred to in the documents and any modification of such drawings approved in writing by the employer and such other drawings as may from time to time be furnished or approved in writing by the Employer / Architect/ Engineer.

(iv) "Bill of quantities "means the schedule of quantities of items, materials & rates, summaries etc asfinally accepted.

(v) "Specification" means the specifications including Indian or British or other approved standard specifications where so required.

(vi) " Contract" means this agreement and all documents which form part thereof and/or annexed thereto and all amendments thereto made in accordance with the provisions hereof based on Notice Inviting Tenders, thesealed quotations and the Tender Documents including the tender, General & Special conditions of the contract, specifications, designs & drawings, priced schedule & priced bill of quantities and schedule of rates & acceptance thereof, read in conjunction and complementary to one another.

vii) "Contract Price" or "Contract Value" or "Contract Sum" means the set out hereto as the total value of the contract and shall be subject to additions and / or deductions and rebated in accordance with the provision herein contained.

viii) "Employer" / "Owner" / "Client" means the **Zonal Manager, Bank of Baroda zonal office, Rajasthan Region, jaipur** having its Zonal Office at **Baroda Bhawan, Plot no.-13, Airport plaza, Durgapura Tonk road, Jaipur-302018** & includes the Employer's representatives , successors & assigns.

ix) "Architect" means ""**Pahwa Archtech Services, Jaipur**" and their authorized nominees inclusive of their representative for the purpose of this contract or such other persons as shall be nominated for the purpose by the Employer.

xi) "Contractor" mean who is awarded contract to perform the work in accordance with the contracb & includes the contractor's personnel's, representatives, successors & permitted assigns.

xii) "Engineer / Site Engineer" means the technical representative of employer/Architect employed for the site.

xiii) “Permanent Works” shall mean the works which are of a permanent nature & are not Temporary works.

xiv) “Temporary works” means all temporary works of every kind required in or about the execution , completion or maintenance in the works.

xv) “Materials” means the materials, apparatus, equipments, fittings, fixtures & other things for incorporation in the works.

xvi) “Period of maintenance/ Defect Liability Period” shall mean the period of 365 (Three Hundred Sixty Five) days calculated from the date of completion of the works certified by the Architect
Engineer or at the discretion of Architect/Employer and further all statutory requirements like obtaining C & D forms, completion/ occupancy certificate, electric connection are procured &site handed over to the employer.

xvii) “Urgent Works” means any urgent work which in the opinion of the Architect/ Engineer / Employer becomes necessary at the time of execution and / or during the progress of work to obviate any risk of accident or failure or to obviate any risk of damage to the structure or services or required to accelerate the progress of work or which becomes necessary for security or for any other reason, the Architect/ Engineer/ Employer may deem.

Xviii) “Competent Authority” means Zonal **Manager, Rajasthan Region, Zonal Office, Bank of Baroda**,Jaipur having its office at **Baroda Bhawan, Plot no.-13, Airport plaza, Durgapura Tonk road, Jaipur-302018**

xix) “Market rate” means the rate as decided by the Architect/ Engineer / Employer, on the basis of cost of materials inclusive of any taxes, duty, octroi or such statutes in force at the time of work & cost of labour at site where the work is to be executed plus the percentage to cover all the overheads & profit or as per CPWD schedule.

xx) “Approved” means approved in writing ,” approval” means approval in writing.

xxi) “Month” means calendar month.

xxii) “Week” means seven consecutive calendar days.

xxiii) “Day” means a calendar day beginning and ending at midnight.

xxiv) “Prime Cost (P.C.) Sums “ - A prime cost sum is provided to cover the cost of materials to be supplied or work to be done by specialist suppliers / sub - contractors only. The Main contractor in such cases shall be only required to provide “General Attendance” or “Special Attendance” or “Builders works” for which the main contractor shall quote his rates in percentage of the P.C. for “General or Special Attendance” as the case may be. In no case, shall P.C. sums be used for the work to be carried out by the main contractor nor shall the main contractor have any right or claim to either work to be done against the P.C. Sums or payment thereof. The Main contractor shall however only be entitled to the payment for “Builders Works, contractors General or Special Attendance” which is defined hereunder and which may be required to be done, as per the rates quoted by him which shall be applicable to the actual amount of the material supplied or work done against the P.C. Sums by the specialist Sub - Contractor / Supplier.

xxv) “Contractor’s General Attendance” shall be deemed to include only allowing use of scaffoldings, site facilities, accommodation, storage for materials & plant space, office accommodation , providing watch & ward, light, power & water for the work, clearing away rubbish etc. for completion of P.C. Sum work.

xxvi) “Contractor’s Special Attendance” shall besides above include unloading, storing, hoisting, placing in position, providing special scaffoldings etc for completion of the work.

xxvii) :Builders Work” shall include cutting, chasing holes, fixing, placing in position etc making good the same with cement mortar or masonry works or petty civil works etc.

xxviii) PROVISIONAL SUMS: A provisional sum is a lumpsum provision made in the bill of quantities for the cost of unforeseen work and of work, the extent of which cannot be estimated fairly or accurately at the time of tenders, or the part or whole of the works not specified in detail when the contract is entered into. The work against the Provisional sum shall be carried out by the main contractor either on the rates offered by him at the time of tenders, or the same shall be derived by analysis of some standard schedule of rates such as those of N.B.O., or C.P.W.D. or by reducing the same from the rates of nearest items , given in the Bill of Quantities or as per actual expenditure plus fifteen percent contractor's profit as client/ Architect/ Engineer may decide, which shall be final and binding upon the contractor, without having claim or choice to any particular method. A Provisional Sum (P.S.) shall not be subjected to any separate profit , charges on account of "Builders work" or "General or Special Attendance" as the rates of work to be done against provisional sums shall be deemed to have included all those considerations.

xxix) Interpretations & Marginal Heading

Words imparting the singular only also include the plural & vice versa where the context required. Any reference to masculine gender shall whenever required include feminine gender & vice versa.

The marginal headings or captions or notes shall not be deemed to be a part of the clauses and shall not be taken into consideration in the interpretation or construction thereof or of the contract. All other words shall have the meaning assigned to them elsewhere in the contract.

2. **Extent of Contract**

The contract comprises the construction, completion & maintenance of the works & except in so far as the contract otherwise provides, the provision of all labour, materials, constructional plant, temporary works & everything whether of a temporary or permanent nature required in and for such construction, completion & maintenance so far as the necessity for providing the same is specified in or reasonably to be inferred from the contract.

B. TENDER / AGREEMENT

1. Letter of Intent / Acceptance / Award

Before signing of the contract, the Employer may issue by registered post or by otherwise, depositing at the registered office of the contractor, letter of Intent/ Acceptance to enter into a contract with the contract for the execution of the works in accordance with the contract. Upon issue of such Letter of Acceptance/ Intent by the Employer, the Employer shall be deemed to have signified his intention to award the contract, however, the process shall be deemed to be complete only when the contract has been entered into by the Employer & the contractor. However, until a formal contract agreement is prepared & executed, the tender together with the Employer's letter of intent shall constitute a binding contract between the parties, provided the Performance Bond as required under the contract shall have been furnished by the contractor

2. Contract Agreement

Within 30 days after the issue of letter of acceptance, the contractor shall have to enter into a written deed of agreement incorporating all the terms & conditions as embodied in the Tender Documents or modified subsequently in writing and those contained in the letter of acceptance, with the Employer.

The following documents shall be deemed to form and be ready and construed as part of thecontract agreement.

a) The said Tender & Appendix
b) Form of Tender
c) General Conditions of Contract
d) Special conditions of Contract
e) Letter of Acceptance
f) Contract Price
g) Priced bill of quantities as accepted.
h) Specifications
I) Drawings

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 drawings, hard copies of drawings being followed in preference to soft copies of drawings and figured dimensions in preference to scale and special conditions in preference to General conditions.

In the event of conflict/discrepancies between the schedules of Quantities, the Specifications and/or the Drawings, the following order of preference shall be observed:

a) Description of Schedule of Quantities
b) Particular Specification and Special Condition, if any,
c) Drawings
d) C.P.W.D Specifications
e) Indian Standard Specifications of B.I.S.

2. Performance Bond:

The successful Tenderer to whom the Letter of Acceptance is issued shall have to deposit an irrevocable performance bond (as per terms given in the prescribed format as per annexure "A" enclosed herewith") of a Nationalized Bank other than Bank of Baroda for a sum amounting to Five Percent (5%) of the contract price and furnish the same in original to the Employer as guarantee for due performance of the contract, within a period of fourteen days from the date of issue of Letter of Acceptance of the Tender. The said performance bond shall be released after the expiry of the Defect Liability/ Maintenance Period after certification by the Architect/ Bank. The Employer shall be fully authorized to revoke the Letter of Acceptance and forfeit the Earnest Money Deposit furnished along with the Tender, if the successful Tenderer fails to furnish the said performance bond within a period of 14 days as specified above.

4. Language (s)

The language, in which the contract documents shall be drawn up, shall be English.

5. Documents Mutually Explanatory

Except if & to the extent otherwise provided by the contract, the provisions of the conditions of contract shall prevail over those of any other document forming part of the contract. Subject to the foregoing, the several documents forming the contract are to be taken as mutually explanatory of one another but in case of ambiguities or discrepancies, the same shall be explained & adjusted by the Architect/ Bank who shall thereupon issue to the contractor instructions directing in what manner the work is to be carried out.

Sufficiency of Tender

The contractor shall be deemed to have satisfied himself before entering into the contract, as to the correctness and sufficiency of the rates, drawings and process stated in the priced bill of quantities and the Schedule of Rates and prices as set out in the contract and rates and prices shall except in so far as it is otherwise provided in the contract, cover all his obligations under the contract and all matters and things necessary for the proper execution , completion and maintenance of the works.

Absence of Specification

If the specifications do not contain particulars of materials and works which are necessary for the proper completion of the works, and the intention to include, which is inferred, all such materials and works shall be supplied and executed by the contractor without extra charge. If the contractor requires additional information, he shall, so request in writing, well in advance before commencement of the particular work, to the Architect Bank who will issue such detailed information as necessary within a reasonable time.

If, however, during the execution of the works, the contractor shall encounter physical condition or obstructions constituting Force Majeure and which could not have been reasonably foreseen by an experienced contractor, the contractor shall forthwith give written notice thereof to the Architect/ Employer within two weeks after its occurrence and if in the opinion of the Architect/ Employer, such conditions or obstructions until so instructed by the Architect/ Employer except in the event of there being

an urgent need to undertake remedial or other works or repairs to reduce risks of injuries or damages to persons or property.

Obtaining Information related to execution of work

No claim by the contractor for additional payment will be entertained which is consequent upon failure on his part to obtain correct information as to any matter affecting the execution of the works nor will any misunderstandings or the obtaining of incorrect information or the failure to obtain correct information relieves him from any risks or from the entire responsibility for the fulfillment of t he contract.

6. Work to be to the satisfaction of Employer / Architect

The contractor shall execute, complete and maintain the works in strict accordance with the contract to the satisfaction of the Employer / Architect shall comply with and adhere strictly to the Architect's instructions and directions on any matter (whether mentioned in the contract or not) touching or concerning the works. The contractor shall take instructions and directions from the Architect or (subject to the limitations referred to in clause 8 as mentioned in the agreement hereof) from the Architect's Representative.

The contractor shall forthwith comply with all instructions issued to him by the Employer/ Architect in regard to any matter in respect of which the Employer/ Architect requiring compliance with an instruction the contractor does not comply therewith , then the Employer may employ and pay other persons to execute any work whatsoever which may be necessary to give effect to such instruction and all cost, incurred in connection with such action, shall be recoverable from the contractor by the Employer as a debt or may be deducted by him from any monies due or to become due to the contractor under this contract and carrying out such works by other persons / agencies shall not relieve the contractor from fulfilling his obligations under the contract.

6.3. All instructions issued by the Employer/ Architect shall be issued in writing. However, any Instructions issued orally shall be given immediate effect and shall be confirmed in writing by the Employer / Architect/ Engineer thereof within three days from issuing of such oral instructions. Such instruction can be in the form of note in site register signed by employers /Architect.

7. Serving of Notices

On Contractor:

Any notice to be given to the contractor, under the terms of contract shall be served by sending the same by registered post to the contractor's office at Sawai Madhopur or principal place of business or delivering the sameby hand to the contractor's office at Sawai Madhopur or Principal place of business or fax message duly acknowledged by the contractor.

On Employer:

Any notice to be given to the Employer, under the terns of the contract, shall be served by sending the same by Registered post or leaving the same at the Employer's last known address (or in the event of the Employer being a company to or at its registered office).

8. Contract Super seeds previous Documents

The contractor shall have no right to any increase in the rates in the Bill of Quantities nor any other right whatsoever by reason of any representatives explanation or statement given or to be given or by a reason of any information, promise, or guarantee given or alleged to have been given to him by any person (whether in the Employ of the Employer or not) before the date of the contract if being understood that the contract embodies the whole arrangements between the parties with reference to the contract hereby, constituted and all previous correspondence, negotiations, representatives, explanations, statements, promises or guarantees whether oral or written shall be excluded.

DRAWINGS AND SPECIFICATIONS:

No drawing shall be taken as in itself an order for execution unless, in addition to the Architect/Consultants signature, it bears express words stating remark **"GOOD FOR CONSTRUCTION"**.

Three complete sets of the signed Drawings and Specifications and Schedule of Quantities shall be furnished by the Architect/Employer to the Contractor. Such copies shall be kept on the works, and the Employer/Architect or his Representatives shall at all reasonable time have access to the same.

All drawings and specifications shall be returned to the Architect by the Contractor before the issue of the final certificates. The original copy of contract shall remain in the custody of the Bank and shall be produced by him at his office as and when required.

Over and above, Soft Copies of the drawings will be issued by the Architect if requested by the Contractor. Necessary protection will be used by the Architect to prevent willful editing of such softcopies of the drawings by the contractors.

ISSUE OF EXTRA CONSTRUCTION DRAWINGS:

Architect will supply three sets of drawings to the Contractor for construction. Extra prints of drawings for construction will be issued on chargeable basis by Architect as detailed hereunder:

A0-Size Rs. 200.00 each A1-Size Rs. 100.00 each A2-Size Rs. 75.00 each A3-Size Rs. 50.00 each A4-Size Rs. 25.00 each

CONSTRUCTION DRAWINGS:

The successful Tenderer shall state, on receiving the Letter of Intent, what drawings are yet to be issued by the Architect for construction purposes and what further details are required by him from the Architect. Silence on the part of the successful Tenderer in this regard will be construed to mean that he has all the information that he needs for ordering out materials and for contractual purposes. Unless specifically asked for in writing, delays later claimed by the successful Tenderer on account of drawings will not be construed as reason for delay in the execution of the work.

Apart from clarifications sought during the periodic visits to site by the Architect/ Employer representative, the successful Tenderer shall obtain all clarifications on the Architect's drawings from the office of the bank.

c. **DUTIES / POWER OF EMPLOYER/ ARCHITECT**

1. The duties of the Architect representative are to watch & supervise the works and to test &examine any materials to be used on workmanship employed in connection with the works & shall also check measurements and bills. They shall have no authority to relieve the contractor of any of his duties or obligations under the contract, or except as expressly provided hereunder or elsewhere in the contract, to order variation in quantity, to order variation in extension of time limit, extra items, arbitration & extra final payment.

Any approval to be given to the Contractor shall be given by the employer after consultation with the Architect. The approval may be in the form of separate letter in writing by the employer or by counter signing the approval/ instructions of Architect at the site instruction book.

The Employer/Architect may from time to time in writing, delegate to the Architect representative any of the powers and authorities vested in the Employer/ Architect and shall furnish to the contractor a copy of all such written delegations of powers and authorities. Any written instruction or approval given by the Employer/Architect Representatives to the contractor within the terms and

such delegation (but not otherwise) shall bind the contractor as though it had been given by the Employer/ Architect provided always as follows:-

i) Incorrect approval or failure of the Architect representative to disapprove any work or materials shall not prejudice the power of the Employer/Architect there after to disapprove such work or materials and to order the pulling down, removal or breaking up thereof.

ii) If the contractor shall be dissatisfied, by reasons, of any decision of the Architect Representative he shall be entitled to refer the matter to the Employer/ Architect/ Engineer who shall thereupon confirm, reverse or vary such a decision.

D. DUTIES OF CONTRACTOR

1. Contractor's General Responsibilities

The contractor shall , subject to the provisions of the contract, and with due care & diligence, execute, complete & maintain the works & provide all labor including supervision, materials, constructional plant & all other things, whether of a temporary or permanent nature, required in

and for such execution ,completion & maintenance so far as the necessity for providing the same , excluding those to be provided by the Employer is specified in the contract, or is reasonably to be inferred from the contractor. Temporary electric water charges & any other extra charges shall be paid by the contractor & nothing shall be paid by the employer.

The contractor shall carry out and complete and maintain the works in accordance with goodArchitectural /Engineering practices and using materials and workmanship of the quality and standards therein specified provided that where and to the extent that approval of the quality of materials or of the standards of workmanship is a matter of option, such quality & standards shall be subject to approval and satisfaction of the Employer.

2. Contractor's Superintendence

The Contractor shall give and/ or provide all necessary superintendence during the execution of the works and as long thereafter as the Employer/Architect may consider necessary for the proper fulfillment of the contractor's obligations under the contract. The contractor or his competent and authorized technical agent or representative and all other technical staff approved of in writing by the Employer/ Architect/ (which approval may at any time be withdrawn) are to be constantly present at the work site and shall give whole time to the superintendence of the same. Such representatives shall be adequately qualified and have the required experience in similar works. If such approval shall be withdrawn by the Employer/ Architect the contractor shall as soon as is practicable (having regard to the requirement of replacing him as hereinafter mentioned) after receiving written notice of such with drawl remove the agent from the site and shall not thereafter employ him again on the site in any capacity and shall replace him by another agent approved by the Employer/ Architect. Such authorized agent or representative shall receive on behalf of the contractor directions and instructions from the Employer/ Architect or (subject to the limitations contained in the contract) the Employer/ Architect Representative.

Contractor's senior representative for execution and co-ordination of works

The contractor shall have on site at all times during working hours throughout the course of the contract at least one competent senior representative who shall be empowered to make decisions bindings on the contractor in respect of all matters likely to arise in connection with the execution & coordination of the works at site & shall keep the Employer/ Architect and the

employer informed at all times about the name & designation of such representative only.
Contractor's senior representative shall have the power to take joint measurements and sign the measurement books/ bills.

Contractor's employees

The contractor shall provide & employ after approval from the employer/ Architect on the site in connection with the execution, completion & maintenance of the works the following staff but not limited to and with minimum qualification and experience:

a) Site-in-charge: Graduate in Civil /Architecture with -3- years experience and adequate exposure to works of similar nature and magnitude.

b) Additional Engineering staff/Technical assistants as are qualified, skilled & experienced in their respective callings and sub agents, foremen and leading hands are competent to give proper supervision ensuring quality and output to the work they are required to supervise , and

c) Such skilled semi-skilled and unskilled labors as are necessary for the proper and timely execution, completion & maintenance of the works.

Removal of contractor's employees

The Employer/Architect shall be at liberty to object to and require the contractor to remove forthwith from the works any person employed by the contractor on or about the execution or maintenance of the works who in the opinion of the Employer/Architect misconducts himself or is incompetent or negligent in the proper performance of his duties or whose employment is otherwise considered by the Employer/Architect to be undesirable and such person shall not be again employed upon the works. Any person so removed from the works shall bereplaced without delay by a competent substitute approved by the Employer/ Architect.

Unauthorized Persons

No unauthorized persons are to be allowed on the site. The contractor shall instruct all such persons to keep out and shall take steps to prevent trespass.

3. Safety of Site Operations

The contractor shall take full responsibility for the safety, stability and adequacy of all site operations and methods of construction including all temporary works, provided that the contractor shall not be responsible, except as may be expressly provided in the contract, for the design or specification of the permanent works.

4. Assignment

The contractor shall not assign the contract or any part thereof or any benefit or interest therein or there under without the prior written consent of the Employer / Architect.

5. Sub - Letting

Except where otherwise expressly provided in this contract, the contractor shall not sub - let the whole or any part of the works without the prior written consent of the Employer/ Architect and such consent, if given, shall not relieve the contractor from any liability or obligation under the contract and he shall be responsible for the acts, defaults and neglect of any sub - contractor, his agents, servants or workmen as fully as if they were the acts, defaults or neglect of the contractor. Provided always that the provision of labour on a piece work basis shall not be deemed to be sub - letting under this clause

6. Inspection of Site

The contractor shall be deemed to have understood, accepted and to have entered into the contract based on such data regarding hydrological, climatic and physical conditions as shall have been examined by the contractor and / or as shall have been indicated by the Employer in the documents furnished to the contractor for the purpose of tendering. The contractor shall inspect & examine the site and its surroundings and shall satisfy himself before submitting his tender or entering into the contract as to the form and nature of the site, the quantities and nature of the works, materials necessary for the completion

of the works , the means of access to the site, the accommodation he may require and the rules and regulations and statutory obligation he has to fulfill and shall himself obtain all necessary information as to risks , contingencies and other circumstances which may influence or affect his Tender or the obligations assumed by him under the contract. A Tenderer 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.

7. Remedy for bad work

If it shall appear to the Employer /Architect their representative in charge of the work/ official of Chief Technical Examiner (CTE), that any work has been executed with unsound imperfect or unskillful workmanship or with materials of any inferior description , or that any materials or articles provided by him for the execution of work are unsound or of a quality inferior to that contracted for , or otherwise not in accordance with the contract, the contractor shall on demand in writing from the Employer/ Architect specifying the work, materials or articles complained of notwithstanding that the same may have been inadvertently passed, certified and paid for forthwith rectify and remove & reconstruct the work , so specified in whole or in part as the case may require at his own risk and cost and in the event of his failing to do so within a period to be specified by the Employer/ Architect in his demand , aforesaid, the contractor shall be liable to pay compensation at the rate of one percent on the amount of the value of work ascertained by the Employer Architect, for every day not exceeding ten days, while his failure todo so shall continue and in the case of any such failure the Employer/ Architect may rectify or remove and re execute part or whole of the work with new materials after dismantling the rejected works at the risk & cost in all respects from the contractor.

8. Notice of Operation

The contractor shall not carry out important operation without the consent in writing of the Employer /Architect representative.

9. Assistance for Employer /Architect/ Employer's Representative

The contractor shall provide for the Employer/Architect at all times during the contract including maintenance, a competent chainman and / or all such other means as they may require to assist him in carrying out or checking any measurements, levels, setting out or measuring up of work. The contractor is also to provide ladders, gangways etc .and the necessary attendance to move and adopt as directed for inspection or measurement of the works by the Employer/ Architect and their representatives.

10. Construction Records

The contractor shall keep and provide to the Employer/Architect Representative full and accurate records of the dimensions and positions of all new work and any other information necessary for the Employer/Architect Representative to be able to prepare complete drawings, recording details of theworks as constructed.

11. Office Accommodation for Employer / Architect and Visiting officials

The contractor shall provide and maintain all necessary office(s) workshops, stores, shelters, sanitary facility, canteens and other temporary buildings for themselves and their staff at site to the approval of Employer /Architect Representative. The contractor shall also provide without any extra cost office accommodation for the Employer/Architect Representatives, visiting and inspecting officials, Meeting room with an attached toilet. The office space shall be well lighted and air cooled and shall be provided with the adequate number of electric lights , plug points, ceiling fans , water coolers and all required furniture and fittings including cabinets and drawing stands. In addition, full time assistance of a typist and one office bearer will also be given. The layout and detailed plan of all temporary office accommodation to be built at the site shall be to the approval of the Employer /Architect/McCall such facility shall beremoved at the completion of project or any later dates as approved.

Telephone

The contractor shall maintain a telephone at site at his own cost and shall pay all bills for calls and maintenance. The telephone shall be installed by the contractor and the contractor shall allow the use of the telephone to all other contractor / sub - contractors engaged on the works and may recover proportionate call charges from them. He shall also allow free use of the telephone to the Employer's Representative / Architect and other visiting officials for phone calls in connection with the works.

12. Lighting for works

The contractor shall at all times provide adequate and approved lighting as required for the proper execution and supervision and inspection of the works.

13. Site Instruction Book

The Employer /Architect Representative shall maintain a site instruction book on the site in which he or his authorized representative's remarks, instructions, decisions and other essential details, of the work shall be recorded. The contractor shall regularly note the contents of this book and initial it signifying his having done so and take immediate action on the same.

14. Progress Report

The contractor shall submit monthly progress reports indicating status of each activity planned for the period under consideration and summary of each completed and planned activity and the anticipated starting date for the activities planned but not in progress, schedule of materials including the details of materials received and expected time of arrival of other materials as ordered and such other details affecting the program me and progress of work to the Employer/Architect Representative in a form as required by him which shall also include reasonable number of progress photographs of the works.

15. Site Meetings

Progress and quality evaluation meetings will be held at site every fortnight. The contractor's senior representative in charge of the project along with his site in charge and other staff including of approved sub contractors and suppliers as required shall participate in these review meetings and ensure all follow up actions. The contractor shall be responsible for co-coordinating with the Employer/Architect to arrange such meeting. In case of urgent requirements, the Employer / Architect can so ask the contractor to arrange such meetings at site.

16. Return of Plant

The contractor shall supply to the Employer/Architect Representative a monthly return showing full particulars on a form, to be approved by him, of the items of the plants including locations and state of each and the sections of the works on which they are employed.

The return is to be presented on the tenth day of each month.

17. Contractor to verify Site Measurements

The contractor shall check and verify all site measurements whenever requested by other specialists, contractors or by nominated or other sub - contractor to enable them to prepare their own shop drawings and pass on the information with sufficient promptness , as will not in any way delay works. A copy of all such information passed on shall be given to the Employer/Architect Representative.

18. Hoarding

The contractor shall put up a suitable hoarding of approximates 4m x 3m in English to a design to be approved by the Employer/Architect. The board shall include the name of the work, Employer, Architects, and the contractor etc.

19. Specialist Sub - Contractor

The contractor shall get all the specialist works such as the anti termite treatment , water proofing work , sanitary plumbing & drainage works, electrical work, false ceiling , aluminum works, doors, fire fighting ,

lift etc. executed through approved specialist contractors having requisite experience in the particular trade. The list of such specialist sub - contractors the contractor proposes to use, shall be submitted with his tender along with details of their experience and on approval by the Employer /Architect the particular sub - contractor only shall be appointed for carrying out the work. The Employer / Architect shall have the right to reject any specialist sub contractor who meets with the approval of the Employer Architect and no claim by the contractor regarding this aspect shall be entertained.

20. Shop Drawings

The contractor and / or his approved sub - contractor shall prepare shop drawings for specialist trades such as sanitary & plumbing , electrical and mechanical works, false ceiling, aluminum doors and windows , removable partitions and any other item as stipulated in these specifications in respect to the requirement under the contract. The shop drawing shall follow the design and detailing requirements as indicated in the Architect's drawings, specifications and bills of quantities and shall incorporate the fabrication details as proposed by the contractor/ sub contractors, the features and exact conditions as available at the site of construction , any aspect related to coordination with other disciplines which might interfere with the proper installation with his work and any other details that the Employer/Architect might stipulate. Three copies of these shop drawings shall be submitted by the contractor to the Employer/Architect. The Employer/Architect shall at his earliest convenience,scrutinize these and return One copy to the contractor with his remarks/ comments/ approval. On receivingthe final approval of the shop drawings, further work on the item shall be proceeded with by thecontractor. The contractor shall submit these shop drawings to the Employer/Architect sufficientlyearly and well in advance considering the overall time schedule to allow the Employer/Architect reasonable time to scrutinize the drawings and get it corrected before further processing by the contractor.Any plea of delay on this aspect by the contractor shall not be entertained.

The Architect's approval of fabrication working details and shop drawings, however, shall not relieve the contractor from his responsibility for errors and incorrect setting out and coordination between the trades or discipline. The Architect's approval shall be in general and not intended to serve as a check and shall not relieve the contractor from furnishing the materials and performing the works as required by the drawings and specifications.

Should the contractor prove unable to produce satisfactory shop drawings or be unable to produce drawings to conform to the progress of the work the Employer /Architect reserves the right to take whatever steps are necessary to have drawings undertaken by others by debit to the contractor's account.

Any decision taken by the Employer /Architect to have shop drawings produced elsewhere shall not relieve the contractor of his contractual obligations and the contractor must provide to the Employer /Architect. all necessary details, physical dimensions, descriptive literature of all equipment and materials to be incorporated on drawings within 10 days of a request from the Employer /Architect.No extension in contractual delivery time shall be allowed on account of the time consumed in submission and reviewing of defective drawings & resubmission of the drawings after being incorporated with the comments of the Employer/Architect.

21. Photograph of Works carried out

The contractor shall every month supply at his own cost a reasonable number of postcard size colored photographs of the works carried out from time to time as per the instructions of the Employer Architect. In the event of any dispute or termination of contract, either by the Employer or the contractor as provided. The contractor shall arrange to obtain photographs of the works completed upon the date of such termination of such contract.

22. Approved Makes

The specifications provide a list of approved makes of some materials specified. The employer / /Architect has the right to choose any of the approved makes from the list, which according to him is the best & most suitable for the purpose. The tender price quoted shall cover for this aspect. Only when it is not possible to use any of the approved makes, either due to non-availability or due to technical reasons. The contractor shall propose alternative materials and if found suitable these shall be approved by the Employer/Architect for construction but without any extra cost to the Employer.

23. The contractor shall not employ coal mining or controlled area labor falling under any category whatsoever on or in connection with the work or recruit labor from area within a radius of 32 km (20 miles) of the controlled area. Subject as above the contractor shall employ imported labor only i.e., deposit imported labor or labor imported by the contractors from area, from which import is permitted.

24. The contractor shall immediately remove any laborer who may be pointed by the Employer / Architect as being a coal mining or controlled area laborer. Failure to do so shall render the contractor liable to pay to Bank a sum calculated at the rate of Rs. 10/- per day per laborer. The certificate of Employer about the number of coal mining or controlled area laborer and the number of days for which they worked shall be final and binding upon all parties to this contract.

25. It is declared and agreed between the parties that the aforesaid stipulation in this clause is one in which the public area interested within the meaning of thee exception in Section 74 of Indian Contract Act, 1872.

E. TAXES/ DUTIES/ INSURANCE/ PATENT/INDEMNITY

1. Compliance with Statutes, regulations etc.

The contractor shall conform to in all respects with the provisions of any such statute, ordinance or law as aforesaid and the regulation or Bye - laws of any local or other duly constituted authority prevailing , which may be applicable to the works or to any Temporary works and with such rules and regulations of public bodies and companies as aforesaid and shall keep the Employer indemnified against all penalties and liability of every kind for breach of any such statute , ordinance or law , regulation or bye-law. Provided always that the Employer will repay or allow to the contractor all such sums as the Architect shall certify to have been properly payable and paid by the contractor in respect of such fees, after due verification of the documents.

3. Patents Rights & Royalties

The contractor shall save harmless and indemnify the Employer from and against all claims and proceedi ngs for or on account of infringement of any patent rights , design trade mark or name or other protected rights in respect of any constructional plant , machine work or material used for or in connection with the works or temporary works or any of them and from against all claims , demand, proceedings , damages , costs, charges and expenses whatsoever in respect thereof or in relation thereto. The contractor shall pay all tonnage and other royalties , rent and other payments or compensation (if any) for getting stones, sand gravel, clay or other materials required for the works or Temporary works or any of them.

3. Taxes, Works contract Tax for works etc.

The contractor shall pay and be responsible for payment of all taxes, duties, levies, fees or charges in respect of the works including , Tax on works contract, and octroi, payable in respect of materials, equipments, plant and other things required for the contract. All of the aforesaid taxes, duties, levies, fees and charges shall be paid by the contractor's account and Employer shall not be required to pay any additional or extra amount on this account. Variation of the taxes, duties, levies, fees etc. if any till completion of the work, shall be deemed to be included in the accepted rates excluding GST and no extra claim on this account will in any case be entertained.

Taxes on Profit

The contractor will be required to pay all taxes levied by the central and / or state Bank on such part of his profit in respect of the contract as is chargeable therewith under the laws for the time being in force.

4. Indemnifying Bank from any claims/actions

The contractor shall fully indemnify and keep indemnified the Bank against any action, claim or proceeding relating to infringement or use of any patent or design or any alleged patent or design rights and shall pay any royalties which may be payable in respect of any article or part thereof included in the contract. In the event of any claims made under or action brought against Bank in respect of any such matters as aforesaid , the contractor shall be 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 President of India 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.

5. DAMAGE TO PERSONS AND PROPERTY, INSURANCE, ETC.

The Contractor shall be responsible for all injury to the work or workmen persons, animals or things and for all damages to the structural and/or decorative part of property which may arise from the operation or neglect of himself or of any sub-Contractor or of any of his or a sub-Contractor's employees, whether such injury or damage arise from carelessness, accident or any other cause whatsoever in any way connected with the carrying out of this contract. The clause shall be held to include entirely, any damage to buildings whether immediately adjacent or otherwise, and any damage to roads, streets, foot-paths or pathways as well as damage caused to the buildings and the work forming the subject of this contract by rain, wind or other inclemency of the weather. The Contractor shall indemnify the Employer and hold them harmless in respect of all and any expenses arising from any such injury or damages to persons or property as aforesaid and also in respect of any claim made in respect of injury or damage under any acts of compensation or damage consequent upon such claim the Contractor shall reinstate all damage of every sort mentioned in this clause, so as to deliver the whole of the contract work complete and perfect in every respect and so as to make good or otherwise satisfy all claims for damages to the property of third parties.

The Contractor shall obtain a policy covering under Workmen compensation Act, a third party insurance as well as any other insurance and indemnify the employer entirely from all responsibilities in this respect. The insurance must be placed with a company approved by the Employer and must be effected jointly in the name of the Contractor and the Employer and the policy lodged with the latter. The scope of insurance is to include damage or loss to the contract itself till this is made over in complete state.

Insurance is compulsory and must be affected from the very initial stage. The Contractor shall also be responsible for anything which may be excluded from damage to any property arising out of incidents, negligence or defective carrying out of the Contractor.

6. INSURANCES

Unless otherwise instructed the Contractor shall insure the entire work including all materials, etc. to the full value of the contract, and keep the same insured until the virtual completion of the contract against loss or damage by fire and/or earthquake, flood or damages from whatever cause.

The insurance is to be at the Contractor's own cost & must be placed with a company approved by the employer, in the joint names of the Employer and the Contractor for such amount. If any further insurance, over and above what is stated above is called to be made by the employer, the premium of such further sum shall be allowed to the Contractor as an authorized extra.

The Contractor shall deposit the policy and receipt for premium paid with the Employer within 21 (twenty one) days from the date of issue of work order unless otherwise instructed. In default of the Contractor insuring as provided above, the Employer on his behalf may so insure and may deduct the premier paid from any money due, or which may become due to the Contractor. The Contractor shall, as soon as the claim under the policy is settled or the work reinstated by the Insurance company should they elect to do so, proceed with due diligence with the completion of work in the same manner as though the incident had not occurred at all.

The Contractor in case of rebuilding or reinstatement after fire, and any other risk or risks mentioned in the above paragraph shall be entitled to extension of time for completion as the Employer may deem fit.

7. Insurance against third party risks:

On commencement of the work, the contractor shall take out and submit to the Employers a suitable insurance policy against third party risks. The limits of liability of this insurance shall be as follows:

a) Contractor's All Risk ‘CAR’ policy for the value of contract price and necessary workmen compensation policy valued for the duration of work.

b) Rs.25 Lacs in respect of any one accident or series of accidents arising out of one event.

c) Contractor shall take out third party insurance for 3 no. of such accidents with Rs.10,00,000/- (Ten lacs) in respect of any person.

F. COMPLETION TIME / PROGRESS REPORT

1. Commencement of Works

The contractor shall commence the works on site within a period of 15 days after the receipt of an order in writing to this effect from the Employer or the Engineer/Architect or the date of handing over the site whichever is later and shall proceed with the same with due expedition and without delay except as may be expressly sanctioned or ordered by the Engineer/Architect or be wholly beyond the contractor's control.

2. Possession of Site for Construction Purpose

The Employer will give to the contractor possession of so much of the site as may be required to enable the contractor to commence and proceed with the construction programme referred to in clause 18 hereof (if any) and otherwise in accordance with such reasonable proposals of the contractor as he shall by notice in writing to the Employer/Architect make and will from time to time as the works proceed give to the contractor possession of such further options of the site as may be required to enable the contractor to proceed with the construction of the works with due dispatch in accordance with the said programme or proposals (as the case may be).

3. Detailed Construction Programme

Within 15 day of receiving letter of Acceptance the contractor shall prepare and submit a detailed construction programme of works in the form of a Critical path network showing the contractor's proposed sequence of operation drawings, construction / manufacture, delivery erection and commissioning to ensure that the works as comprised in the contract are completed well before the completion period of -15-months.

Time being the essence of the contract; the contractor shall have to follow strictly the Detail Construction Programme as approved by the Employer/Architect. It shall be the responsibility of the contractor to deploy equipment, engage skilled, unskilled labour and commissioning of all other materials and financial resources to ensure that the progress of work is achieved strictly according to the approved construction programme.

At any stage or stages during the currency of the work, should there be found any slippage in achievement of progress of any activity / activities. which is / are either on the critical path or in respect of which, float time becomes zero and come on the critical path, the contractor shall be advised to furnish the revised critical path network and the contractor shall have to augment and supplement his arrangements and organization for the work in such a manner that the work gets regulated as per the approved programme.

Estimated Expenditure

The detailed programme shall also show the month wise estimates of expenditure and cash flow requirements for completion of the work.

Progress Report

a) Monthly detailed progress reports showing the progress of individual activities of programme as achieved at site till such period and being suitability marked on the approved network diagram, or as directed by the Architect, shall be provided by the contractor indicating the actual state of progress during the course of the contract, together with other details, procurement & delivery schedules of materials/equipments, as required by the Architect. Four copies of such progress report shall be submitted by the contractor to the Employer through the Architect on or before the 3rd day of each month.

b) The submission to and comments / approval by the Employer/ Architect Representative shall not relieve the contractor of any of his duties, responsibilities or liabilities under the contract.

G. SITE PREPRATION AND EXECUTION OF WORK

1. STORAGE OF MATERIALS:-

The Contractor shall provide and maintain proper sheds for the proper storage and adequate protection of the materials etc. and other work that may be executed on the site including the tools and materials of Sub-Contractors and remove the same on completion. Cement godown shall be constructed for storing as per norms with a stack of 10 bags each, two ft. opening all around with two ft. passage between each stack. Cement should be stored one ft. above the ground level and the floor of the godown shall consists of wooden planks resting one base prepared of dry bricks.

So also reinforcement bars are to be stored above the ground level to prevent the same from getting rusted.

2. Tools:

All tools, equipments and instruments as instructed by the Employer / Architect and as are considered necessary for the work shall be provided by the Contractor for the due performance of this contract.

All measuring tapes to be of steel and suitable scaffolding and ladders that may be required for safely taking measurement shall be supplied by the Contractor.

The masons and the supervisors on the work shall carry with them always a one meter or two meter steel tapes and a measuring tape of 30 meters, a spirit level, a plumb bob and a square and shall check the work to see that the work is being done according to the drawing and specifications. The Employer/ Architect will use any or all measuring instruments or tools belonging to the Contractor for checking the work executed or being executed on the contract.

The Contractor should cover in his rates for making provisions for all reasonable facilities for the use sub contractors for their work or for work to be Employer / Architect.

3. Setting Out

The contractor shall be responsible for the true and proper setting out of the works in relation to original points lines and levels of reference given by the Employer/Architect in writing and for the correctness (subject as above mentioned) of the position, levels, dimensions and alignment of all parts of the works and for the provision of all necessary instruments, appliances and labor in connection therewith. If at any time during the progress of the works any error appear or arise in the position, levels , dimensions or alignment of any part of the works, the contractor required to do by the Architect/Employer, or its representative, shall at his own expense rectify such error to the satisfaction of the Employer/Architect or it's Representative. The checking of any setting out of any line or level by the Employer/Architect or its Representative shall not in any way relieve the contractor of his responsibility for the correctness thereof and the contractor shall currently project and preserve all bench - marks , sight - rails , pegs and other things and references used in setting out the works.

4. DATUM

The 'datum' will be furnished by the Employer Architect in conformity with regulations of appropriate Authority. The contractor shall made arrangements for preserving the above datum till completion of the work. All levels shown in the drawings are to be strictly adhered to.

5. BENCHES

The Contractor is to construct and maintain proper benches of all the main walls, in order that the lines and levels may be accurately checked at all times.

6. Bore holes & Exploratory Excavation

If at any time during the execution of the works the Employer / Architect shall require the contractor to make bore holes or to carry out exploratory excavation, such requirement shall be ordered in writing and shall be deemed to be an additional order under the provisions of Clause hereof and a provisional sum in respect of such anticipated work shall have been included in the bill of quantities.

7. Watching & Lighting

The contractor shall in connection with the works provide and maintain at his own cost adequate lights, guards, warning signs and watch & ward staff when and where necessary or required by the Architect/ Employer for the protection of the works or for the safety and convenience of the public or others.

8. Care & Protection of Works

From the commencement to the certified completion of the whole of works, the contractor shall take full responsibility for the care thereof and of all Temporary works and in case any damage , loss or injury shall happen to the works or to any part thereof or to any Temporary works for any cause whatsoever (save and except the excepted risks as defined in clause H of SCC) the contractor shall at his own cost repair and make good the same so that at completion , the works shall be in good order and condition and in conformity with every respect with the requirements of the contractor and the Employer/Architect instructions. In the event of any such damage, loss or injury happens from any of the expected risks, the contractor shall , if to the extent required by the Employer/Architect and subject always to the provisions of clause H 1.2 of SCC, repair and make good the same as aforesaid at its or his own expense of the contractor.

The contractor shall also be liable for any damage to the works occasioned by him including his subcontractors in the course of any operations carried out by him for the purpose of completing any outstanding work and complying with his obligations under clause H 2 of SCC thereof. The contractor shall indemnify the Employer from all risks on this account.

9. Giving of Notices & payment of fees to Authorities

The contractor shall, in time give all notices and pay for all fees required to be given or paid by any central or state statute ordinance or other law or any regulation or Bye - law of any local or other constituted authority in relation to the execution of the works of any Temporary works and by the rules and regulations of all public bodies and companies affected in any way by the works or any Temporary works.

10. Excavated materials property of Employer

All materials and things of any kind obtained from excavations or found on or under the site or any additional site which the contractor may be allowed to occupy, shall remain the property of the Employer and shall not be used in the works or sold or otherwise disposed of without the write authority of the employer unless otherwise expressively provided in the specification. No excavations are to be made upon the site or additional site beyond those shown on the drawings without written authority of the Employer/Architect or the Employer/Architect's Representative.

11. Fossils, etc.

All fossils, coins, articles of value or antiquity and structures and other remains or things of geological or archaeological interest discovered on the site of the works shall be deemed to be the absolute property of the Employer and the contractor shall take reasonable precautions to prevent his workmen or any other persons from removing or damaging any such article or thing and shall immediately upon discovery thereof and before removal acquaint the Architect/ Engineer's representative of such discovery and carry out at the expense of the Employer and the instructions of employer's / Architect's representative's to the disposal, or otherwise, of the same.

12. Interference with Traffic and adjoining properties

All operations necessary for the execution of the works and for the construction of any Temporary works shall so far as in compliance with the requirements of the contract permits be carried on so as not to interfere unnecessarily or improperly with the public convenience or the access to use andoccupation of public and private roads and footpaths or to or of properties whether in the possession of the Employer in respect of all claims , demands , proceedings , damages , costs , charges and expense whatsoever arising out of or in relation to any such matters in so far as the contractor is responsible therefor.

13. Extraordinary Traffic

The contractor shall use every reasonable means to prevent any of the highways or bridges communicating with or on the routes and use vehicles and restrict and distribute loads so that any such extraordinary traffic as will inevitably arise from the moving of plant and material from and to the site shall be limited as far as reasonably possible and so that no unnecessary damage or injury may be occasioned to such highways and bridges.

Special loads

Should it be found necessary for the contractor to move one or more loads of constructional Plant Machinery or pre-constructed units or parts of units of work over part of a highway or bridge the moving whereof is likely to damage any highway or bridge unless special protection or strengthening is carried out then the contractor shall adopt proper & adequate measures and shall be responsible for all the costs and consequences thereof.

Settlement of Extra Ordinary Traffic Claims

If during the carrying out of the works at any time thereafter the Employer receives any claim arising out of the execution by the contractor of the works in respect of damage or injury to highways or bridges he shall immediately report the same to the Architect/ Employer and the contractor and thereafter the contractor shall negotiate the settlement of and pay all sums due in respect of all claims and shall indemnify the Employer in respect thereof and in respect of all claims, demands, proceedings, damages, costs charges and expenses in relation thereto provided always that if and so far as any such claims or part thereof shall in the opinion of the Architect/ Employer/ be due to any failure on the part of the contractor to observe and perform his obligations then the amount certified by the Employer/ Architect due to such failure shall be paid by the contractor. Point it out to the contractor through the Employer/ Architect and in case contractor fails to settle the claim within reasonable time, the employer in case so required will settle/ pay the claimed amount , which will be adjusted in the bill payable to the contractor.

14. Opportunities for other contractor / agencies

The contractor shall, in accordance with the requirements of the Employer/ Architect,
afford all reasonable opportunities for carrying out their work to any other contractor or agencies employed by the Employer and their workmen and to the workmen of the employer and of any other duly constituted authority who may be employed in the execution on or near the site of any work not included in the contractor or of any contract which the employer may enter into in connection with or ancillary to the works. For any dispute in the matter, the same should be referred to Employer / Architect and decision given by them will be binding.

15. Supply of Plant Materials & Labour

Except where otherwise specified, the contractor shall at his own expense supply and provide all the constructional plant, tools & equipment, temporary works, materials both for temporary and for permanent works, labor (skilled & unskilled and including the supervision thereof), transport to or from the site and in and about the works and other things of every kind required for the construction, completion and maintenance of works.

16. Site Clearance Contractor to keep site clear

During the progress of the works, the contractor shall keep the site reasonably free from all unnecessary obstruction and shall store or dispose off any constructional plant and surplus materials and clear way and remove from the site any wreckage, rubbish or temporary works which are no longer required.

Clearance of Site on completion

On the completion of the works, the contractor shall clear away and remove from the site all constructional plant, surplus materials, rubbish and temporary works of every kind and leave the whole of the site and works clean and in a workmanlike condition to the full satisfaction of the employer/ Architect not later than one month from the virtual completion of the works.

17. Quality of Materials & Workmanship

All materials & workmanship shall be the best of the respective kinds described in the contractor and in accordance with the Employer Architect instructions & shall be subjected from time to time to such tests as the Employer Architect may direct at the place of manufacture or fabrication or on the site or at all or any of such places. The contractor shall upon the instruction of the Employer Architect furnish him with documentation to prove that the materials & goods quality with the requirements of contract. The Employer Architect may issue instruction in regard to removal of material from site or any work, if these are not in accordance with the contract. The contractor shall provide such assistance instruments, machinery, labour & materials as are normally required for examining , measuring & testing any work and the quality , weight or quantity of any materials before incorporation in the works for testing as may be selected and required by the **(Employer/ Architect/ their representative).** However, the employer shall have every right to have the materials/ quality checked as to ensure the standard of construction & quality of materials.

18. SAMPLES & TESTING

Apart from adhering to any special provision made in the specifications regarding submission of samples, the contractor shall within 10 days of his receipt of Letter of Intent, provide to the Employer/Architect samples along with the detailed literature of all materials, he proposes to use in the building irrespective of the fact that a specific make / material might have been stipulated. If certain items, proposed to be used, are of such nature that samples cannot be presented or prepared at the site, detailed literature / test certificates of the same shall be prepared at site, detailed literature / test certificate of the same shall be provided instead. Before submitting the samples / literature, the contractor shall satisfy himself that the material / equipment for which he is submitting the samples / literature meet with the requirement of the specification. The Employer/Architect shall check; the sample and give his comments and / or approval to the same. Only when the samples are approved in writing, he shall proceed with the procurement and installation of the same. The approved samples shall be signed by the Employer/Architect for identification and shall be kept on record at his office until the completion and acceptance of the work and shall be available at the site for inspection / comparison at any time. The contractor shall keep with him a duplicate of such samples to enable him to process the matter.

For items of work where the samples are to be made at the site, the same procedure shall be followed. All such samples shall be prepared at a place where it can be left undisturbed until the completion of the project.

The Employer/Architect shall give his comments/approval to the samples at his earliest convenience. Any delay that might occur in approving of the samples for reasons of its not meeting with the specifications shall be able to the account of the contractor. In this respect the decision of the Employer/Architect will be final.

On delivery of the supplies at the site, the contractor shall specifically arrange to get the supply inspected by the Employer/Architect and compared with the approved sample and his specific approval obtained before using the same in the work.

If samples are not approved, the contractor shall forthwith arrange to supply to the 'Employer/Architect for his approval, fresh samples complying with the specification laid down in the contract. Architect shall always keep the employer fully informed.

The contractor shall be bound, at his own cost to get the regular testing of samples of each batch of cement & steel and other materials in the manner as specified by I.S.I. or B.I.S. relevant codes or in the manner as may be specified by the 'Employer/Architect and get the same approved by the Employer/Architect, before their use on works.

Alternately, the Employer/Architect shall be entitled to have the necessary tests carried out at contractor's cost for any materials brought / supplied by the contractor, other than those, for which satisfactory proof has already been furnished, and the contractor shall provide, at his expense, all facilities which the Employer/Architect may require for the purpose.

If any tests, other than those specified in the contract are required by the Employer/Architect, the contractor shall provide all facilities required for the purpose and charges for all such tests shall be borne by the contractor.

Cost of materials consumed in the tests shall be borne by the contractor, in all cases.

Should there be any doubt about the accuracy or results of certain tests carried out by the contractor at site or outside, the Employer/Architect shall be entitled to get the confirmatory testing carried out at an alternative facility at the contractors cost and the contractor shall be bound to provide all facilities & co-operation for the alternative testing.

19. ACCESS FOR INSPECTION

The Employer/Architect, and their respective representatives shall at all reasonable times have free access to the works, the site and to the workshops, factories or other places where materials are lying or from which they are being obtained and the contractor shall give every facility to the Employer/Architect, and their representatives necessary for inspections and examination and test of materials and workmanship. The contractor shall afford every facility and assistance for inspecting the works & materials and for checking and measuring materials.

20. Examination of work before covering up

No work shall be covered up or put out of view without the approval of the Employer/Architect or the Representative and the contractor shall afford full opportunity for the Employer/Architect or the Representative to examine & measure any work which is about to be covered up or put out of view and to examine foundations before permanent work is placed thereon. The contractor shall give information to the Employer/Architect Representative whenever any such work or foundations is or are ready or about to be ready for examination and the Employer/Architect representative shall without unreasonable delay; attend for the purpose of examining and measuring such work or for examining such foundations.

Uncovering and making openings

The contractor shall uncover any part or parts of the works or make openings in or through the same as the Employer/Architect may from time to time direct and shall reinstate and make good at his cost such part or parts to the satisfaction of the Employer/Architect .

21. PROTECTION OF ADJACENT BUILDINGS / STRUCTURES / OCCUPANTS / INHABITANTS / USERS

The Contractor shall be solely responsible for the protection of the adjoining / adjacent buildings / structures etc. within and outside the campus, and shall erect necessary scaffoldings / take other protective measures for the same. The Contractor shall also be solely responsible for the safety of the occupants / inhabitants / users of the adjoining / adjacent buildings and structures.

1. Inspection & Testing during manufacture

The Employer/Architect shall be entitled during manufacture to inspect, examine and test on the contractor's premises during working hours the materials and workmanship and check the progress of manufacture of all fabrication materials to be supplied under the contract, and if part of the said materials is being manufactured on other premises, the contractor shall obtain permission from the Employer/Architect to inspect, examine and test as if the said plant were being manufactured on the contractors premises. Such inspection, examination or testing if made shall not relieve the contractor from any of his right obligation under the contract.

2. Dates for Inspection & Testing

The contractor shall agree with the Employer/Architect the date on and the place at which any plant / works will be ready for testing as provided in the contract and unless the Employer/Architect or its Representative shall attend at the place so named on the date agreed, the Employer/Architect shall ensure to be present personally or hire a qualified representative with the tests, and shall forthwith forward to the Employer/Architect duly certified copies of the test readings.

3. Facilities for Testing at Manufacturer's Works

For tests on the premises of the contractor or of any sub-contractor, the contractor shall provide such assistance , labor , materials , electricity , fuel , stores, apparatus and instruments as may be requisite and as may be reasonably demanded to carry out such tests efficiently.

4. Way leaves etc.

The contractor shall bear all expenses and charges for special or temporary way leaves required by himin connection with access to the site. The contractor shall also provide at his own cost any additional accommodation outside the site required by him for the purpose of the works.

5. Power, Water & Other facilities

The contractor shall be responsible to provide within the scope of work all facilities necessary for the performance of the work including (but not limited to) water, electrical power, electrical power through generator transportation, labor tools, construction and testing equipment and machinery, borrow areas, access roads and right (s) of way to or about the job site(s) and or borrow area.

The employer does not warrant or undertake the provision of any facility aforesaid or otherwise whatever to the contractor, or assistance on obtaining / procuring the same or other assistance whatever for or in the performance or testing of the work and the contractor shall not imply by conduct, expression or assurance or by any other means, any promise or obligation on the part of the employer contrary to the provision hereof and any such promise or obligation understood by the contractor shall not be binding upon the employer, or for any claim thereof at time during the period of contract.

6. Night or Sunday Work

Subject to any provision to the contrary contained in the contract none of the permanent work shall save as herein provided, be carried on during the night or on Sundays without the permission in writing of the Employer/Architect or its Representative , save when the work is unavoidable or absolutely necessary for the Technical Reasons , saving of life or property or for the safety of works in which case the contractor shall immediately advise the Employer/Architect , Provided always that the provisions of this clause shall not be applicable in the case of any work, which becomes essential to carry out by rotary or double shifts in order to achieve the progress & quality of the part of the works being technically required/continued with the prior approval of the Employer/Architect.

All work at night shall be carried out without unreasonable noise and disturbance and with the approval of local authority. If so applicable, the contractor shall indemnify the Employer from and against any liability for damages on account of noise or other disturbance created while or in carrying out the work and from and against all claims , demands, proceedings , costs, charges and expenses whatsoever in regard or in relation to such liability and the financial liability if
incurred by the employer shall be deducted from the bill raised / certified for payment.

7. Dimensions and Levels

All dimension and levels shown on the drawings shall be verified by the contractor on the site and he will be responsible for the accuracy and maintenance of all dimensions and levels.

Figured dimensions are in all cases to be accepted and no dimension shall be scaled. Large scale details shall take precedence over small - scale drawings. In case of discrepancy the contractor shall ask for clarification from the Architect/Architect's Representative before proceeding with the work.

8. Employer's Supply of materials

The employer, entirely at their own discretion may decide to supply some materials. In such a case, the rates of items of work affected due to such supply shall be suitably varied as per analysis of rates as directed by the Employer/Architect. No claim on this aspect from the contractor shall be entertained.

9. Keeping Site Clean

During the progress of the works and when directed by the Employer/Architect or its Representative , the contractor shall keep the site clear of all rubbish and debris including that which may be deposited on the site by any sub-contractor until the date of issue of certificate of completion. The cost of keeping the site clean shall be deemed to have been included for in the rates.

On completion of the works, the contractor shall at his own expenses clear away and remove from the site not later than -7- days from the date of completion of works all constructional plant, surplus material, rubbish and temporary works of every kind and leave the entire site and works clean and in work man like condition to the satisfaction of the Employer/Architect or its Representative.

10. NOTICE AND PATENTS OF APPROPRIATE AUTHORITY AND OWNERS

The Contractor shall conform to the provisions of any Act of the Legislature relating to the, work and to the Regulations and byelaws of any authorities, and/or any water, lighting and other companies, and/or authorities with whose systems the work under the contract has relevance and shall before making any variations from the drawings or specification that may be associated to so conform, give the variations proposed to be made and the reasons for them and apply for instruction thereon. The Employer/Architect on receipt of such intimation shall give a decision within a reasonable time.

The Contractor/s shall arrange to give all notices required for by the said Acts, Regulations or Bylaws to be given to authority, and to pay to such authority or to any public officer all fees that may be properly chargeable in respect of the work and lodge the receipts with the Employer.

The Contractor shall indemnify the Employer against all claims in respect of patent rights, royalties, and damages to buildings, roads or member of public in course of execution of work and shall defend all actions arising from such claims and shall keep the Employer saved, harmless and indemnified in all respects from such actions, costs and expenses.

11. CLEARING SITE AND SETTING OUT WORK.

The site shown on the plan shall be cleared of all obstructions, trees, bushes, shrubs, loose stone, and rubbish materials of all kinds. All holes or hollows whether originally existing or produced by removal of loose stone or materials shall be carefully filled up with earth well rammed and leveled off as directed at his own cost.

The Contractor shall set out the work and shall be responsible for the true and perfect setting out of the work and for the correctness of the positions, levels, dimensions and alignment of all parts thereof. If at any time, any error shall appear during the progress of any part of the work, the Contractor shall at his own expenses rectify such error, if called upon, to the satisfaction of Employer/Architect/. The Contractor shall further set out is finally approved and the rates quoted in his tender should include this and no extra cost on this account will be entertained.

These benches will consist of timber posts of adequate length and minimum diameter 75 mm to be driven in the ground at suitable distance as directed encased with brick work. The wire nails will be driven on the top of wooden post on the center line of columns, walls, inside and walls, columns etc may be clearly indicated so that checking may be done at any time if it is so required.

12. CONTRACTOR IMMEDIATELY TO REMOVE ALL OFFENSIVE MATTERS

All soil, filth or other matters of any offensive nature taken out any trench, sewer, drain, cesspool or other place shall not be deposited on the surface but shall be at once carted away by the Contractor to a safe place as per rules of the appropriate authorities/instruction of the Employer/Architect. The Contractor shall keep the foundations and work free from water and shall provide and maintain at his own expenses electrically or other power driven pumps and other plant to building is handed over to the Employer for the purpose, until the building is handed over to the Employer. The Contractor shall arrange for the disposal of the water so accumulated to the satisfaction of the employer and the local authority and no claims will be entertained afterwards if he does not include in his rates for the purpose.

13. ACCESS

Any authorized representative of the Employer/Architect shall at all reasonable times have free access to the work and/or to the workshop, factories or other places where also to any place where materials are being prepared or constructed for the work and also to any place where the materials are lying of from where they are being obtained, and the Contractor shall give every facility to the Employer or their representative necessary for inspection and examination and test of the materials and workmanship. Except the representatives of the Employer, Architect and the , no person shall be allowed at any time without the written permission of the Employer.

14. MATERIALS, WORKMANSHIP, SAMPLES, TESTING OF MATERIALS

All the work specifies and provided for in the specifications or which may be required to be done in order to perform and complete any part thereof shall be executed in the best and most workman-like manner with materials of the approved quality of the respective kinds in accordance with the particulars contained in and implied by the specifications and as represented by the drawings or instructions as may from time to time be given by the Employer/Architect/ during the execution of the work, and to his entire satisfaction.

The Contractor shall have to carry out tests on materials and workmanship in approved material testing laboratories or as prescribed by Employer/Architect/ at the Contractor's cost to prove that the materials etc. under test conform to the relevant I.S. Codes or as specified in the specifications. No extra payment on this account should in any case be entertained.

The Contractor shall get the materials used in the Construction tested at a recognized Engineering College / Laboratory at his own cost and forward the reports to the Employer/Architect/.

A list of materials of approved make and brand is shown in the "Technical Specification". Materials are to be used from the annexed materials list. In case of genuine non-availability of specified makes, alternative products of equivalent may be used with prior permission from the Employer/Architect/.

All the materials (except where otherwise described) stores and equipment required for the full performance of the work under the contract must be provided through normal channels under the contract must be provided through normal channels and must include charges for all duties, sales tax, octroi and other charges legally payable and must be the best of their kind available and the Contractor shall be entirely responsible for the proper and efficient carrying out of the work. Samples of all materials to be

used must be submitted to the Employer/Architect/ when so directed by the Employer/Architect and written approval from Employer/Architect must be obtained prior to placement of order. A register should be maintained by the Contractor at the site showing records of test results along with the original test report of materials. Separate register should be maintained with approved samples of each material duly signed by the Employer/Architect.

During the inclement weather, the Contractor shall suspend concreting and plastering for such time as the Employer/Architect may direct and shall protect from injury all work during its course of execution. Any damage during the currency of the present work to any part of the work for any reasons due to rain, storm or neglect of Contractor, shall be rectified by the Contractor in an approved manner at no extra cost.

Should the work be suspended by reason of rain, strike, lock-outs or any such cause, the Contractor shall take all precautions necessary for the protection of work and at his own expenses shall make good any damage arising from any of these causes.

The Contractor shall cover up and protect from damage, from any cause, all new work and shall supply all temporary protection for the execution of the work whether by himself or special tradesman or Sub-Contractor and any damage caused must be made good by the Contractor at his expenses.

15. CONTRACTOR NOT TO DEPOSIT MATERIALS IN A MANNER THAT MAY CAUSE INCONVENIENCE TO THE PUBLIC

The Contractor(s) shall not deposit materials on any site which will seriously inconvenience the public. The Employer/Architect/ may require the Contractor to remove any materials, which are considered by him to be a danger or inconvenience to the public or cause them to be removed at the Contractor's cost.

16. SUBSTITUTION

Should the Contractor desire to substitute any materials and workmanship, he / they must obtain the approval of the Employer/Architect in writing for any such substitution well in advance. For materials designated in this specification by such term as "Equal" or "Other approved" etc. specific approval of the Employer/Architect has to be obtained in writing.

17. CONCEALED WORK

The Contractor shall give due notice to the Employer/Architect whenever any work is to be buried in the earth, concrete or in the bodies, walls or otherwise becoming inaccessible later on in order that the work may be inspected and correct dimensions taken before such burial, in default whereof the same shall, at the opinion of the Employer/Architect be either opened up for measurement at the Contractor's expense or no payment may be made for such materials. Should any dispute or difference arise after the execution of any work as to measurements etc. or other matters which cannot be conveniently tested or checked, the decision of the Employer/Architect shall be accepted as correct and binding on the Contractor.

18. Urgent Repairs: -

If, by reason of any accident of failure, or other event occurring or connection with the works, or any part thereof, either during the execution of the works, or during the DLP, any remedial or other work or repair shall in the opinion of the Employer/Architect, be urgently necessary for the safety of the works and the Contractor is unable or Unwilling at once to do such work or repair, the Employer may employ and pay Other Persons to carry out such work or repair as the employer Architect may consider necessary. If the work of repair so done by the Employer is the work which in the opinion of the Employer/Architect, the Contractor was liable to do at his own expense under the Contract, all expenses incurred by the Employer in so doing shall be recoverable from the Contractor by the Employer, or may be deducted by the Employer from any monies due or which may become due to the Contractor. Provided always that the Employer/Architect as the case may be, shall as soon after the occurrence of any such emergency as may be reasonably practicable notify the Contractor thereof in writing.

19. The work (whether fully constructed or not) and all materials, machines, tools and plants, scaffolding, temporary buildings and other things connected therewith shall be at the risk of the contractor until the work has been delivered to the Bank. In the event of the work or any materials properly brought to the site for incorporation in the work being damaged or destroyed in consequence of hostilities or warlike operation, the contractor shall, when ordered (in writing) by the Bank, remove any debris 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 the provision of this agreement for the work of clearing the site of debris, stacking or removal of serviceable materials and for reconstruction of all works ordered by the Bank, 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 assessed by the Architect/Bank. The contractor shall be paid for the damages / destruction suffered and for testing the material at the rate based on analysis of rates tendered for in accordance with the provision of the contract. The certificate of the Architect/Bank regarding the quality of materials and the purpose for which they were collected shall be final and binding on all parties to this contract.

20. Plants etc, not to be removed

No constructional Plant Temporary works or materials or any part thereof shall be removed from the site without the written consent of the Employer/Architect which consent shall not be unreasonably withheld where the same is no longer immediately required for the purpose of completion of the works. TheEmployer will permit the contractor the exclusive use of all such constructional plant, Temporary works andmaterials in and for the completion of the works until the happening of any event which gives right to the Employer to exclude the contractor from the site and proceed with the completion of the works.

H WORKS TO BE MEASURED

1. The Employer shall except as otherwise stated ascertain and determine by measurement of the quantity and value of work done in accordance with the contract. He shall, when he requires any part or parts of the works to be measured give notice to the contractor's authorized agent or representative who shall forthwith attend or send a qualified agent to assist the Employer/Architect/ or an Employer/Architect of choice of employer in checking such measurements & other substantiations of the Bill submitted by the contractor and shall furnish all particulars required by either of them. Should the contractor not attend or neglect or omit to send such agent then the measurement made by the Employer/Architect or approved by him shall be taken to be the correct measurement of the work andshall be conclusive and binding on the contractor.

2. For the purpose of measuring such permanent work as is to be measured by records and drawings , the Employer/Architect and its Representative shall prepare records and drawings of such work from time to time and the contractor , as and when called upon to do so in writing , shall within 14 days, attend to examine and agree such records and drawings with the Employer/Architect or its Representative and shall sign the same when so agreed and if the contractor does not so attend to examine and agree such records and drawings within the aforesaid period they shall be deemed to be correct.

3. The work shall be measured not withstanding any general or local custom except where otherwise specifically described or prescribed in the contract.

I. WORKMANSHIP

For Plumbing & Sanitary Work

All the water supply and sanitary works shall be carried out by the licensed plumbers approved by the local authorities and skilled workman, experienced in the trade.

All works shall be completely concealed either within shafts or chases or in fills and dropped ceilings unless specifically shown in drawings or required otherwise.

All works shall be adequately protected to the satisfaction of the Employer/Architect in charge, so that the whole work is free from damage throughout the period of construction up to the time of handing over.

The contractor shall be responsible for coordinating the work with works of other trades sufficiently ahead of time to avoid unnecessary hold-ups. Hangers, sleeves, recesses etc. shall be left in time as the works proceed whether or not these are shown in drawings.

All clamps, screws, bracket and all miscellaneous steel works needed in the work shall be fully galvanized. Only specified brands of materials will be used subject to the approval of the sample.

Before the work is handed over, the contractor shall clean all fixtures removing all plaster, stickers, rust stains and other foreign matter of discoloration of fixtures leaving every part in acceptable condition and ready for use, to the satisfaction of the Employer/Architect.

All Sanitary ware and fittings shall conform to I.S. Standards. The contractor shall submit samples of all fittings and fixtures proposed to be used to the Employer/Architect for his approval. The approved samples shall remain with the Employer/Architect till the completion of the work.

All workmanship shall conform to Indian Standard Codes of Practice. The fixing and finishing shall be neat, true to level and plumb. Manufacturer's instructions shall be followed closely regarding installation and commissioning.

All fixtures shall be protected throughout the progress of the work, from damages Special Care shall be taken to prevent damage and scratching of fittings. Tool marks on exposed fixtures shall not be accepted. Protective papers on fixtures shall be removed with hot water only at the final completion of work.

All the water supply, drainage and sanitary works shall be carried out strictly as per specifications, BIS codes and CPWD specifications with amendments up-to-date.

Testing

Before any pipe for water supply are painted or covered the same shall be tested to a hydraulic pressures of 1.5 liters the working pressure. Pressure shall be maintained for at least 4 hourswithout appreciable drop in pressure. In addition to the sectional testing of water supply pipes, the contractor shall test the entire installation on completion of the job to the entire satisfaction of the Employer / Architect . The contractor shall rectify all leakages and restore damage
done to the building and furniture at his own cost.

Electrical Work

Approval by Fire Insurance

The equipment supplied along with its accessories shall be those approved for use in electrical installation by the Fire Sectional committee of the Insurance Association of India.

Compliance to Indian Electricity Rules

The equipment supplied as well as the installation work carried out shall comply in all respects with Indian Electricity Act and India Electricity Rules (1955) as amended up-to-date.

Codes and Regulations

The work shall be governed by the electrical drawings, this specification in conformity with relevant Indian Standard Code and regulations issued by the Bureau of Indian Standards.

Statutory Regulations Inspection and Testing

It will be the contractor's responsibility to prepare and submit drawings, test certificate and any other information as may be required by the local authorities to obtain supply and commissioning of

The equipments. The contractor shall assist in the explanation of its drawings and coordinate with the owner for approval to the drawings and to the work as executed. Necessary fees as required will have to be paid by the contractor.

Competency of Electrical Staff

Accepted norms of good workmanship are required. The electrical works shall be done by qualified and trained staff having sufficient competency in electrical works and under the overall supervision of electrical contractors licensed by the statutory authorities.

Conformity to Specification

The work is to be executed according to the electrical drawings, these specifications, the relevant IS codes. In case of ambiguity the following order shall prevail

(a) As detailed in the nomenclature of the item in the Bill of Quantities read with drawing.
(b) The particular specifications of the item as detailed.
(c) The relevant IS codes.
(d) The Indian electricity rules (1955)

The work shall be executed neatly and well finished to conform to good workmanship levels.

J. FAULT OF CONTRACTOR

1. Removal of Improper works & Materials

The Employer/Architect shall during the progress of the works have power to orderin writing from time to time

(a) The removal from the site within such time or times as may be specified in the order of any materials which in the opinion of the Employer/Architect are not in accordance with the contract.

(b) The substitution of proper and suitable materials and

(c) The removal and proper re-execution (notwithstanding any previous test thereof or interim payment there for) of any work which in respect of materials or workmanship is not, in the opinion of the Employer/Architect in accordance with the contractor.

2. Default of Contractor in Compliance

In case of default on the part of the contractor in carrying out such order the Employer shall be entitled to terminate contract or employ and pay other persons to carry out the same and all expenses consequent thereon or incidental thereto shall be borne by the contractor and shall be recoverable from him by the Employer or may be deducted by the Employer from any monies due or which may become due to the contractor.

3. Remedy on contractor's failure to remove defective work

If the contractor shall fail to carry out any such work as aforesaid required by the Employer on the advice of the Architect shall be entitled to carry out such work by his own workmen or by other contractors and if such work which in the opinion of the Architect/, the Contractor was liable to do his own expense under the contract, then all expenses consequent thereon or incidental thereto shall be recoverable from the contractor by the Employer and shall be deducted by the Employer from any monies due or that becomes due to the contractor.

4. Correction/ Withholding of Certificates: -

The Employer/Architect may by any certificate make any correction or modification in any previous certificate, which shall have been issued and shall have power to withhold approval of any certificate if the works of any part thereof are not being carried out to satisfaction.

The final bill shall be submitted by the Contractor to the Employer/Architect within one month of the date of certificate of completion furnished by the Architect and payment shall be made by the employer within three months from the date of receipt of the final bill duty verified and certified by the Architect. The final bill shall be accompanied by a certificate of completion from the Architect. Payments of final bill shall be made after deduction of Retention Money, which sum shall be refunded in themanner stated therein. The acceptance of payment of the final bill by the contractor would indicate that he will have no further claim in respect of the work executed.

K. VARIATION AND FIXATION OF RATES

1. Variations

If the Employer/Architect may take any variation in quality or quantity of the works or any part thereof that may in their opinion be necessary, then the Architect with the prior written consent of the Employer shall have power to order the contractor to carry out the same and in any of the following :

(a) Increase or decrease the quantity of any work included in the contract.
(b) Omit any such work.
(c) Change the character or quality or kind of any such work.
(d) Change the levels lines position and dimension of any part of the works and
(e) Execute additional work of any kind necessary for the completion of the works.

And no such variation shall in any way validate or invalidate the contract but the value (if any) of all such approved variations shall be taken into account in ascertaining the amount of the contract price.

The price of materials and/or wages of labor required for execution of work shall not be considered.

Orders for Variation to be in writing

No such variation shall be made by the contractor without an order in writing of the Employer/Architect , except for urgent works/ repairs in terms of clause 49 here of provided that no order in writing shall be required for increase or decrease in quantities not amounting to more than twenty five percent in the total quantity of works where such increase or decrease is not the result of an order given under this clause but is the result of the quantities exceeding or being less than those stated in the Bill of Quantities provided also that if for any reason the Employer/Architect shall consider it desirableto give any such order verbally, the contractor shall comply with such order and any conformation in writingof such verbal order given by the Employer/Architect whether before or after the carrying out of the order shall be deemed to be an order in writing within the meaning of this clause. Provided further that if the contractor shall within seven days confirm in writing to the Employer/Architect any verbal order of the Employer/Architect and such confirmation shall not be contradicted in writing by the Employer/Architect within fourteen days, it shall be deemed to be an order in writing by theEmployer/Architect.

Valuations of Variations

The Employer/Architect shall determine the amount if any which in his opinion shall be added to or deducted from the contract Price, in respect of any extra or additional work done or work omitted or work substituted by his order. All such work shall be valued at the rates set out in the contract or derived from a relevant and /or similar item of the contract if in the opinion of the Employer/Architect the same shall be applicable. If the contractor shall not contain any rates applicable to the extra or additional / substituted work then suitable prices shall be agreed upon between the Employer/Architect and the Contractor, on the basis of standard analysis or rates of CPWD OR NBP or actual expenditures. (Proof of which shall have to be furnished by the contractor to Employer/Architect satisfaction) plus 15% (fifteen percent) covering contractor's profit, contractor's special and general attendance, as may be

decided by the Employer/Architect. In the event of disagreement the Employer/Architect shall fix such prices as shall, in their opinion be reasonable and shall communicate to the contractor & which shall be binding upon on the contractor. Under no circumstances, the contractor shall at any stage suspend the work on account of non-settlement of rates of such deviated items. It is however made clear that in case the variation involved does not increase the area as per plans. Contractor shall not be entitled to any additional amount.

Variations Exceeding 25 percent

If the net effect of all variations (other than those arising by reason of any clause relating to variations in price of materials and /or labour) shall be found, on completion of the whole of the works, to result in a reduction or an addition greater than 25 percent of the sum named in the Tender the amount of the contract price shall be amended by such sums as shall be agreed upon between the Engineer & the contractor. In the event of disagreement, the Engineer shall fix such sum, as shall, in his opinion, be reasonable and proper regard being had to all material and relevant factors including the contractor's own cost and overheads.

1.6. Contract Price not subject to variation

Save as specifically provided elsewhere in the conditions of contract, the contract rates shall not be adjusted in respect of any increase or decrease of cost to the contractor in carrying out the works by reason of alteration in the rates of wages and allowances payable to labor or change in the conditions of employment thereof or change in the cost of materials (whether for the permanent or temporary works) consumable stores fuel and power or variations in the rates of freight and insurance or in the incidence of or rates of landing charges or the operation of any law or statue or variation in the cost of any other matter or thing of whatsoever nature subsequent to the date of tender.

Power of Employer/Architect to fix rates

1. Provided that if the nature or amount of any omission or addition relative to the nature or amount of the whole of the works or to any part thereof shall be such that, in the opinion of the Employer/Architect the rate of price contained in the contract for any item of the works is, by reason of such omission or addition/ substitution rendered unreasonable or inapplicable, then a suitable rate or price shall be agreed upon between the Employer/Architect and the contractor. In the event of disagreement the Employer/Architect shall fix such other rate or price as shall in his opinion be reasonable and proper having regard to the circumstances and with the approval of the employer. Any item cropping up during the execution which is not in the bill of quantity & is proposed by Employer/Architect in the interest of job, the rates of such item shall be fixed/ recommended by the Architect based on the rate calculations through the proper analysis & the same shall be approved by the bank / employer & only then the contractor shall be allowed to execute at site.

2. Day Work

The Employer may if, in his opinion it is necessary or desirable , depending on nature / circumstances of the work , order in writing that any additional or substituted work shall be executed on a day work basis. The contractor through the Employer/Architect shall then be paid for such work under the conditions set out in the day work schedule included in the Bill of Quantities and at the rates and prices affixed thereto by him in his Tender. The contractor shall furnish to the Employer/Architect receipts for other vouchers as may be necessary to prove the amounts paid and before ordering materials shall submit to the Employer/Architect quotations for the same for his verification & approval thereof.

In respect of all work executed on a day work basis the contractor shall during the continuance of such work deliver each day to the Employer/Architect or its Representative an exact list in duplicate of the names, occupation and time of all workmen employed or to be deployed on such work togetherwiththe brief description of particular job in advance for verification by the Employer/Architect or its Representative and a statement also in duplicate showing the description and quantity of all materials and plant used thereon in approved format or there for (other than plant which is included in the percentage addition in accordance with the Schedule herein before referred to) . One copy of each list and statement will if correct or as agreed shall be signed by the Employer/Architect or its Representative a priced statement of the labor material and plant (except as aforesaid) used on day works as approved and the contractor shall not be entitled to any payment unless such lists and statements have been fully and punctually

rendered and approved by the Employer/Architect.Provided always that if the Employer/Architect shall consider that for any reason the sending of such list or statement by the contractor in accordance with the foregoing provision, the contractor shall maintain a separate system for workman/ labor employed together with amounts disbursed subject to certification by Employer/Architect, the amount claimed shall be disbursed by the employer on total bill raised.

3. Quantities

In pursuance of clause 33 hereof, the quantities set out in the Bill of Quantities are the estimated quantities of the work and they are not to be taken as the actual and correct quantities of the works to be executed by the contractor in fulfillment of his obligations under the contract & the quantities may vary conforming to actual site conditions & requirements and such variation shall not in any way vitiate or invalidate the contract, nor shall the contractor be entitled to any additional claim for increase or decrease of quantities of any item/ items of work.

L. RECOVERY OF CLAIMS

1. Whenever any claim or claims for payment of a sum of money arises out of or under the contract or against the contractor, the Bank shall be entitled to with hold and also have a lien to retain such sum or sums in whole or in part from the security, if any deposited by the contractor and for the purpose aforesaid the Bank shall be entitled to with hold the security deposit, if any, furnished as the case may be and also have a lien over the same pending finalization or adjudication of any such claim. In the event of the security being insufficient to cover the claimed amount or amounts or if no security has been taken from the contractor, the Bank shall be entitled to withhold and have a lien to retain to the extent of such claimed amount or amounts referred to above, 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 the Bank or any contracting person through the Bank pending finalization of adjudication of any such claim.

2. It is an agreed term of the contract that the sum of money or moneys so withheld or retained under the lien referred to above by the Bank will be kept withheld or retained as such by the Bank till the claim arising out of or under the contract is determined by the arbitrator (if the contract is governed by the arbitration clause) by the competent court, as the case may be and the contractor will have no claim for 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 Bank 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.

3. Bank shall have the right to cause an 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 overpaid in respect of any work done by the contractor under the contract or any work claimed to have been done by him under the contract and found not to have been executed the contractor shall be liable to refund the amount of over payment and it shall be lawful for Bank to recover the same from him in the manner prescribed in sub clause (i) 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 Bank to the contractor without any interest thereon whatsoever. Provided that the Bank shall not be entitled to recover any sum overpaid, nor the contractor shall be entitled to payment of any sum paid short where such payment has been agreed upon between the superintending engineer or executive engineer on the one hand and the contractor on the other under any term of the contract permitting payment for work after assessment by the superintending engineer or the executive engineer.

4. Any sum of money due and payable to the contractor (including the security deposit returnable to him) under the contract may be withheld or retained by way of lien by the Bank or any other contracting person or persons through the Bank 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 Bank or with such other person to persons.

   It is an agreed term of the contract that the sum of money so withheld or retained under this clause by the Bank or till his claim arising out of the same contract or any other contract is either mutually settled or

determined by the arbitration clause or by the competent court, as the case may be and that the contractor shall have no claim for interest or damages whatsoever on this account or any other ground in respect of any sum of money withheld or retained under this clause and duly notified as such to the contractor.

M. COMPLETION

1. Final Certificates & Termination of responsibilities

Final Completion Certificate

On successful completion of entire works covered by the contract to the full satisfaction of Employer/Architect, the contractor shall ensure that the following works have been completed to the satisfaction of Employer/Architect: (a) clear the site of all scaffolding , wiring , pipes, surplus materials, contractor's labor, equipment and machinery (b) demolish, dismantle and remove all contractor's site offices and quarters and other temporary works , structure and constructions and other items and things whatsoever brought upon or erected at the site or any land allotted to contractor by the owner and not incorporated in the permanent works (c) remove all rubbish, debris etc. from the site and the land allotted to contractor and shall clear , level and dress , compact the site as required and said land to the satisfaction of the Employer/Architect. (d) shall put the owner in undisputed custody and possession of the site & all land allotted by the owner to the contractor, (e) all defects / imperfections have been attended & rectified to full satisfaction of the Employer/Architect during the Defect Liability Period.

Unless the contractor shall have fulfilled the provisions of the clause, the works shall not be deemed to have been completed.

Upon the satisfactory fulfillment by contractor as stated above, the contractor shall be entitled to apply to the Employer/Architect for a final completion certificate in respect of the entire work.

In case, if in the opinion of the Employer , some portion / portions of the building have been substantially completed at some point of time to the entire satisfaction of the Employer/Architect which can be occupied and used by the Employer if employer so requires, without any hindrance , inconvenience or inadequate facility and if the employer desires to occupy and use such portion/ portions of the building at any time, the Architect may issue a certificate of partial completion of the building for such portion/portions of the building as may be occupied and used by the Employer , within 14 days after the receipt of application from the Contractor and the Defect liability for such portion/portions of the building shall commence from the date of such certificate of partial completion.

This issuance of a completion certificate shall be without prejudice to the Employer's rights and contractors liabilities under the contract, including the contractor's liability for the Defect Liability Period nor shall the issuance of a completion certificate in respect of the works or work at any site be construed as a waiver of any right or claim of the Employer against the contractor in respect of work or the works at the site and in respect of which the completion certificate in question has been issued.

Defect Liability / Maintenance Completion Certificate

The contract shall not be considered as completed until a Maintenance Completion Certificate shall have been signed by the Architect and delivered to the Employer with a copy to the contractor stating that the works have been completed and maintained during the Defect Liability Period by the contractor to his full satisfaction. The Maintenance Completion Certificate shall be given by the Employer/Architect within twenty eight days after the expiration of the Maintenance/Defect Liability period (or in case of different Periods of Defect Liability period, shall become applicable to different parts of the works after the expiration of latest of such periods) or as soon thereafter as any works ordered during such period pursuant to clause 42 hereof shall have been completed by the contractor to the satisfaction of the Employer/Architect and full effect shall be given to this clause notwithstanding any previous entry on the works or the taking possession working or using thereof or any part thereof by the Employer or till such time occupancy certificate is obtained by the Architect from the appropriate statutory authority.

Cessation of Employer's Liability

The Employer shall not be liable to the contractor for any matter or thing arising out of or in connection with the contract or the execution of the works unless the contractor shall have made a claim in writing in respect thereof before the issuance of the Defect Liability / Maintenance completion Certificate under this clause.

2. Defect - Liability / Maintenance Period

The contractor shall maintain the whole of permanent works in a thoroughly sound , substantial efficient and perfect condition during the Defects-Liability period of 365 days , after the date of completion of the whole or part of works as certified by the Employer/Architect, remedying at his own cost and to the satisfaction of the Employer/Architect, any defects (excepting fair wear & tear, cleaning , normal day to day maintenance during the use of the building after being occupied) which may becomeapparent, prior to or during this Defect - Liability period, arising out of defective materials and /or workmanship or default , neglect or omission of the contractor not with standing, that the Employer has usedportions of the works before the whole of the works were completed , during the Defect Liability period. All tools plant, machinery, materials, superintendence, labour & other devices of all kinds necessary for such maintenance of the works during Defect Liability Period are to be supplied by and at the expense of the contractor.

If it shall appear to the Employer/Architect or his Representative at any time during constructionor re-construction or prior to the expiration of the Defects- Liability Period of 365 days, that

(i) Any work has been executed with unsound, imperfect or unskilled workmanship or that any materials or articles provided by the contractor for execution of the works are unsound or of a quality inferior to that contracted for , or ;

(ii) Any defect, shrinkage or other faults have appeared in the work arising out of defective or improper materials or workmanship;

The contractor, upon receipt of a notice in writing to that effect from the Employer/Architect, shall forthwith rectify the defects or remove the materials or articles so specified and provide other materials or articles at his own expense within a fortnight notwithstanding, that the same may have been inadvertently passed, certified and paid for:

If the contractor or his workmen or employees shall injure or destroy any part of the structure in which they may be contiguously working or any structure, road fence, etc. contagious to the premises on which the work or any part of it is being executed , or if any damage shall happen to the work while in progress , the contractor shall have to make good the same at his own expense.

The whole cost of such rectification of defects, replacement of defective work or part thereof to the satisfaction of the Employer/Architect, shall be at the expense of him contractor.

3. As Built Drawings

The contractor shall furnish three sets of drawings "as erected" and approved by different statutory authorities in accepting the work in its entirely and completion.

4. As built & Record Drawings

Before the works (or any section thereof) are completed in accordance with clause 41 hereof, the contractor shall furnish to the Employer all operating and maintenance instructions/ manual / technical

catalogues together with as built drawings of the works as completed, in sufficient details in the opinion of the Architect to enable the Employer to maintain, dismantle, reassemble and adjust all parts of the works. The contractor shall submit the as built drawings and record drawings for whole of the works including civil works, plumbing, drainage and water supply, electrical, air conditioning and ventilation , Elevator services & all other services for approval of the Employer/Architect. Firstly , a set of draft drawings shall be submitted and on approval of which the final as built drawings shall be submitted and shall comprise each three prints and one reproducible of each drawing covering all essential information for proper and easy maintenance. The work shall not be considered to be completed for the purpose of clause 41 hereof until such approved instructions, manual, drawings, have been supplied to the Employer. Cost or charges for the purpose shall be included in the price for relevant work and no extra cost incurred will be claimed or allowed.

5. Operating and Maintenance Instructions/ Manual and list of spares

The contractor shall submit to the Employer/Architect/ for approval, as early as possible before dispatch of any equipments etc. General instructions namely operations and maintenance instruction manuals concerning the correct manner of assembling, operating & maintaining the work with special reference to any recently developed features. These instruction manuals shall be submitted immediately following approval of the drawings together with the lists of spare parts separately.

The manuals shall be submitted for approval in the same manner as the drawings and when finally approved, copies shall be prepared and forwarded to the Employer/Architect. The contractor shall ensure that the erection supervisor has a copy in his office at site.

The instruction manuals shall describe in detail the erection procedure and use of all erection equipment and measurement devices. The procedure for assembling, adjusting, operating & dismantling of each component, system and machine shall be described and illustrated. The maintenance of each equipment shall be described including the recommended frequency of inspection & lubrication.

The contractor shall in prepare the instruction manual, take into account the lack of experience and familiarity of the operating personnel with this type of equipment.

The contractor shall be fully responsible for ensuring that all plant and materials supplied under this contract are suitable for use under local climatic conditions.

6. Completion Drawing

After the completion of all works and approval thereof by the Employer/Architect, the contractor will have to prepare completion drawings as executed for various systems with complete details and submit as below:

(i) Conduit layout, location of junction and pull boxes and no. of wires through each section of conduit.
(ii) Location of main & sub distribution switch gear and cabling.
(iii) HT & LT cable layout.
(iv) Single line diagram of complete electrical systems.
(v) Control scheme for various interlock
(vi) Layout of equipments in sub - stations
(vii) Earthling layout
(viii) Cable route diagram

8. PREPARATION OF BUILDING WORKS FOR OCCUPATION AND USE ON COMPLETION

The whole of the work will be thoroughly inspected by the contractor and deficiencies and defects put right. On completion of such inspection, he shall inform the Employer/Architect that he has completed the work and it is ready for inspection. On completion, the Contractor shall clean all windows & doors including cleaning and oiling, if necessary, of all hardware, inside & outside, all floors, staircases and every part of the building and the Site. He will leave the entire premises neat and clean and ready for immediate occupancy and to the satisfaction of the Employer/Architect.

9. COMPLETION / LIASONING CERTIFICATE

From the time of award of the Contract, the Contractor shall liaison with Urban Improvement Trust / Development Authority, Sawai Madhopur / Nagar Nigam Sawai Madhopur, Fire Services/ Forest Department or any and all other statutory bodies to obtain the permission to commence the work, permission to continue the work, permissions for electrical connections water supply connections/sewerage disposal connections/ permission for cutting of trees, if any, any other permissions required to start, continue, complete and occupy the premises requirements / and the Contractor shall also get the Completion Certificate and Occupancy Certificate from the Competent Authority. All matters pertaining to any and all statutory agencies pertaining in any way / manner to the construction of the building / its services / its access / etc. shall be dealt by the Contractor.

All the fees paid to the above agencies shall be reimbursed by the Bank against proper bills / receipts / vouchers / etc. but no extra payment other than the fees deposited / paid to the said agencies shall be made. The final bill of the Contractor shall not be settled until all such approvals are obtained.

All necessary efforts to get the Completion Certificates / Occupancy Certificates shall be made by the Contractor – and the firm shall be solely responsible for obtaining the same. If any deviations are made in the plans / approved drawings due to any reasons whatsoever, the Contractor shall liaison with concerned Authority to get them approved at the same terms and conditions as mentioned above. All technical help in the form of drawings etc. shall be made available to the Contractor by the Employer through its Architects.

N. Alterations, Additions and Omissions:

a) The term "Variation" as used under this clause means the alteration or modification of the design, quality or quantity of work as shown upon the drawings, scope of works, specification or included in the priced schedule of quantities and desired by or referred to in the schedule of quantities and includes the addition, omission or substitution of any work, the alteration of the kind of standard or any of the materials or goods to be used in the work, and removal from the site of any works materials or goods executed or brought thereon by the Contractor for the purpose of work other than work materials or goods which are not in accordance with this contract. The Employer/Architect shall have power to order the Contractor to do any of the following:

i) Increase or decrease the quantity of any work included in the contract.

ii) Omit any such work.

iii) Change the character or quality or kind of any such work.

iv) Change the levels, lines, position and dimensions of any part of the Works and

v) Execute additional work of any kind necessary for the completion of the works and no such variation shall in any way validate or invalidate the contract, but the value, if any, of all such variations shall be taken into account in ascertaining the amount of the Contract Price.

b) Orders for Variation to be in Writing:

The Contractor shall make no such variations without an order in writing of the Employer/Architect. Provided that no order in writing shall be required for Increase or decrease in the quantity of any work where such increase or decrease is not the result of an order given under this Clause, but is the result of the quantities exceeding or being less than those stated in the scope of works.

V

SPECIAL CONDITIONS OF CONTRACT

SPECIAL CONDITIONS OF CONTRACT

A. COMPLETION TIME, PROGRAMME OF WORK

1. Time for Completion

The entire project shall be completed as per the contract terms & conditions and handed over to the clients within twelve calendar months including rainy period as well. The time is the essence of the contract.

2. Programme of Work

Time being the essence of the contract the contractor shall have to follow strictly the detailed construction programme as approved by the Employer/Architect. It shall be the responsibility of the contractor to deploy equipment, engage skilled, unskilled labor and commission all his material and financial resources toensure that the progress of the work is achieved strictly according to the approved construction programme. At any stage or stage during the currency of work should there be found any slippage in achievement of progress of any activity/ activities which is/ are either in the critical path or in respect of which float time becomes is/ are either in the critical path or in respect of which float time becomes zero and come on the critical path. The contractor shall be bound to furnish the revised construction programmefor approval by the 'Employer/Architect. The contractor shall have to augment and supplement his arrangements and organization for the work in such a manner that the work gets regulated as per the approved programme. The submission and approval by the Employer/Architect of such programme(s) shall not relieve the contractor of any of his duties or responsibilities under the contract or from adheringto the construction programme. However, the extra limit for completion of programme shall not in any casebe enlarged and in the event of delay, the consequences shall follow & it will not be responsibility of employer to pay any such damage to the contractor.

3. Estimated Expenditure

The detailed programme shall also show month wise estimates of expenditure and cash flow requirements for completion of the work. Employer's liability to pay would however arise only in respect of duly certified bills submitted.

4. Rate of Progress

The whole of the materials, plant and labour to be provided by the contractor and the mode, manner and speed of execution and maintenance of works are to be of a kind and conducted in such a manner to the satisfaction of the Employer/Architect. Should the rate of progress of the works or any part thereof beat any time in the opinion of the Employer/Architect slow to ensure the completion of the whole of the works by the prescribed time or extended date for completion, the Employer/Architect shall also notify the contractor in writing and the contractor shall thereupon take such steps as be considered necessary and the Employer/Architect may approve to expedite progress so as to complete the works by the prescribed time or extended time for completion. Such approval neither shall relieve the contractor from fulfilling obligations under the contract nor will he be entitled to raise claims arising out of such approvals.

5. Extension of time:-

a) If in the opinion of the Bank the works be delayed

- by force majeure or
- by reason of any exceptionally inclement weather or
- by reason of proceedings taken or threatened by the dispute with adjoining or neighboring Banks or public authorities arising otherwise than through the Contractor's own default or

- by the works or delays of other Contractors or tradesmen engaged or nominated by the Bank or the Architect and not referred to in the Schedule of Quantities and/or Specifications or
- by reason of the Architect instructions or
- by reason of civil commotion, legal combination of strike or lock-out affecting any of the building traders or in consequence of the Contractor not having received in due time necessary instructions from the Architect for which he shall have specifically applied in writing, ahead of time, giving the Consultant reasonable time to prepare such instructions,

The Bank shall make a fair and reasonable extension of time for completion of the Contract works. In case of such strike or lock-out, the Contractor shall, as soon as may be, given written notice thereof to the Architect, but the Contractor shall nevertheless constantly use his endeavors to prevent delay and shall do all that may reasonably be required to the satisfaction of the Architect/ to proceed with the work.

The Contractor shall proactively take all practicable steps to avoid or reduce any delay in the execution and completion of the works arising out of

i) Force Majeure
ii) Exceptionally inclement weather
iii) Loss and damage by fire and earthquake
iv) Civil commotion, lockout, strike etc.
v) Delay on the part of the nominated Sub-Contractor or nominated supplier.
vi) Delay on the part of the other Contractors employed by the Bank.

Request for rescheduling of milestone of extension of time shall be made by the contractor in writing not later than fourteen days of the happening of the event causing delay the contractor shall also if practicable indicate in such a request the period for which extension is desired. Again it is to clarify that there is no provision of escalation in contract value during project execution.

5.3 In any such case the 'Employer/Architect/' may give a reasonable extension of time for completion of the work, which shall be communicated to the contractor by Employer/Architect/ in writing within 10 days of the date of receipt of such timely request by the Employer/Architect/. Any extension of completion period shall not entitle the contractor to any other monetary gain or claim. The decision of the employer on any monetary claim shall be final and binding to the contractor.

6. Liquidated Damage:-

If the contractor shall fail to complete the works within the stipulated period of completion mentioned in clause 1 herein above, the contractor shall be liable and shall pay to the employer as pre-estimated damages at the rate of one percent of the Contract price for each week of delay calculated on daily basis subject to a maximum of 10.00% (Ten percent) of the contract value. In case the non-completion is limited to certain areas of the building / items of work/ component of work etc./ which is not preventingthe Employer to occupy and use the building effectively as decided by the Employer/Architect/. Then liquidated damages shall be limited to 10.00% of the cost of the particular areas of building / items of work / Components of work etc subject to the ceiling as indicated before. The decision of the employer in this respect shall be final and binding upon the contractor.

B. SECURITY DEPOSIT

1 Security Deposit:

The security deposit shall consist of Earnest Money Deposit, Initial Security Deposit & Retention Money deducted from running bills.

The contractor agrees to deposit, within 14 days after communication of letter of intent or letter of acceptance of his tender, a further sum to make up 2% of the value of the accepted tender including the Earnest Money as Initial Security deposit failing which the Employer at his discretion may revoke theletter of Acceptance and forfeit the Earnest Money deposited along with the tender.

Besides above, Retention Money at the rate of 8% (Eight Percent only) shall also be deducted from the Running account bills of the contactor. The Retention Money shall deduct till achieving of 5% of total contract value.

50% of Security deposit shall be payable after -15- days of issuing of virtual completion certificate by the Architect subject to clearance of site by the contractor.

Subject to the completion and handing over the complete works building as per the terms & conditions of the contract well within the completion period including extension of time, the remaining security deposit after adjustment of contractor's dues/ outstanding or liquidated damages shall be released to the contractor only after the defect liability period is over.

2. Security deposit of the work as mentioned in the above shall NOT be refunded till the contractor produces a clearance certificate from the labor officer. As soon as work is virtually complete, the contractor shall apply for the clearance certificate to the labor officer under intimation to the Employer. The Employer, on receipt of the said communication shall write to the labor 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 labor 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.

C. ADVANCE

1. 1.1Mobilization advance not exceeding 10 % (Ten Percent) of the contract sum may be given to the contractor if requested against an irrevocable bank guarantee from a Schedule Bank in the prescribed format as per annexure 'B' for an amount of required advance. A simple interest rate of 15% shall be charged on the Mobilization advance. The amount of the Bank guarantee shall be the Mobilization advance plus the expected interest accrued on the amount.

1.2 That the Employer shall always have the right to encase the Bank guarantee at any stage, if the employer is convinced that the advance made to the contractor for procurement of aforementioned new machinery / equipment is not being judiciously utilized by the contractor with due diligence and urgency for the purpose for which it is intended.

1.3. Recovery of 100% of such sums shall be made from the next running bill account.
1.4(i) If the circumstances are considered reasonable by the Bank, the period mentioned in (ii) and (iii) for request by the contractor in writing for grant of mobilization advance and plant and equipment advance may be extended in the discretion of the Bank.
1.5 The said bank guarantee for advances shall initially be made for the full amount and valid for the contract period, and be kept renewed from time to time to cover the balance amount and likely period of complete recovery together with interest.

2. Secured advance:
Payments as secured advance, shall also be admissible during the course of the execution of the work, against the non-perishable materials brought to the site up to 75% value of such materials subject to the following :-
   i) That an indenture bond by the contractor in prescribed format along with vouchers or any other document indicating the value of such materials is furnished.
   ii) That the materials brought to site are in accordance with the specification in the contract and are meant for incorporation in the contract work.
   iii) That the said materials are properly stored and / or protected against damage and loss, due to any cause whatsoever to the satisfaction of Employer/Architect/. That the contractor shall be fully responsible for the custody, watch & ward of the materials at his cost & risk till the materials are utilized on this work.
   iv) That the contractor shall keep up-to-date accounts of such stores and shall put up the same any time to 'Employer/Architect/ or its Representative at once whenever asked to do so.
   v) That the contractor shall fully indemnify the Employer / client for any loss or damage to such material.

The payments made under this clause shall be adjusted as & when materials are utilized on the work. The advance against any surplus material shall be recoverable from the contractor's due.

No advance shall be made against materials like raw wood, glass, coarse & fine aggregates and perishable materials.

D. TERMINATION/ SUSPENSION OF WORKS

1. Suspension of works:

The contractor shall, on receipt of the order on writing of the Employer/Architect/ suspend the progress of works or any part thereof for such time and in such manner, as the 'Employer/Architect/ may consider necessary for any of the following reason:-

i) On account of any default on the part of the contractor or
ii) For proper execution of works or part thereof for reasons other than the default of the contractor or
iii) For the safety of the works or part thereof :

The contractor shall, during such period of suspension of work, properly protect and secure the works to extend necessary and carry out the instructions given in that behalf by the 'Employer/Architect/' diligently

If the suspension is ordered for reasons (ii) & (iii) of the clause 9 (a) above :-

i) The contractor shall be entitled to an extension of time equal to period of every such suspension plus 15% for completion of suspended work or suspended activities of the work as the case may be.
ii) If the total period of all such suspension as mentioned above , exceeds 30 days, the contractor shall in addition, be entitled to compensation as the 'Employer/Architect/ may on the basis of facts, consider reasonable, compensation in respect of salaries and / or wages paid by the contractor to his employees & labor at site actually remaining idle during the period of suspension provided the contractor furnishes daily labor reports to the 'Employer/Architect/ Representative for his verification.

If the work is suspended for reason given in sub-clause (1) of clause 10.1, the contractor shall neither be entitled to any compensation, for the period of suspension nor any extension of time: The contractor shall comply to the instructions of the 'Employer/Architect/ fully in such a manner that the default on the part of the contractor is rectified by earliest to enable the Engineer/Architect to revoke his order of suspension by earliest for resumption of work in accordance with the contract requirements.

5. TERMINATION OF CONTRACT :

Foreclosure in full or in part due to abandonment or reduction in scope of work If at any time after acceptance of the tender , Employer decides to abandon or reduce the scope of the works for any reason whatsoever and hence not require the whole or any part of the works given to be carried out , the Employer/Architect/ shall give notice in writing to that effect to the contractor and the contractor shall have no claim to any payment of compensation or otherwise whatsoever on account of any profit or advantage which he might have derived from the execution of the works in full, but which he did not derive in consequence of the foreclosure of the whole or part of the works .

The contractor shall be paid at contract rates full amounts for works executed at site and in addition a reasonable amount as certified by the Employer/Architect/ for the items hereunder mentioned which could not be utilized on the work to the full extent because of the foreclosure.

a) Any expenditure incurred on preliminary site work e.g. temporary access roads, temporary labour huts, staff quarter and site office storage accommodation and water storage tanks.

b) The employer shall have the option to take over contractor's materials or any part thereof either brought to site or of which the contractor is legally bound to accept delivery from suppliers.

i) For materials taken over to be taken over by the employer, the cost to be paid shall take into account purchase price, cost of transportation and deterioration or damage which have been caused to materials while in the custody of the contractor.

ii) For materials not retained by the Employer reasonable cost of transporting such materials from site to contractor's permanent stores or to his other works whichever is less. If materials are not transported to either of the said places, not cost of transportation shall be payable.

a) If any materials supplied by the Employer are rendered surplus the same except normal wastage shall be returned by the contractor to Employer at rates not exceeding those at which these were originally issued less allowances for any deterioration or damage which may have been caused whilst the materials were in the custody of the contractor, such materials shall be transported by him from site to the place of issue or a place other than the place of issue, if so required by the employer and in such an event he will be paid for the cost of transporting such materials from site.

b) Reasonable compensation for transfer of T & P from site to contractor's permanent stores or to his other works, whichever is less. If T & P are not transported to either of the said place no cost of transportation shall be payable.

c) Reasonable compensation for repatriation of contractor's Site staff and outside labor for any special work to the extent necessary

The contractor shall , if required by the Employer/Architect/ furnish to him books of accounts , wage books, time sheets and other relevant documents as may be necessary to enable him to certify the reasonable amount payable.

3. TERMINATION OF CONTRACT IN THE EVENT OF DEATH:

If the contractor is individual or a proprietary concern and the individual or the proprietor dies and if the contractor is a partnership concern and one of the partner dies or there is any change in the constitution of the company, then, unless the employer is satisfied that the legal representatives of the individual contractor or the properties of the proprietary concern and in case of a partnership , the surviving partners of the reconstituted company are capable of carrying out and completing the contract, the employer shall be entitled to cancel the contract, as to its uncompleted part without employer being in any way liable to payment of any compensation to the estate of the deceased contractor and/ or to the surviving partners of the contractor's firm on account of the cancellation of the contract.

The decision of the Employer that the legal representatives of the deceased contractor of the surviving partners of the contractor's firm cannot carry out and complete the contract shall be final and binding on the parties.

4. CANCELLATION OF THE CONTRACT IN FULL OR IN PART:

If the contractor:

i) at any time makes default in proceeding with the works with due diligence and continues to do so even -15- days after a notice in writing from the Employer/Architect/: or

ii) commits defaults in complying with any of the terms and conditions of the contract and does not remedy within -15- days after a notice in writing is given to him in that behalf by the Employer/Architect/: or

iii) fails to complete the works or any part of the work on or before the date of completion and does not complete them within the period specified in notice given in writing in that behalf by the Employer/Architect/: or

iv) Has obtained a contract with the employer as a result of wrong tendering or other non- bonafide methods of competitive tendering; or

v) being an individual , or a firm, any partner thereof, shall at any time be adjudged insolvent or have a Receiver appointed or order of 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 relevant act for the time being in force or make any conveying of assignment of his

creditors or purport to do or if any application be made under any relevant act for the time being in force for the administration of his estate or if a trust deed be executed by him for benefit of his creditors: or

vi being a company, shall pass a resolution or the court shall make an order for the liquidation of its affairs, or a Receiver, liquidator or manager on behalf of debenture holders shall be appointed or circumstances shall arise which entitle the court or debenture holders to appoint a Receiver or manager, which entitle the court to make a winding up order or

vii shall suffer an execution being levied on his goods and allow it to be continued for a period of 21 days or

viii assigns, transfers, sublets (engagement of labor on a piece work basis or of labor with materials not to be incorporated in the work, shall not be deemed to be subletting) or attempts to assign , transfer or sublet the entire works or any portion thereof without the prior written approval of the employer.

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.

When the contractor has made himself liable for action under any of the cases aforesaid, the engineer-inc-charge on behalf of Bank of Baroda 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 earnest money deposit, security deposit already recovered and performance guarantee under the contract shall be liable to be forfeited and shall also be absolutely at the disposal of the Bank.

b. After giving such 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.

The employer may, without prejudice to any other right or remedy which shall have accrued or shall accrue thereafter to Employer, by written notice cancel the contract as whole or only such items of work in default from the contract.

5. The Employer shall on such cancellation have powers to:

a) Take possession of the site and any materials, constructional plants, implements, stores etc there on and/or.
b) Carry out the incomplete work by any means at the risks and cost of the contractor.

On Cancellation of the contract in full or part , the Employer/Architect/ shall determine what amount, if any, is recoverable from the contractor for completion of the works or in case the works or part of the works not to be completed , the loss or damage suffered by the Employer. In determining this amount, credit shall be given to the contractor for the value of the contractor's materials taken over and incorporated in the work, and use of machinery belonging to the contractor.

Any excess expenditure incurred or to be incurred by the Employer in completing the works or part of the works or the excess loss or damage suffered or may be suffered by the employer as aforesaid after allowing such credit shall be recovered from any moneys due to the contractor on any account, and if such moneys are not sufficient, the contractor shall be called upon in writing to pay the same, within 30 days of the notice given to that effect by the 'Employer/Architect/'.

If the contractor shall fail to pay the required sum within the aforesaid period of 30 days, the Employer/Architect/ shall have the right to sell any or all the contractor's unused materials, constructional plant, implements, temporary building etc. and apply the proceeds of sale thereof towards the satisfaction of any sums due from the contractor under the contract and in accordance with the provisions thereof.

Any sums in excess of the amounts due to the employer and unsold materials constructional plant etc shall be returned to the contractor, provided always that if cost or anticipated cost of completion by the employer of the works is less than the amount which the contractor would have been paid had he completed the works, such benefit shall not accrue to the contractor.

1. The contractor shall not in any way interrupt or do any act , matter of thing to prevent or hinder such other contractors or other persons or person employed from completing and finishing or using the materials and plants for the works when the works shall be completed , or as soon as thereafter as conveniently may be, the employer shall give notice in writing to the contractor to remove his surplus materials and plants and should the contractor fail to do so within a period of -14- days after receipt by him the employer may sell the same by Public auction and shall give credit to the contractor for the amount so realized. Any expenses or losses incurred by the employer in getting the works carried out by other contractors shall be adjusted against the amount payable to the contractor by way of selling his tools and plants or due on account of work carried out by the contractor prior to engaging other contractors or against the security deposit.

6. CHANGES IN CONSTITUTION

Where the contractor is a partnership firm, the prior approval in writing of the Employer shall be obtained before any change is made in the constitution of the firm.

Where the contractor is an individual or a Hindu undivided family business concern such approval as aforesaid shall likewise be obtained before the contractor enters into any partnership agreement where under the partnership agreement where under the partnership firm would have right to carry out the work hereby undertaken by the contractor.

If prior approval as aforesaid is not obtained the contract shall be cancelled as provided for in clause 6.

E. PRIME COST / SUMS

1. PRIME COST (P.C.) SUMS

Prime cost (p.c.) sums – A prime cost sum is one that is provided to cover the cost of materials to be supplied or work to be done specialist's supplier / sub contractors only. The main contractor in such cases shall only be required to provide 'General Attendance' of 'Special attendance' or builders work (as the case may be) for which the main contractor shall quote his rates in percentage of the prime cost sum. In no case. P.C. sum shall be used for the work to be carried out by the main contractor nor main contractor shall have any right to claim to either the work to be carried out by the main contractor nor main sum or payment thereof except to the extent of payment made by him to the nominated sub contractor as per the direction & certificate of Employer/Architect/. The main contractor shall however only be entitled to the payment for builder's work, contractors general or special attendance which may be required to be done, as per the rates quoted by him which shall be applicable to the actual amount of materials supplied or work done against the P.C. sum by the nominated sub contractor / supplier etc.

Every sum in the bill of quantities which contains either in whole or part a prime cost (P.C.) sum for goods or materials or any work / sub work to be supplied or to be done by nominated specialist supplier or sub - contractor and incorporated into the works at the sole discretion of Employer/Architect/ shall be varied by substitution for the prime cost the actual price of suppliers goods services or work as the case may be paid by the contractor to the nominated sub-contractor on the direction of the Employer/Architect/ and the contract price shall be increased or decreased (as the case may be) by the amount by which the sum in the bill of quantities is increased or decreased by such substitution.

2. PROVISIONAL SUMS

A provisional sum is a lump sum provision made in the bill of quantities for the cost of unforeseen work and of work, the extent of which cannot be estimated fairly or accurately at the time of tenders or the part or whole of the work not specified in detail when the contract ids entered into. The work against the provisional sum shall be carried out by the main contractor either in the rates offered by him at the time of tenders or the same shall be derived by analysis on the basis of some standard analysis of rates items give in the bill of quantities: or as per actual expenditure plus fifteen percent as the client may decide, which shall be final & binding upon the contractor, without having claim or choice to any particular method. A

provisional sum (P.S.) shall not be subjected to any separate profit, charges on account of builder's work. Or contractor's general or special attendance as the rates of work to be done against Provisional Sum shall be deemed to have included all those considerations. The contract price shall however be adjusted according to the increase or decrease of the actual work done and paid for against any provisional sum.

3. Nominated Sub-Contractors Objection to Nomination

All specialists , sub-contractors , merchants, trade men and others executing any work or supplying any goods for which primer cost sums are included in the bill of quantities who may have been or be nominated or selected or approved by the Employer/Architect/ and all persons to whom by virtue of the provisions of the bill of quantities or specification the contractor is required to sublet any work shall in execution of such work or the supply of such goods be determined to sub-contractor employed by the contractor and are hereinafter referred to as nominated sub-contractors provided always that the contractor shall not be required by the Employer/Architect/ be deemed to be under any obligation to employ any nominated sub-contractor who shall decline to enter into a sub contract with the contractor containing provisions :

a) That in respect of the work or goods the subject of the sub-contract the nominated sub-contractor will undertake towards the contractor the like obligation and liabilities as are imposed upon the contractor towards the employer by the terms of contract and will save harmless and indemnify the contractor from all claims, demands, proceedings, damages, costs, charges and expenses whatsoever arising out of or in obligations or to fulfill such liabilities and

b) That the nominated sub-contractor will save harmless and indemnify the contractor from and against any negligence by the nominated sub contractor , his agents, workmen and servants and from and against any misuse by him or them or any constructional plant or Temporary works provided by the contractor for the purpose of the contract and from claims as aforesaid.

4. Payments to Nominated Sub- Contractor

Before issuing under clause 20 hereof any certificate which includes any payment in respect of work done or goods supplied by any nominated sub-contractor, the Employer/Architect/ shall be entitled to demand from the contractor reasonable proof that all payments (less retentions) included in previous certificates in respect of the work or goods of such nominated sub-contractor have been paid or discharged by the contractor in default whereof unless the contractor shall

(a) inform the Employer/Architect/ in writing that he has reasonable cause for withholding or refusing to make such payment and

(b) Produce to the Employer/Architect/ reasonable proof that he has so informed such nominated sub-contractor in writing.

The employer shall be entitled to pay to such nominated sub contractor direct upon the certificate of the Architect/ all payments (less retentions) which the contractor has failed to make to such nominated sub-contractor and to deduct by way of set off the amount so paid by the employer from any sums due or which become due from the employer to the contractor. Provided always that where the Architect/ has certified and the employer has paid direct further certificate in favor of the contractor deduct from the amount thereof the amount so paid direct , as aforesaid but shall not withhold or delay the issue of the certificate itself when due to be issued under the terms of the contract.

5. Final Payment to Nominated Sub-Contractors

If the Employer/Architect/ desires to secure final payment to any nominated sub-contractor before final payment is due to the contractor and if such sub-contractors has satisfactorily indemnified the contractor against any latent defects then the Employer/Architect/ may in a certificate under clause 20 of these conditions include an amount to cover the said final payments and thereupon the contractor shall pay to such sub-contractor , the amount so certified and the limit or retention money named in the Appendix to the tender shall be reduced in proportion to the amount so certified and the contractor shall

be discharged from all liability for the work or materials covered by such certificates except for any latent defects.

F. CERTIFICATE & PAYMENTS

1. Unless otherwise provided payment shall be made at monthly intervals as & when required by contractor for value specified in accordance with the conditions set out below.

2. The contractor shall submit to the Employer/Architect/ after the end of each month or as and when required by contractor for value specified in appendix as interim bill comprising statement of bill showing the estimated contract value of the permanent work supported with all requisite statements, calculation of quantities & valuation based on measurement of works, executed up to the end of the preceding month (if such value as stated in the Appendix to form of tender shall justify the issue of an interim certificate) and the contractor will be paid monthly on the certificate of the Architect/, the amount due to him on account of the estimated value of the permanent work executed utpo the end of the previous month together with such amount (if any) as the Employer/Architect/ may consider proper on account of materials for permanent work delivered by the contractor on the site and in addition such amount as the Employer/Architect/ may consider fair and reasonable for any temporary works for which separate amounts are provided in the bill of quantities subject to :

(a) a retention of the percentage named in the tender until the amount retained shall reach the 'Limit of retention money' named in the Appendix to the form of tender (hereinafter called "the retention money")
(b) Partial recovery of any advance payment.
(c) Any sums which are due & payable to the employer by the contract under the terms of contract.
(d) Any previous payments made by the employer to the contractor under the terms of the contract provided always that no interim certificate shall be issued for a sum less than the minimum interim certificate as stated in the Appendix to the form of tender.

The contractor shall submit his final bill substantiated with complete supporting documents as required by the Architect, showing the account of all works as executed by him in details, the quantities and value of work done in accordance with contract, within 90 days of date of completion of all works as certified by the Architect.

The Employer shall pay the net amount, if due, after all recoveries and deductions within 90 days of receipt of certificate from the Engineer/Architect.

3. over **- Payments & Under - Payments**

Whenever any claim for the payment of a sum of money to the Employer arises out of or under this contract against the contractor, the same may be deducted by the Employer from any sum then due or which at any time thereafter may become due to the contractor under this contract & from his security deposits; or he shall pay the claim on demand.

In the event of the above mentioned sources of recovery being insufficient to cover the claimed amount or amounts , the Employer shall be entitled to withhold and have a lien to retain to the extent of such claimed amount or amounts in excess of the recoveries possible from this contract, from any sum or sums found payable or which at any time thereafter may become payable to the contractor under any other contract or contracts that the contractor may have with the Employer , pending finalization or adjudication of such claimed amount/or amounts.

It is an agree term of the contract that the contractor will have no claim for interest or damages whatsoever on any account in respect of the amount or amounts recovered, withheld or retained under the lien referred to above and duly ratified as such to the contractor, in case the contractor invokes arbitration or resorts to adjudicate for settlement of such sum or sums of money recovered or withheld or retained in lien by the Employer.

For the purpose of this clause where a contractor is a partnership firm or limited company the Employer shall be entitled to recover or withhold and also have a lien to retain towards such claimed amount in whole or in part from and sum found payable to any partner/Director of a limited company as the case may

be, whether in his individual capacity or otherwise under this contract or other contracts as the case may be.

Employer reserves the right to carry out post-payment audit and technical examination of the work & final bill including all supporting vouchers, abstracts, etc. Employer further reserves the right to claim recovery of any over-payment as and when detected, non withstanding the fact that the amount of the final bill may be including by one of the parties as an item, of dispute before an arbitrator appointed under clause 25 hereunder and notwithstanding the fact that the amount of the final bill figures in the arbitration award.

If as a result of such audit and technical examination any over payment is discovered in respect of any work done by the contractor under the contract, it shall be recovered by the employer from the contractor by any or all of the methods prescribed above or if any underpayment is discovered the amount shall be duly paid to the contractor by the employer.

G. MEASUREMENTS

1. Typographical Mistakes

Any typographical mistakes/ errors / omissions in the spelling / grammar or description in any of the tender documents shall be subject to correction by the Employer/Architect/ in the overall spirit of the intended contract, general contracting procedures and practices or as per standard course of Engineering/Architecture practice. The Architects clarifications regarding partially omitted particulars or typographical or clerical errors shall be final and binding on the Contractor.

2. Method of Measurements: -

a) Measurements shall be taken in accordance with the method stipulated in the specification. In case it is not stated the following shall be the method of measurements:

i) As per Indian Standard method of measurements, SP 27 - Handbook of method of measurement of building works.

ii) The measurement for certificate of payment shall be as described in mode of payment.

iii) IS-1200 Latest Revision

b) Quantity Surveying: -

The Contractor will himself undertake the quantity surveying work and submit his bills supported by reconciliation statements as directed. In case he fails to submit his bills in proper order, the Employer reserves for himself the right to employ an expert who will also be employed, if the bills stated by the Contractor show inaccuracies frequently indicating that the Contractor is not capable of taking the required measurements and producing a proper bill. The Contractor (or the expert) will make the measurements on the basis of the drawings. The billing procedure and formats shall be as approved by the Architect/. The payment for this expert shall be made by the Employer, and the amount shall be deducted from the Contractors Bill.

Unless otherwise mentioned elsewhere in the tender, measurement will be on the net quantities or work produced in accordance with up to date rules laid down by the Indian Standards Institution. In the event of any dispute with regard to the measurement of the work executed, the decision of the Architect / Employer shall be final and binding on the Contractor.

3. MEASUREMENT OF WORK

The Contractor will record weekly and submit measurements for verification and endorsement of the Employer/Architect/. The Employer/Architect/ shall from time to time intimate to the contractor that he requires the work to be measured, and the Contractor shall forthwith attend or send a qualified agent to assist the Employer/Architect/ or the Employer/Architect/ representative in taking such measurements and calculations and to furnish all particulars or to give all assistance required by either of them.

Should the Contractor not attend or neglect or omit to send such Agent then the measurement taken by the Architect/Employer or their representative shall be taken to be the correct measurement of the work. The Contractor or his Agents may at the time of measurement take such notes and measurement as may be required. All authorized extra work, omissions and all variations made without the Employer/Architect/ knowledge, if subsequently sanctioned by him in writing, with the approval of the Employer shall be included in such measurements. The final measurement should be done within three months from the date of completion of work jointly by the Architect/Employer and/or his representative. If the Contractor fails to comply, the measurements taken by the Employer/Architect/ will be final.

4. METHOD OF MEASUREMENT

Contractor to Verify Site Measurements:

a) The Contractor shall check and verify all site measurements whenever requested by other specialists, Contractors or by nominated or other subcontractor to enable them to prepare their own shop drawings and pass on the information with sufficient promptness as will not in any way delay the works. A copy of all such information passed on shall be given to the Architect/Employer.

b) Measurement to be recorded before work is covered up:

The contractor shall take joint measurements with the Employer/Architect/ before covering up or otherwise placing beyond the reach of measurement any item of work. Should the contractor neglect to do so, the same will 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. No claim for interim bill payment will be entertained unless the bill is accompanied
with detailed measurements.

H. CONTRACOTRS LIABILITY AND INSURANCE

From commencement to completion of the works, the contractor shall take full responsibility for the care thereof and for taking precautions to prevent loss or damage and to minimize loss or damage to the greatest extent possible and shall be fully responsible / liable for any damage or loss that may happen to the works or any part thereof to any fixed / unfixed materials supplied at sit against which payment or recoverable advance may have been paid or not, from any cause whatsoever (save and except the excepted risk) and shall at his own cost, repair & make good the same so that at completion , the works shall be in good order and condition and in conformity in every respect with the requirements of the contract and instructions of the Employer/Architect/.

Without limiting his obligations and responsibilities under the above clause, the contractor shall insure the following in the joint names of the employer and the contractor, against all loss or damages from whatever cause (other than the expected risks) for which he is responsible under the terms of contract and in such manner that the employer and the contractor are covered during the period of construction of the works and the defects liability period for loss or damage caused by the contractor in course of any operation carried out by him for the purpose of complying with his obligations.

(a) The works and the temporary works to the full values such works executed from time to time.

(b) The materials, constructions plant and other things brought to site by the contractor to the full value of such materials, constructional plant and other things.

2. DAMAGE TO PERSONS AND PROPERTY

The contractor shall indemnify and keep indemnified the employer against all losses and claims for injuries or damage to any person or property whatsoever which may arise out of or in consequence of the construction and maintenance of the works and against all claims, demands, proceedings, damages, costs, charges & expenses whatsoever in respect of or in relation thereto, PROVIDED always that nothing herein contained shall be deemed to render the contractor liable for or in respect of or to indemnify the employer against any compensation or damage 'Excepted Risks'.

Before commencing execution of the work, the contractor shall , without in any way limiting his obligations and responsibilities under the conditions, insure against any damage , loss or injury which may occur to any property (excluding that of the employer) or to any person (including any employee of employer) by arising our of carrying our of the contract.

3. EMPLOYER TO BE INDEMNIFIED

The contractor shall at all times indemnify the employer against all claims, damages or compensation under the provision of Payment of wages Act, minimum wages act, employer's liability act, Industrial Disputes Act and the Maternity benefit act or any modifications thereof or any other law relating thereto and rules made there under from time to time or as a consequences of any accident or injury to any workmen or other persons in or about the works whether in the employment of the contractor or not save and where such accident or injury has resulted from any act of the Employer their agents or servants , and also against all costs, charges and expenses of any suit action or proceedings arising out of such accident or injury and against all sum or sums which may with the consent of the contractor be paid to compromise or compound any such claim without limiting his obligations and liabilities as above provided the contractor shall insure against all claims, damage or compensation payable under the workmen's compensation act 1923 or any modification thereof or any other law relating thereto

All the aforesaid insurance policies shall provide that they shall not be cancelled till the Employer/Architect/ has agreed to their cancellation.

The contractor shall prove to the Employer/Architect/ or his authorized representatives from time to time that he has taken out all the insurance policies referred to above and have paid the necessary premium for keeping the policies alive till the expiry of the defects liability period.

The contractor shall ensure that the similar insurance policies are taken out by his sub – contractors (if any) and shall be responsible for any claims or losses to Employer resulting from their failure to obtain adequate insurance protection in connection thereof. The contractor shall produce or cause to be produced by his sub –contractors (if any) as the case may be, the relevant policy or policies and premium receipt as and when required by the Employer/Architect/.

4. REMEDY ON CONTRACTOR'S FAILURE TO INSURE

If the contractor and / or his sub-contractor (if any) shall fail to effect and keep in force the insurance referred to above or any other insurance which he/they may be required to effect under the terms of the contract , then in any such case Employer may without being bound to effect and keep in force such insurance and pay such premium or premia as may be necessary for that purpose and from time to time deduct the amount so paid by the employer from any moneys due or which may become due to the contractor or recover the same as a debt from the contractor.

5. INSURANCE COMPANY SHOULD BE APPROVED

All insurances to be affected by the contractor and / or his sub-contractor (if any) shall be taken out only with the insurance company or companies approved by the employer and this approval to any particular insurance company shall not be unreasonably withheld.

6. EXCEPTED RISKS

The contractor shall be under no liability whatsoever whether by way of indemnity or otherwise for in respect of destruction of or damage to the works (save to work condemned or rejected under the provision of contract prior to the occurrence of any excepted risk hereinafter mentioned) or Temporary works or to property whether of the Employer or third parties or for /or in respect of injury or loss of life which is the consequence whether direct or indirect of war hostilities
(Whether war be declared or not) invasion, act of foreign enemies , rebellion , revolution, insurrection or military or super power civil war and / or riot , commotion or disorder otherwise than among the contractor's/ Sub contractor own employees (hereinafter compressively referred to as " the said expected risks" and the employer shall indemnify and save harmless the contractor against and from the same and against from all claims, demands , proceedings , damages costs charges and expense whatsoever arising

there out or in connection therewith and shall compensate the contractor for any loss of or damage to property of the contractor used or intended to be used for the purpose of the works (including property in transit to the site) and occasioned either directly or indirectly by the said excepted risks.

7. DAMAGE TO WORKS BY EXCEPTED RISKS

If the works or temporary works or any materials (whether for the former or the latter) brought to site shall sustain destruction or damage by reasons of any of the said excepted risks, the contractor shall be entitled to payment for any permanent or temporary works and for any materials so destroyed or damaged and / or shall be paid by the employer the cost of making good such materials so far as may be necessary for the completion of the works on a prime costs basis as the Employer/Architect/ may certify to be reasonable.

PROJECTILE, MISSILE ETC

Destruction, damage, injury or loss caused by the explosion or impact whenever and wherever occurring of any mine, bomb, shell, grenade or other projectile, missile or ammunition or explosive or war shall be deemed to be a consequence of the said excepted risks.

8. CONCEALED WORK

The Contractor shall give due notice to the Employer/Architect whenever any work is to be buried in the earth, concrete or in the bodies, walls or otherwise becoming inaccessible later on in order that the work may be inspected and correct dimensions taken before such burial, in default whereof the same shall, at the opinion of the Employer/Architect be either opened up for measurement at the Contractor's expense or no payment may be made for such materials. Should any dispute or difference arise after the execution of any work as to measurements etc. or other matters which cannot be conveniently tested or checked, the decision of the Employer/Architect shall be accepted as correct and binding on the Contractor.

9. FIRST-AID FACILITIES

The Contractor shall at his own expense arrange to ensure availability of medical attendance promptly when necessary. He shall provide properly equipped first-air station, in charge of qualified persons at suitable location within easy reach of the workmen and staff. The Contractor shall also provide for transport of serious cases to the nearest Hospital. The Contractor shall be responsible for any liability which may be excluded from the policies referred in Clause 37, 38, etc and also for all other damages to any person, animal or property arising out or incidental to the negligence or defective carrying out of this contract. He shall also indemnify the Employer in respect of any cost, charges or expenses arising out of any claims or proceedings and also in respect of any award of compensations and damages arising there from.

The Employer shall with the concurrence of the Architect/ be entitled to deduct the amount of any damage, compensation, cost charges and expenses arising from or occurring from, or in respect of, any such claims or damages from any or all sums due or become due to the Contractor without prejudice to the Employer's other rights in respect thereof.

10. FIRE FIGHTING ARRANGEMENTS

The Contractor shall at his own expenses provide at suitable, prominent and easily accessible places requisite number of fire extinguishers and buckets- some filled with sand and some with water.

11. INCOME TAX/GST ON WORKS CONTRACT

Statutory deduction on account of Income Tax/GST on works contract and other taxes legally payable by the contractor shall be made from all interim and final payments as per extant statute.

12. LAND FOR CONTRACTORS ESTABLISHEMENT

For the purpose of construction of Contractor's store-yard, go-downs, site office, etc. the Contractor's may utilize with permission of the Employer / Architect, portion of the land belonging to the employer if available at such location as would not interfere with the execution of the work. The Contractor shall for this purpose submit to the Employer/Architect/ for his approval a plant or plans of the proposed layouts

for the site facilities. The Employer/Architect/ reserves the right to modify the contractor's proposal as he may deem fit.

13. WATER

The rates quoted by the Contractor shall include all expenditure for providing all the water for the full contract period required for the work, including that for the work people and all staff on the site. He shall make his own arrangement for the supply of good quality water. He shall obtain municipal connection or any other connection, and all charges for connection and consumption shall be borne by him. If municipal water is not available or inadequate, he shall make other arrangements like sinking tube wells or making bore wells if allowed or permitted, or transport from outside by tanker or any other suitable means entirely at his cost and no separate payment for the same will be made. All permissions for the same and payments for the same shall be done by the Contractor.

14. POWER

The Contractor shall at his own cost arrange for necessary power for construction and lighting for the entire period of contract. If however, separable power is available in the premises, the Contractor shall make his own arrangement to obtain necessary connections, maintain efficient service of electric lights and power and shall pay for all the requisite charges for the same. The Employer, as well as the Architect shall give all the recommendations necessary to obtain power and water connections from the concerned authorities, but the responsibility for obtaining the same shall rest with the Contractor.

If any other Contractor, appointed by the employer, is required to use water and power, he shall be allowed to use the same and make temporary connections from the supply arranged by the main Contractor at rates and terms that may be mutually agreed upon by both, failing which, at rates, terms and conditions that may be decided by the Employer/Architect/.

I. COMPLETION / LIASONING

1. COMPLETION / LIASONING CERTIFICATE

From the time of award of the Contract, the Contractor shall liaison with Urban Improvement Trust / Development Authority, Sawai Madhopur / Nagar Nigam Sawai Madhopur, Fire Services/ Forest Department or any and all other statutory bodies to obtain the permission to commence the work, permission to continue the work, permissions for electrical connections water supply connections/sewerage disposal connections/ permission for cutting of trees, if any, any other permissions required to start, continue, complete and occupy the premises requirements / and the Contractor shall also get the Completion Certificate and Occupancy Certificate from the Competent Authority. All matters pertaining to any and all statutory agencies pertaining in any way / manner to the construction of the building / its services / its access / etc. shall be dealt by the Contractor.

All the fees paid to the above agencies shall be reimbursed by the Bank against proper bills / receipts / vouchers / etc. but no extra payment other than the fees deposited / paid to the said agencies shall be made. The final bill of the Contractor shall not be settled until all such approvals are obtained.

All necessary efforts to get the Completion Certificates / Occupancy Certificates shall be made by the Contractor – and the firm shall be solely responsible for obtaining the same. If any deviations are made in the plans / approved drawings due to any reasons whatsoever, the Contractor shall liaison with concerned Authority to get them approved at the same terms and conditions as mentioned above. All technical help in the form of drawings etc. shall be made available to the Contractor by the Employer through its Architects/.

J. DISPUTES

1. SETTLEMENT OF DISPUTES

2. EXCEPTED MATTERS:

If the disputes or differences pertain to the under noted maters (called excepted matters), the decision of Zonal Manager, Bank of Baroda Zonal office, rajasthan Region, jaipur shall be final, conclusive and binding on the parties, No arbitration shall arise in such matters except either by mutual agreement or under the directions of a competent Court:

i) Instruction
ii) Transactions with local authorities
iii) Proof of quality of materials
iv) Assigning or under letting of the contract.
v) Certificate as to the cause of delay on the part of the Contractor and justifying extension of time.
vi) Rectification of defects pointed out during the defects liability period.
vii) Notice to the contractor to the effect that he is not proceeding with due diligence.
viii) Certificate that the contractor has abandoned the contract.
ix) Notice of determination of the contract by the Employer.
Decision, opinion certificate or evaluation of the Employer/Architect/ with respect of or any of the matter regarding which the decision of the Employer/Architect/ is stated to be as final or conclusive or binding in these conditions of the contract or specifications or in the bill of quantities forming part of the contract

If any dispute or difference of any kind whatsoever shall arise between the Architect and the contractor in connection with or arising out of the contractor on the carrying out of works (whether during the progress of the works or after their completion and whether before or after termination, abandonment or breach of contract) it shall be referred to the employer. The decision of the competent authority of the employer in this regard is the final & binding to the contractor.

If any dispute or difference barring excepted matters as above of any kind whatsoever shall arise between the employer and the contractor in connection with or arising out of the contract or the carrying out of works (whether during the progress of the works or after their completion and whether before or after termination, abandonment or breach of contract) it shall in the first place be referred to the Employer/Architect/ who within a period of 90 days after being requested by either party to do, shall under intimation to the contractor give his decision in writing to the employer for approval and onward transmission to the contractor for their acceptance.

If the Employer/Architect/ has given written notice of his decision to the contractor and no claim to arbitration has been communicated to him by the contractor, within a period of 90 days from receipt of such notice, the said decision shall remain final & binding upon the contractor.

If the Employer shall fail to give his decision in writing as aforesaid within a period of 90 days after being requested as aforesaid or if the contractor be dissatisfied with the decision of the employer then and in such case either the contractor may within 90 days after expiration of the first named period of 90 days require that the matters in dispute be referred in writing to the employer, further seeking their decision on the matter and if the employer fail to give his decision in writing as aforesaid within a period of 30 days after being requested as aforesaid by contractor , or if the contractor be dissatisfied with any such decision of the employer , then in such case either the employer or the contractor may within 90 days after the expiration of the second named period of 30 days after being requested as aforesaid by contractor or if the contractor be dissatisfied with any such decision of the employer then in such case either the employer or the contractor may within 90 days after the expiration of the second named period of 30 days require that the matter or matters in dispute be referred to arbitration as herein under provided.

2. Work not to be stopped

The contractor expressly agrees that the event there arise any kind of dispute / disputes or the matter of dispute / disputes is referred to arbitration, the contractor shall at no stage stop or slow down the work on this excuse and shall proceed diligently to complete and hand over all works as per contract within the scheduled completion period.

3. ARBITRATION

All matters in dispute other than “expected matter “ as stated in clause 24 between the parties arising out of these presents shall be referred to the sole arbitrator to be appointed by the Zonal Manager , Bank

The cost of arbitration to the reference and award respectively shall be at the discretion of the Arbitrator and the amount thereof shall be shared between the parties and the arbitrator shall direct by whom and to whom and in what matter same shall be born & paid. This submission shall be deemed to be submission to Arbitration within the meaning of Arbitration & Conciliation Act 1996, in force or any statutory modification thereof.

K. SAFETY CODE

1. Safety Provisions:

The Contractor shall comply with all the precautions as required for the safety of the workmen by the I.L.O. Convention No. 62 as far as they are applicable to the Contract. The Contractor shall provide all necessary safety appliances, gears like goggles, helmets, masks, etc. to the workmen and the staff.

A. SCAFFOLDS

i) Suitable scaffolds shall be provided for workmen for all works that cannot safely be done from the ground, or from solid construction except in the case of short duration work which can be done safely from ladders. When a ladder is used, it shall be of rigid construction made either of good quality of wood or steel. The steps shall have a minimum width of 450mm and a maximum rise of 300 mm. Suitable hand holds of good quality wood or steel shall be provided and the

ii) Scaffolding or staging more than 4m. above the ground floor, swung or suspended from an overhead support or erected with stationary support shall have a guard rail properly bolted, braced or otherwise secured, at least 1 m. above the floor or platform of such scaffolding or staging and extending along the entire length of he outside and ends thereof with only such openings 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.

iii) Working platforms, gangways and stairways shall be so constructed that they do not sag unduly or unequally and if the height of the platform, gangway or stairway is more than 4 m. above ground level or floor level, they shall be closely boarded and shall have adequate width and be suitably fenced as described in (ii) above.

iv) Every opening in the floor of a building or in a working platform shall be provided with suitable means to prevent the fall of persons or materials by providing suitable fencing or railing whose minimum height shall be 1m. Wherever there are open excavations in ground, they shall be fenced of by suitable railing and danger signals installed at night so as to prevent persons slipping into the excavations.

v) Safe means of access shall be provided to all working places. Every ladder shall be securely fixed. No portable single ladder shall be over 9m. in length while the width between side rails in rung ladder shall in no case, be less than 290mm. for ladder up to and including 3m. in length. For longer ladders this width shall be increased at least 20mm for each additional meter of length.

vi) A sketch of the ladders and scaffolds proposed to be used shall be prepared and approval of the Engineer obtained prior to construction.

2. OTHER SAFETY MEASURES

i) All personnel of the contractor working within the plant site shall be provided with safety helmets. All welders shall wear welding goggles while doing welding work and all metal workers shall be provided with safety gloves. Persons employed on metal cutting and grinding shall wear safety glasses.

ii) Adequate precautions shall be taken to prevent danger from electrical equipment. No materials on any of the sites of work shall be so stacked or placed as to cause danger or inconvenience to any person or the public.

3. EXCAVATION & TRENCHING

i) All trenches, 1.25m. or more in depth shall at all times be supplied with at least one ladder for each 30m. in length or fraction thereof. The ladder shall be extended from bottoms of the trench to at least 1m. above the surface of the ground. Sides of trenches which are 1.5m 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 1.5m 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.

ii) The contractor shall take all measures on the site of the work to protect the public from accidents and shall be bound to bear the expenses of defense of every suit, action or other proceedings at law that may be brought by any persons for injury sustained owing to neglect of the above precautions and to pay any such persons or which may with the consent of the contractor, be paid to compromise any claim by any such person.

4. DEMOLITION

1) Before any demolition work is commenced and also during the process of the work:

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

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

c) All practical steps shall be taken to prevent danger to persons employed from the 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.

5. PERSONAL SAFETY EQUIPMENTS

i) All necessary personal safety equipment as considered adequate by the site Engineer / 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.

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

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

iv) Those engaged in welding works shall be provided with welder's protective eye sight lids.

v) Stone breakers shall be provided with protective goggles and protective clothing and seated at sufficiently safe intervals.

vi) When workers are employed in sewers and manholes, which are in use, the contractor shall ensure that the manhole covers are opened and are ventilated at least for an hour before the workers are allowed to get into 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.

vii) The contractor shall not employ men below the age of 18 years and women on the work of painting with products containing lead or any toxic material in any form. Wherever men above the age of 18 are employed on the work of such painting the following precautions should be taken:

viii) No paint containing lead or lead products shall be used except in the form of paste or ready made paint. Paints like vinyl and epoxies having toxic fumes should be applied after following all precautions laid down by manufacturers.

ix) 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 dry rubbed and scrapped.

x) Overalls shall be supplied by the contractor to the workmen and adequate facilities shall be provided to enable the working painters to wash during the cessation of work.

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

6. HOISTING MACHINES

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

a) These shall be of good mechanical constructions sound material and adequate strength and free from patent defect and shall be kept in good repair and in good working order.

b) Every rope used in hoisting or lowering materials or as 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 shall 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 shovel 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. Conditions 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 site Engineer/. As regards contractor's machines, the contractor shall notify the safe working load of the machine to the whenever he brings any machinery to site of work and get it verified by the concerned.

a) 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 of the risk of any part of a suspended load becoming accidentally displaced. When workers are employed on electrical installations which are already energized, insulated mats, wearing apparel, such as gloves, sleeves and boots as may be necessary, should be provided. The workers should not wear any rings, watches and carry keys or other materials which are good conductors of electricity.

b) 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.

c) 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.

d) 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, Engineers of the Department or their representatives.

e) Not withstanding the above clause from (i) to (xviii), 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.

L. MODEL RULE FOR THE PROTECTION OF HEALTH & SANITARY ARRANGEMENTS FOR WORKERS

1. DEFINITION

a. 'Work place' means a place at which at an average 50 workers is employed in connection with construction work.

b. 'Large Work Place' means a place at which average 500 or more workers are employed in connection with construction work.

2. FIRST AID

a. At every work place, they shall maintain in readily accessible place first aid appliance including an adequate supply of sterilized dressings and sterilized cotton wool. The appliance shall be kept in good order and in large work place they shall be placed under the charge of a responsible person who shall be readily available during working hours.

b. At large work places, where hospital facilities are not available within easy distance of the works, first aid posts shall be established and be run by a trained compounder.

c. Where large work places, are remote from regular hospitals, an indoor ward shall be provided with one bed for every 250 employees.

d. Where large works are situated in cities, towns in their suburbs and no beds are considered necessary owing to the proximity of city or town hospitals, suitable transport shall be provided to facilitate removal of urgent cases to the hospitals. At other work places, some conveyance facilities, such as car, shall be kept readily available to take injured person or persons suddenly taken ill to the nearest hospital.

3. DRINKING WATER

In every work place, there shall be provided and maintained at suitable places easily accessible to labour sufficient supply cold water fit for drinking. 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. Every water supply of storage shall be at a distance of not less than 15 M, from any latrine, drain or other source of pollution where water has to be drawn from an existing well which is within 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 water proof. 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.

4. WASHING & BATHING PLACES

a. Adequate washing & bathing places shall be provided separately for men and women.
b. Such places shall be kept in a clean & drained condition.

5. SCALE OF ACCOMODATION IN LATRINES & URINALS

There shall be provided within the precincts of every work place latrines and urinals in an accessible place, and the accommodation, separately for each of them shall not be less than the following scale:

No. of seats

a.	Where the number of person does not exceed 50	-2 persons
b.	Where the number of persons exceeds 50 but does not exceed 100	-3 persons
c.	For every additional 100	- 3 persons

In particular cases, the Employer/Architect/ shall have the powers to vary scale where necessary.

6. LATRINES & URINALS FOR WOMEN

If women are employed, separate latrines & urinals screened from those for men and marked in the vernacular in conspicuous letters 'For Women only' shall be provided on the scale laid in Rule 6. Those for men shall be similarly marked 'For Men only' a poster showing the figure of a man and a woman shall also be exhibited at the entrance of latrines for the respective sex. There shall be adequate supply of water close to the urinals & latrines.

7. LATRINES & URINALS

All latrines shall be provided with septic tank or leach pits in case of small units. All the latrines shall be kept in good sanitary condition.

8. CONSTRUCTION OF LATRINES

The inside walls shall be constructed of masonry or some suitable heat resisting non –absorbent materials and shall be cement washed inside and outside at least once a year. The dates of cement washing shall be noted in a register maintained for this purpose and kept available for inspection. Latrines will not be a standard lower than bore-hole system and should have thatched roofs.

9. DISPOSAL FOR EXCRETA

Unless otherwise arranged for by the local sanitary authority, arrangements for proper disposal of excreta shall be made by septic tank or leach pit duly approved by the Employer/Architect/ and in conformity with the requirements of local public health authorities.

10. PROVISION OF SHELTER DURING REST

At every work place there shall be provided free of cost , two suitable sheds, one for meal and the other for rest separately for men and women for the use of labor. The height of the shelter shall not be less than 3.5M from the floor level, to the lowest part of the roof. The sheds should be roofed with at least thatch and mud flooring will be provided with a dwarf wall around not less than 750mm. Sheds should be kept clean and the space should be on the basis of at least 0.50 square meters per head.

11. CRECHES

a. At every work place, at which 50 or ,or women workers are ordinarily employed , there shall be provided two huts for the use of children under the age of 6 years belonging to such women, one hut shall be used for infants , games and play and the other as their bed room. The huts shall not be constructed on a lower standard than the following.

   i. Thatched roofs
   ii. Mud floors and walls
   iii. Planks spread over the mud floor and covered with matting.

   The huts shall be provided with suitable and sufficient openings for light and ventilation there shall be adequate provision of sweepers to keep the place clean. There shall be two daises in attendance. Sanitary utensils shall be provided to the satisfaction of the Health Officer of the area concerned. The use of the hut shall be restricted to children, their attendants and mothers of the children.

b. Where the number of women workers is more than 25 but less than 50, the contractor shall provide at least one hut and one 'Dai' to look after the children of women workers.

c. The size of crèche or crèches shall very according to the number of women workers.

d. The crèche or crèches shall be properly maintained and necessary equipment like toys etc shall be provided.

12. CANTEEN

Cooked food canteen on a moderate scale shall be provided for the benefit of workers wherever ot is considered expedient.

13. ANTI MALARIAL PRECAUTIONS

The contractor at his expenses conforms to all anti malarial instructions given by the Engineers/ Architect from time to time.

13. In addition to the above, the contractor is also responsible to comply all the Bank guidelines amended time to time in respect of model rules for protection of health & sanitary arrangement for workers employed at work places.

M. LABOR LAW

1. Engagement of labor and labor Regulations

The contractor shall comply with all the provisions of the minimum wages act, 1948, and contract labor (Regulation and Abolition act, 1970, amended from time to time and rules framed there under and other labor laws affecting contract labor that may be brought into force from time to time.

i) The contractor shall employ labour in sufficient numbers either directly or through sub -contractors to maintain the required rate of progress and of quality to ensure workmanship of the degree specified in the contract and to the satisfaction of the Employer/Architect/.

ii) The contractor shall not employ, in connection with the works, any person who has not completed his fourteenth year of age.

iii) The contractor shall furnish to the Employer/Architect/ fortnightly distribution return of the number and description by trades of work, people employed on the works.

iv) The contractor shall also submit on the 4th and 19th of every month to the Employer/Architect/ a true statement showing in respect of the second half of the preceding month and the first half of the current month (1) the accidents that may have occurred, if any, during the said fortnight showing the circumstances under which they happened and the extent of damage and injury caused by them and (2) the number of female workers who have been allowed Maternity Benefit as provided in the Maternity Benefit Act or Rules made there under and the amount paid to them. It is made clear that all liabilities on these account shall be of the contractor and the employer shall have no concern whatsoever in respect of any accident claim or benefits to female labor engaged by the contractor.(3) The number of laborers employed by him on the work
(4) their working hours (5) The wages paid to them.

v) The contractor shall pay to the labor, employed by him either directly or through sub- contractors , wages not less than fair wages as defined in the contractor's labor Regulations or as provided under the labor laws.

vi) The contractor shall, in respect of labour employed by him either directly or through sub - contractors, comply with or cause to be compiled with the contractor's labour regulations in regard to all matters provided therein or under minimum wages Act as provided in the act.

vii) The contractor shall comply with the provision of the latest payment of wages Act, Minimum wages Act, Employer's Liability Act, Workmen's compensation Act, Industrial Disputes Act and the Maternity Benefit Act, the contract labour (Regulation and Abolition) Act, or any modifications thereof or any other law relating thereto and rules made there under from time to time.

viii) The decision of the Employer/Architect/ in matters relating to the reports from the inspecting officers, shall be final and binding and deductions for recovery of any liquidated damages in this respect may be made from any amount payable to the contractor.

ix) Observance by Sub-Contractors

The contractor shall be responsible for the observance by sub contractors employed by him in the execution of this contract of the provisions hereof and applicable laws, rules & regulations.

x) Returns of Labour, etc.

The contractor shall deliver to the Architect/ representative or at his office a return in detail in such form and at such intervals as the Architect/ may prescribe showing the supervisory staff and the numbers of the several classes of skilled and unskilled labour from time to time employed by the contractor on the site and such information respecting constructional plant as the Architect/ representative may require.

2. CONTRACTORS LABOUR RULES – REGULATION

Labour Rules:

The Contractor shall at all times during the continuance of the Contract, comply fully with all existing Acts, regulations and bylaws including all statutory amendments and re-enactment of State or Central Bank and other local authorities and any other enactments, notifications and acts that may be passed in future either by the State or the Central Bank or local authority, including Indian Workmen's Compensation Act. Contract Labour (Regulation and Abolition) Act 1970 and Equal Remuneration Act 1976, Factories Act, Minimum Wages Act, Provident Fund Regulations, Employees Provident Fund Act, schemes made under the same Act and also Labour Regulations as revised Health and Sanitary Arrangement for Workmen, Insurance and other benefits and shall keep Employer indemnified in case any action is commenced by competent authorities for contravention by the Contractor. If the Employer is caused to pay or reimburse, such amounts as may be necessary to cause or observe, or for non-observance of the provisions stipulated henceforth on the part of the Contractor, the Architect/Employer shall have the right to deduct from any money due to the Contractor, his amount of Performance Security or recover from the Contractor personally any sum required or estimated to be required for making good the loss or damage suffered by the Employer, responsibility in connection with the employees of the contractor, who shall, in no case, be treated as the employees of the Employer at any point of time.

Fair Wages:

The Contractor shall pay the laborers engaged by him on the work not less than fair wage which expression shall mean, whether for time of piecework, the respective rates of wages fixed by the local authorities as fair wages for the area payable to the different categories of laborers or those notified under the Minimum Wages Act for corresponding employees of the Employer, whichever may be higher.

The Contractor shall, notwithstanding the provisions of a contract to the contrary, cause to be paid a fair wage to labourers indirectly engaged on the Works, including any labour engaged by sub/contractors in connection with the said works as if the labourers had been directly employed by him.

Notices:

The Contractor shall before he commences the work, display, and correctly maintain in a clean and legible condition at a conspicuous place on the Site, notices in English and in a language spoken by the majority of the workers, stating therein the rate of wages which have been fixed as fair wages and the hours of work for which such wages are earned and send a copy of such notices to the Architect/.

Record of wages etc.

The contractor shall maintain records of wages and other remuneration paid to his employees in such form as may be convenient and as per the requirements of the / Employer/ Architect and the Conciliation Officer (central), Ministry of Labour Bank of India, or such other authorized person appointed by the centralor State Bank and the same shall include the following particulars of each worker:

Name, worker's number and grade;
Rate of daily or monthly wage;
Nature of work on which employed;
Total number of days worked during each wage period;
Total, amount payable for the work during each wage period; All deductions made from the wagewith details in each case of the ground for which the deduction is made;

Wage actually paid for each wage period.
The Contractor shall provide a Wage Slip for each worker, employed on the Works.
The Wage records and Wage Slips shall be preserved for at least 12 months after the last entry for Inspection of Wage Records.

The Contractor shall allow inspection of the aforesaid Wage Records and Wage Slips to the Architect/ and to any of his workers or to his agent at a convenient time and place after due notice is received, or to the Employer or any other person authorized by him on his behalf.
The Employer/Architect or any other person authorized by them on their behalf shall have power to make enquiries with a view to ascertaining and enforcing due and proper observance of the Fair Wages Clause. He shall also have the Power to investigate into any complaint regarding any default made by the Contractor or subcontractor in regard to such provision.

2.4.11 No party shall be represented by a legal practitioner in any investigation or inquiry under this Clause, unless Employer/Architect/ agree otherwise.

ANNEXURE – I

PROFORMA OF APPLICATION FOR REGISTRATION OF ESTABLISHMENT EMPLOYING CONTRACT LABOUR

1. Name and location of the establishment
2. Postal address of the establishment.
3. Full Name and address of the Principal Employer
4. Full name and address of the manager or the person responsible for the supervision and control of the establishment.
5. Nature of work carried on in the establishment
6. Particulars of contractors and contract labour
    a. Names and address of the contractors
    b. Nature of work in which contract labour is employed or is to be employed
    c. Maximum number of contract labour to be employed on any day through each contractor.
    d. Estimated date of commencement of each contract work under contractor.
    e. Estimated date of termination of employment of contract labour under each contractor
7. Particulars of treasury receipt enclosed. (Name of the treasury, amount and date)

I hereby declare that the particulars given above are true to the best of my knowledge and belief.

Principal Employer Seal and Stamp

ANNEXURE – II

PROFORMA OF REGISTER OF CONTRACTORS

1. Name and Addresses of the Principal Employer _____
2. Name and address of the establishment _____

Sr. No..	Name and address of the contractor	Nature of work on contract	Location of contract work	Period From	Contract To	Maximum Number of workmen employed by the contractor

ANNEXURE – III

PROFORMA OF NOTICE OF COMMENCEMENT/ COMPLETION OF CONTRACT WORK

1. Name and Principal employer & address
2. No. and date of certificate of registration
3. I /we hereby intimate that the contract work_____(Name of work) given to_____(Name and address of the Contractor) having License No. _____ dated _____ has commenced/ has been completed with effect from _____ (date)/ on _____(date).

Signature of the Principal
Employer

The Inspector,
_____
_____
_____

ANNEXURE – IV

PROFORMA OF CONCRETE CUBE TEST REPORT

1) Name of the Project _____
2) Name of the Contractor _____

Sr. No.	Date of Casting	Identification Mark and location in which the representative concrete is placed	Mix proportion	Date of testing	Crushing strength as on the date of test.
1.	2.	3.	4.	5.	6.

Crushing strength as on the 28th day	Average crushing strength (average of 3 companion cubes) as on the 28th day	Remarks	Signature of the Contractor
7.	8.	9.	10.

ARCHITECT **CONTRACTOR** **BANK**

ANNEXURE – V

PROFORMA OF MEASUREMENT BOOK

1st Page

BANK OF BARODA

_____office

Measurement Book No.

(Pages 1 to_____)

This book is issued to Shri _____

Signature of_____of Bank of Baroda

Certified that this book contains_____pages

Signature of the official
to whom the book is issued

ANNEXURE – VI

MEASUREMENT BOOK

Item. No.	Description	Measurements			Unit	Quantity	Remarks
		L	B	D/H			
			`				

Contractors **Architects** **Bank**

Checking / Test checking Engineer

Date of Checking/ Test Checking

ANNEXURE – VII

RUNNING A/C BILL

1. Name of Contractor / Agency
2. Name of work
3. Sr. No. of this bill
4. No. and date of previous bill
5. Reference to Agreement No.
6. Date of written order to commence
7. Date of completion as per agreement

Sr. No.	Item Description	Unit	Rate (Rs.)	As per Tender
1	2	3	4	5

Up to previous R/A. Bill Qty. Amount (Rs.)	Up to date (Gross) Qty Amount (Rs.)	Present Bill Qty. Amount (Rs.)	Remarks
6.	7.	8.	9.

Note: 1) If part rate is allowed for any item, it should be Indicated with reasons for allowing such a rate

2) If adhoc payment is made, it should be Mentioned specifically

Contractor Architect Bank

ANNEXURE – VIII

ACCOUNT OF SECURED ADVANCE, IF ADMISSIBLE ON MATERIALS HELD AT SITE BY THE CONTRACTOR

No.	Item	Quantity	Unit	Amount	Remarks
1	2	3	4	5	6

Total value of material at site

Secured Advance @_____% of the above value

CERTIFIED (i) that the materials mentioned above have actually been brought by the Contractors to the site of the work and no advance on any quantity of any of this item is outstanding on their security, (ii) that the materials are of imperishable nature and are all required by the contractors for use in the work in connection with the items for which rates of finished work have been agreed upon.

Dated signature of Contractors

Dated signature of

Dated signature of Bank's Architects

(Name of the)

_____

(Name of the Architects)

ANNEXURE – IX (R.A. BILL CERTIFICATE)

The measurements on the basis of which the above entries for the running bill no_____were made have been taken jointly on_____and are recorded at pages _____ to_____of measurement book No. _____

_____
Signature and date of Contractor

_____
Signature and date of
Architect Representative

The work recorded in the above mentioned measurements has been done at the site satisfactory as per tender drawings, conditions and specification.

PROFORMA OF UNDERTAKING IN CONNECTION WITH PAYMENTS OF ADVANCE ON MATERIALS BROUGHT BY THE CONTRACTORS TO THE SITE

The undertaking made this _____ day of _____ 20 _____ between the Bank of Baroda _____ and having its _____ office at (hereinafter called the Employer) of the one part and_____(hereinafter called the Contractors of the other part).

The Employer and the Contractors have entered into an Agreement dated_____hereinafter called as the said agreement and in terms of clause no._____of the conditions in the agreement, the Employer has agreed that the Contractors will be paid an advance of 75 % of the cost of non-perishable building materials brought by the Contractor to the site for consumption in the works at the discretion of the Employer.

The Contractors have applied to the Employer that they are allowed advances on the security of materials absolutely belonging to them and brought by them to the site of work. The Employer has agreed to do so on the terms and hereinafter set out.

Not this Letter of Undertaking witnesses that in consideration of the said agreement and in consideration of the amount paid/ payable to the Contractors by the Employer and/or any further advances as may be made to the Contractors as aforesaid, the Contractors hereby agree with the Employer and undertake as under:

i) The amount advanced by the Employer to the Contractors as aforesaid and all or any further sum or sums advanced as aforesaid shall be employed by the Contractors in or towards expediting the execution of the said works and for no other purpose whatsoever.

ii) That the materials which have been offered to and accepted by the Employer as security are absolutely the Contractors own property and free from encumbrances of any kind and the Contractor will not make any application for or receive a further advance on the security of materials which are not absolutely his own property and free from encumbrances of any kind and the Contractors indemnify the Employer against all claims to any materials in respect of which an advance has been made to them as aforesaid.

iii) That the materials on the security of which any further advance or advances may hereafter be made as aforesaid (hereinafter called the said materials) shall be used by the Contractors solely in the execution of the said works in accordance with the directions of_____of the Employer and accordance with the terms of the said agreement.

iv) That the contractors shall take their own cost all the necessary and adequate arrangement for the proper watch, safe custody and protection against all risks of the site of the said works in the contractors custody and on their own responsibility and shall at all times be open to inspection to the Employer's Engineers or any Officer authorized by the Employer. In the event of the materials or any part thereof being stolen, destroyed or damaged, the Contractors will further replace the same with other materials of like quality or repair and make good the same as required by the Employer.

v) That the said materials shall not on any account be removed from the site of the said works except with the written permission of the _____of Bank of Baroda.

vi) That the advances shall be repayable in full when or before the Contractors receive payment from the Employer of the price payable to them for the said works under the terms and the provisions of the said agreement provided that if any intermediate payments are made to the Contractors on account of work done, then on occasion of each such payment, the Employer will be at liberty to make a recovery from the Contractors bill for such payment by deducting there from the value of the said materials then actually used in the construction and in respect of which recovery has not been made previously, the value for this purpose being determined in respect of each description of materials at the rates at which the amount of the advances made under these presents were calculated.

vii) That if the Contractors shall at any time make any default in the performances or observance in any respect of any of the terms and provisions of the said agreement or of these presents, the total amount of advance or advances that may still be owing to the Employer, shall immediately on the happening of such default be repayable by the Contractors to the Employer together with interest thereon at 12 % per annum from the date or respective dates of such advance or advances to the date of repayment and with all costs, charges, damages and expenses incurred by the Employer in or for the recovery thereof or the enforcement of this security or otherwise by reason of the default of the Contractors and the Contractors hereby covenant and agree with the Employer to repay and pay the same respectively to him accordingly.

viii) That the Contractors hereby charge all the said materials with the repayment to the Employer of the sum or sums advanced as aforesaid and all costs, charges, damages and expenses payable under these presents PROVIDED ALWAYS and it is hereby agreed and declared that notwithstanding anything in the said agreement and without prejudice to the powers contained therein if and whenever the covenant for payment and repayment hereinabove contained shall become enforceable and the money owing shall not be paid in accordance therewith, the Employer may at any time thereafter adopt all or any of the following courses as he may deem best:

a) Seize and utilize the said materials or any part thereof in the completion of the said works on behalf of the Contractors in accordance with the provisions in that behalf contained in the said agreement debiting the Contractors with the actual cost of effecting such completion and the amount due in respect of advances under these presents and crediting the Contractors with the value of work done as if he had carried it out in accordance with the said agreement and at the rates thereby provided. If the balance is against the Contractors, they are bound to pay the same to the Employer on demand.

b) Remove and sell by public auction the seized materials or any part thereof and out of the moneys arising from the sale, retain all the sums aforesaid repayable or payable to the Employer under these presents and pay over the surplus (if any) to the Contractor.

c) Deduct all or any part of the money owing out of the Security Deposits or any sum due to the Contractor under the said agreement.

x) That except in the event of such default on the part of the Contractors as aforesaid, no interest shall be payable on the said advance.

xi) That in the event on any conflict between the provisions of these presents and the said agreement, the provisions of these presents shall prevail and in the event of any dispute or difference arising over the construction of effect of these presents the settlement of which has not been herein before expressly provided for the same shall be referred to Zonal Manager, Bank of Baroda zonal office Jaipur, whose decision shall be final and no appeal shall lie against his decision before any court, arbitrator or authority.

xii) The provision of this Undertaking shall be deemed to be supplemental to the said agreement.IN WITNESS WHEREOF the Contractors have set their hands to these presents the day and year first hereinabove written.

Signed, sealed and delivered by the said Contractors in the presence of

Witness: Signature
Name
Address

ANNEXURE – X

PROFORMA OF CERTIFICATE OF PAYMENT BY ARCHITECT/

Certificate No. Interim /	Dated	
	Project Particulars:	
Contractor:	Contract / Letter No.	Dated:
	Contract's Bill No.	Dated:

This is to certify that the amount given below (*) is due to your contractors for the work done by them and / or against materials delivered at site and/or for advance towards contract on the above referred project.

Advance against contract:

Less: Advance adjusted to date

Balance Advance

Advance against material delivered at site

Amount of work done to date

Total

Less: Retention on work done

Less: Previously certified up to

Present Certificate (*)

Rupees _____

Necessary Deduction U/S 194C of the Income Tax 1961/ TDS, GST /Work Contract Tax may be made before paying the above certified amount.

Remarks, if any

(P.T.O.) the details of insurance policy are given in the next page.

Enclosures: Bill Signature of Architect Signature of

ANNEXURE – XI

PROFORMA OF HINDRANCE REGISTER

Name of the work : Date of state of work:

Name of Contractor : Period of Completion:

Agreement No. : Date of completion:

Sr. No.	Nature of Hindrance	Date of occurrence of hindrance	Date of which hindrance was removed	Period of hindrance	Signature of Architect	Signature of	Remarks
1	2	3	4	5	6	7	8

Contractor Architect Bank

PROFORMA FOR APPLICATION FOR EXTENSION OF TIME PERIOD (ANNEXURE – XII)

1. Name of Contractor :

2. Name of the work as given in the agreement :

3. Agreement no. :

4. Estimated tender amount :

5. Date of commencement of work as per agreement :

6. Date of completion stipulated in agreement :

7. Period for which extension of time has been given Previously :

a. Ist extension vide Architect's//Bank letter

No. Dated Months Days

b. 2nd extension vide Architect's // Bank's letter :

No. Dated Months Days

c. 3rd extension vide Architect's // Bank's letter

No. Dated Months Days

d. 4th extension vide Architect's // Bank's letter No.

Dated Months Days

Total extension previously given :

8. Reason for which extension have been previously Given (Copies of the previous application should be attached). :

9. Period for which extension is applied for :

10. Hindrances on account of which extension is Applied for with dates on which hindrances occurred And the period for which these are likely to last:

a. Serial No. :

b. Nature of hindrance :

c. Date of Occurrence :

d. Period for which it is likely to last :

e. Period for which extension required for this particular hindrance :

f. Overlapping period if any, with Reference to item (e) above :

g. Net extension applied for :

h. Remarks, if any :

11. Extension of time required for extra work :

12. Details of extra work and the amount involved :

a. Total value of extra work :
b. Proportionate period of extensionOf time on estimated amount put to tender. :

13. Total extension of time required for 11 & 12 :

Submitted to the Architect / Bank/_____

Dated **Signature of Contractor**

FORMAT OF GUARANTEE TO BE EXECUTED BY THE FIRM/ CONTRACTOR IN RESPECT OF THE WORK OF PRE-CONSTRUCTION ANTI-TERMITE TREATMENT(ANNEXURE – XIII)

This agreement made this_____day of_____two thousand_____between_____ having its Head Office at _____(herein after called "the Employer") of the one part and _____(herein after called "the Guarantor") of the other part.

WHEREAS THIS AGREEMENT is supplementary to a contract (hereinafter called the contract dated__and made between the Employer of the one part and the Guarantor of the other part) whereby the Firm / Contractor inter alia undertook to render the building / structure completely free from any infestation of termites. And whereas the Guarantor agreed to give guarantee to the effect that the said building / structure shall remain free from any infestation of termites for a minimum period of ten years from the date of completion of pre-construction anti-termite treatment earned out as per the relevant I.S.Code.

Now the Guarantor hereby agrees to make god all defects and render the building / structure free from any infestation of termites, during this period of guarantee and to the satisfaction of the Employer. The Guarantor also agrees to take up such rectification work at his own cost, and within one week from the date of issue of notice from the Employer, calling upon him to rectify the defects. The decision of the employer as to the cost payable by the Guarantor will be final and binding, in case the Guarantor fails to commence the work as per above notice and the work is got done through some other contractor. That if the Guarantor fails to execute the pre-construction anti-termite treatment or commits breach there under then the Guarantor will indemnify the principal and his successors against all loss, damage caused, expense or otherwise which may be incurred by him by any reason of any default on the part of the Guarantor in performance and observance of this agreement. As to the amount of loss and/or damage and/or cost incurred by the Employer the decision of the Employer will be final and binding.

In witness where of these presents have been executed by the obligator_____and by_____ and for on behalf of the Employer on the ay. Month and year first above written.

Signed, and delivered by _____ by the hands of Shri_____in the presence of _____

Signed and delivered by the hand of_____in the presence of_____

FORM OF GUARANTEE IN RESPECT OF WATER PROOFING WORKS(Annexure-XIV)

The Agreement made this .....day of .....two thousand and _____

between ..... (hereinafter called the Guarantor of the one part) and the Zonal Manager, Bank of Baroda, Zonal Office, Jaipur (hereinafter called the other part.)

WHEREAS THIS agreement is supplementary to a contract (hereinafter called the Contract), dated ..... and made between the GUARANTOR OF THE ONE part and

BANK OF BARODA other part, where by the /Contractor, interalia, undertook to render the buildings and structures in the said contract recited completely water and leak-proof.

AND WHEREAS THE GUARANTOR agreed to give a guarantee to the effect that the said structures will remain water and leak-proof for 10 years from the date giving of water proofing treatment.

NOW THE GUARANTOR hereby guarantees that water proofing treatment given by him will render the structure completely lick-proof and the minimum life of such water proofing treatment shall be 10 years to be reckoned from the date after the maintenance period 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 for such purpose.

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

(b) Alteration shall mean construction of any additional work by removing the water proofing treatment in parts.

(c) The decision of the Architect 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 render the building water proof to the satisfaction of the Architect at him cost and shall commence the work for such rectification within seven days from the date of issue of the notice from the Architect calling upon him to rectify the defects failing which the work shall be got done by the owner by some other contractor at the GUARANTOR'S cost and risk. The decision of the Architect 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 there under, then the Guarantor will indemnify the Principal and his successors against al lose, 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 cost incurred by the Owner the decision of the Architect will be final and biding on the parties.

IN WITNESS WHERE OF these presents have been executed by the obligator_____and by_____and for on behalf of the Dy. General Manager, Bank of Baroda on the day, month and year first above written.

SIGNED, SEALED AND delivered by OBLIGOR in the presence of----------

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3 SIGNED FOR AND ON BEHALF OF THE BANK OF BARODA BY ……. in the presence of_____

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GENERAL SPECIFICATIONS

1. The entire work shall be carried out as per relevant latest CPWD specifications with up to date correction slips up to the date of opening of tender unless otherwise specified in the nomenclature of individual item or in the additional specifications.

2. However in the event of any discrepancy in the description of any item as given in the schedule of quantities or additional specifications appended with the tender and the specifications relating to the relevant item as per CPWD specifications sanctioned above.

3. For the item not covered under CPWD specifications mentioned above, the work shall be executed as per latest relevant standards / codes published by B.I.S. (formerly I.S.I.) inclusive of all amendments – issued thereto or revision thereof , if any, up to the date of receipt of tenders.

4. In case B.I.S. codes/ specifications are not available, the decision of the Architect/ /Engineer–in-Charge based on acceptable sound engineering practice and local usage shall be final and binding on the contractor.

5. Any cement slurry added over base surface (or) for continuation of concreting for bond is added, its cost is deemed to have in built in the item unless otherwise / exp stated and nothing extra shall be payable or extra cement considered with consumption on this account.

6. The rate for all items in which the use of cement is involved is inclusive of charges for curing

7. The particular specifications/ nomenclature of the individual items in the BOQ shall take precedence over the latest C.P.W.D. specifications along with the updated correction slips.

8. For items not covered under the particular specifications and the latest C.P.W.D. specifications, the work shall be done as per the latest relevant IS code of practice.

9. For items not covered under the specifications mentioned in pares 1 to 2 above, the work shall be done as per sound engineering practices and as directed by the Engineer-in-Charge whose decision in this regard shall be final and binding on contractor.

10. **Equivalency of standards and codes**: Whenever reference is made in the Contract to specific standards and codes to be met by the goods and materials to be furnished and work performed or tested , the provisions of the latest current edition or revision of the relevant standards and codes in effect shall apply, unless or otherwise expressly stated in the Contract. When the standards and codes are national or relate to a particular region, other authoritative standards that ensure a substantially equal or higher quality than the standards and codes specified will be accepted subject to the Architect/Bank's prior review and written consent.

11. **Sample approval**: To determine the acceptable make, brand, manufacture & quality of materials and workmanship, the contractor shall get the samples approved by the Architect/ Engineer-in-Charge, well in advance of actual execution, to enable adequate time for inspection and testing, if required. The approved samples shall be kept in the custody of the Engineer in Charge at no extra cost to the employer and shall become guiding samples for the execution of that particular item of work. Work not conforming to the approved samples shall be rejected. Rates quoted for the items shall include for such preliminary work and shall not be paid for separately.

12. **Approved makes:** The contractor shall generally use the brands of materials specified in the list of approved makes. However, the contractor will be bound to use a particular brand specified in the list,

if so instructed b y the Architect/ Engineer-in-Charge. For any items not covered in the list of approved makes the contractor shall follow the instructions of Architect/ Engineer-in-Charge.

13. **Test and test certificates**: The contractor shall be and remain liable at his own cost to conduct tests all tests at all relevant times during supply, erection and installation of any works, structure, material or component as shall be required in terms of the contract documents or by the Architect/ Engineer-in-charge. All samples for testing shall be drawn by Bank / Architect / and testing to be done under their presence.

14. **Field Test** :The contractor shall set up a field laboratory at the work site per all the necessary field tests required for day to day quality control. Contractor shall arrange necessary equipment for conducting tests for slump, sieve analysis, silt, moisture contents, organic impurities and any other tests that may be required by the Engineer-in-Charge. The cost of installing the testing laboratory will be deemed to be included in the relevant items of work and nothing extra shall be payable on this account.

15. **Testing and commissioning**: The contractor shall furnish all labor and install all materials, applications, equipments (Except those supplied by the owner at site) necessary for the complete provision and testing of all installations (Such as electrical, plumbing and other installations) specified herein and shown on the drawings. This also included any material, appliances, equipment not specifically mentioned herein or noted on the drawings but which are necessary and customary to make complete installation with all the systems properly connected and in working condition. The work shall include all incidental jobs connected with the installations such as in excavation trenches and backfilling , cutting / drilling and grouting for fixing of fixtures , equipments etc.

16. **Fees and Permits**: The contractor shall obtain and pay for any permits required for the installation of the work. The owner shall arrange only for payment of security deposits and charges for getting necessary service connections. The contractor shall obtain and deliver to the owner certificates of final inspection and approval by the local or other authorities.

17. **Shop Drawings** : The contractor shall prepare and submit for the approval of the Architect, detailed shop drawings for various works such as Aluminums glazing, Structural glazing , Electrical works including all distribution panels, switch boards, cabinets, special pull boxes etc. Plumbing works including pumps, pedestals, motors, etc. and any other item as directed by the Architect/ Engineer-in-charge.

18. **Mode of measurements**: Mode of measurements for all the works shall be strictly in accordance with the detailed specifications of C.P.W.D. / Current Indian Standard method of measurement. The decision of Employer/Architect/ shall be final.

TECHNICAL SPECIFICATIONS

GENERAL:

1. These specification shall be read in conjunction with the latest, specification .in case this specification are found wanting in any way the relevant C.P.W.D. Specification shall apply.

2. **MATERIALS TO BE APPROVED /BEST QUALITY:**

   The whole of the materials, employed in connection with the permanent work, shall be new and the best of its kind. All materials shall be in accordance with these specifications and shall be as approved by the Architect.

3. **STANDARDS:**

   Except where otherwise specified and permitted by the Architect, all shall materials shall confirm to the latest edition of Indian standard specification.

4. **All:**

   Specialized work such as Termite treatment, Metal doors and windows, tiling, roof insulation, water and damp proofing, structural steel work, glazing, dropped ceiling, painting, and rendering, road work, all plumbing, sanitary and electrical work, fittings and fixtures and horticulture work etc. shall be got done/fabricated erected/installed by approved specialized agencies.

TECHNICAL SPECIFICATION - FOR CIVIL AND STRUCTURAL

1. EARTHWORK

General:

Excavation, Backfilling and Leveling. Excavation shall confirm to the limits indicated on the drawings and shall not be made below the levels fixed by the Architects or Consulting Engineer except where rock is encountered or for removal of unstable materials is required and any additional coast for additional offset shall be borne by the contractor. Unless otherwise specified provision for shoring, pumping, dredging and bailing out water whether subsoil or rain water shall be at the contractors own expense. Rock excavation shall include removal of ledge rock, concrete or masonry structures which required drilling or blasting and boulders larger than half cubic yard in volume where trenches are in deep or bad grounds, the sides of the trenches shall be supported with suitable timbering. Trenches shall be backfilled in selected excavated materials in 8" layer and carefully rammed and consolidated with addition of water if required, and compacted to 95% of maximum density at optimum moisture content to preclude subsequent settlement.

INDIAN STANDARDS

All relevant Standards as specified elsewhere in this Volume are applicable. Indian Standards to be followed are:

1)	IS 1498	Classification and identification of soils for general Engineering purpose.
2)	IS 3764	Safety code for excavation Work.
3)	IS 4081	Safety code for blasting and related drilling operation.
4)	IS 6313	Part-1 Code of practice for anti-termite measures in buildings: constructional measures. Part-2 Code of practice for anti-termite measures in buildings: Pre constructional chemical treatment measures.
5)	SP 27	Hand book of method of measurement of buildings works.
6)		Explosive Rules 1940.

SITE CLEARANCE

Prior to the start of any activity of earth work the area under construction shall be cleared of shrubs,vegetation, grass, brushwood, trees and saplings of girth up to 30cm measured at a height of 1 metre above

ground level All rubbish must be removed and stacked at distance of 50 cm outside the periphery of the area clearance or location as decided by the Architect.

The rate of such clearance is to be included in the rate of other earth-work items.

SETTING OUT

Bench Marks and Reference Lines shall be finalized by the Site Engineer. The contractor shall prepare detailed setting out drawings based on the layout of Architectural drawings and those shall be submitted to the Architect prior to commencement of work.

The contractor shall do the setting out with the use of Theodolite or like instruments at site, based on details given to him. He shall erect timber profiles, masonry pillars, burjis etc. for his use. All markings on these shall be painted with red colour and they shall be maintained for the entire duration of the project. Setting out shall be approved by the Architect before the commencement of any work.

The rate for the earth work items shall include expenses for all such work including labour, material and equipment / instruments etc,

EXCAVATION IN SOILS

Excavation over area

Excavation exceeding 1 m in width as well as 10 sq. in plan and 30 cm in depth shall be considered as excavation over area.

Surface dressing

Trimming of natural ground, excavated surfaces and filled up areas to remove vegetation and / or small inequality not exceeding 15 cm in depth shall be described as surface dressing.

Rough excavation

Excavation not requiring dressing of sides and bottom and reduction to exact levels, such as winning earth from borrow pits, hill side cuttings, etc, shall be described as rough excavation.

Surface excavation

Excavation exceeding 1 m in width as well as 10 Sq mtr on plan but not exceeding 30 Cm in depth shall be considered as surface excavation.

Trenches for pipes / cables

It shall be detailed with nominal dia of pipe / cable. Required bottom width, allowance for concrete foundation for laying pipes, working area, grip required for socketed pipe, return fill, ramming and removal

of surplus soil shall be part of this item unless otherwise specified. It shall generally be measured in running meter unless otherwise noted in the BOQ.

Post holes

Independent post holes (or similar holes) each exceeding 0-5 Cum Shall generally be- enumerated. Rate shall include return fill, ramming and removal of surplus soil.

General

The excavated earth shall be thrown or disposed off beyond 50 m periphery of the building Earth suitable for backfilling shall be stacked separately.

Subsequent disposal of the surplus and unsuitable material shall be as per the respective items. Foundations, trenches shall be dug out to the exact dimensions as shown in the drawing or as directed by the Architect,

In firm soil, the sides of the trench shall be kept vertical up to a depth of 2 m. If the trench is to be deeper, if shall be in the form of steps of 50 cm, at every 2 m depth This shall be suitably increased or decreased as per site conditions and type of soil met with This shall be to the approval of the Architect. Sloping of sides also may be adopted.

The bed of trenches shall be firmly consolidated and leveled by watering and ramming of the soft soil. Defective spots shall be dug out and filled with concrete of the same mix as of PCC or as directed by the Architect, Cost of digging and filling with concrete shall be paid extra if excavation and PCC is measured separately.

If excavation is done to a depth greater than that required, excess depth shall be back filled with the same mix as of PCC or as directed. Cost of such concrete shall be to the contractor's account.

Excavated trenches shall have to be approved by the Architect prior to lying of PCC or any other Permanent Work

Excavation for drains shall be carried out with extra care to cut the sides and bottom exactly to the required shape, slope and gradient. Filling for excess excavation shall be done at the contractor's cost in consultation with the Architect.

Excavated materials shall not be placed within 1 m of the edge of the trench or half the depth of the trench, whichever is more.

1.4.7.7 Excavations for column footings shall be carried to depths indicated in the drawings. Safe bearing capacity at such depth shall be verified to comply design requirements. If ordered by the Architect, appropriate tests shall be carried out by the contractor.

Protection.

Fencing and / or other suitable measures for protection against risk of accidents due to open excavation shall be provided by the contractor at his cost.

Where excavation is to be carried out below the foundation level of an adjacent structure, and to avoid underpinning, precautions such as shoring and strutting, etc must be taken. No excavation should start till such measures are taken to the satisfaction of the Architect. Payments for such work shall not be made separately unless specified otherwise.

EXCAVATION SOFT ROCK

This shall be carried out by crowbars, pickaxes or pneumatic drills or any other suitable means. Blasting may be permitted if the contractor so desires but no extra money shall be paid for blasting. Measurement shall be in cubic meter.

Other general details same as clause 4.7 and its sub clauses.

EXCAVATION IN HARD ROCK

General

On meeting hard rock that requires blasting, the contractor shall inform the Architect. On approval in writing, blasting operation shall start if the contractor feels it necessary and so desires.

The contractor shall obtain the necessary license from the District Authorities for undertaking blasting work and explosive storing as per Explosive Rules 1940, and as updated. Explosive shall only be procured from an authorized dealer. He shall be responsible for the safe custody and proper accounting of explosives. The Bank/Architect/ shall have access to the store.

The contractor shall be responsible for any accident to those working on the site, to the public or to property due to blasting operations,

Measurements shall be in cubic meter by stacking rock and applying predetermined deduction for voids.

Precautions

Safety measures to be adhered to shall be as detailed in IS 4081, Safety Code of Blasting (as amended from time to time, and to related drilling operations). Also digest No. 37 of C.R.C. and I.R.C.A. Road tariff No 18 shall be adhered to.

Blasting operation shall be earned out under the supervision of a responsible authorized agent of the contractor. Timings shall be as approved by the Architect in writing Lunch break will be preferred. The

authorized agent of the contractor should be well conversant with the rules and regulations of blasting operations. Further the contractor shall be employing licensed blasters for actual operation.

All proper precaution for safety shall be taken. All persons shall be moved away to a distance not less than 200m. All entries shall be sealed and red flags displayed at prominent places.

Blasting shall be done only with gunpowder. Dynamite, gelignite, or any other high explosive shall be used only with written permission of the Architect.

The number of charges to be fired and the actual number of shots heard shall be counted and the contractor's agent shall satisfy himself by examining that all charges have exploded. Only then shall workmen be allowed to start work. Unexploded charges shall be flooded with water, a new hole drilled and exploded again.

The Architect shall be informed about all misfires, their causes and the remedial steps taken.

CLASSIFICAITON

All soils comprising any of the following;

a) Vegetable or organic soil, turf, sand, silt, loam clay, mud, peat, black cotton soil, soft shale or loose *murrum*.

b) Any mixture of soils (a)

c) Mud concrete below ground level.

d) Generally any material which yields to the ordinary application of a pickaxe and shovel or to *phawra,* rake or other ordinary digging implement and not affording resistance to digging greater than mentioned in (a) to (c}

e) Stiff heavy clay, hard shale, or compacted murrum requiring close application or a grafting tool or pick or both and shovel

f) Gravel and cobblestone (cobblestone is a rock fragment), usually rounded, having maximum dia in one direction of 75-300 mm.

Soft rock comprising any of the following.

a) Soling of roads, paths etc and hard core.

b) Macadam surfaces of any description, (water bound, grouted, tarmac, etc)

c) Lime concrete, stone masonry, in lime mortar and brick work in lime or cement mortar, below ground level.

d) Soft conglomerate, where the stones may be detached from the metric with picks, crow which may be quarried our split with a crowbar.

e) Limestone, sandstone, laterite, hard conglomerate or other soft or disintegrated rock which may be quarried or split with a crowbar.

f) Unreinforced cement concrete which may be broken up with crowbars or pickaxes and stone masonry in cement mortar, below ground level.

g) Boulders nor requiring blasting, rock fragments usually rounded by weathering, disintegration and exfoliation or abrasion water or ice, having maximum dia length in any direction of 500 mm, found loose, embedded etc.

h) Other varieties of rock which would normally be removed with pick, crowbars, wedges and hammer with only a little difficulty.

Hard rock comprising any of the following

Any rock or cement concrete in excavation for which the use of mechanical equipment or blasting is required.

Reinforced cement concrete.

Boulders bigger than % cubic meter requiring blasting.

Hard rock as in (a) to (c) requiring blasting but prohibited from doing so for any reason and excavation has to be carried out by chiseling, wedging or any other agreed method.

FILLING

Filling shall be done where required with approved quality of earth- It may be from excavation and where possible, cutting and filling shall be done simultaneously to avoid double handling.

Filling shall be done in layers not exceeding 20 cm in depth. Earth used shall be free from roots, grass and rubbish and all lumps and clods exceeding 8 cm in any direction shall be broken down. Each layer shall be watered with optimum moisture content to achieve 90% consolidation. Consolidation shall be done by mechanical rammers or roller of minimum half-ton weight. Where the roller cannot work, wooden or steel rammers of seven to ten kg weight with flat base of 20 Sq.cm or 20 cm dia should be used. Labour for ramming shall be at least 1 for every 6 diggers. In embankment or banking, every third layer of earth shall be rolled and consolidated with power roller of minimum eight ton weight.

PLANKING AND STRUTTING

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

DISPOSAL OF SURPLUS EARTH

Surplus earth shall be used to the maximum extent in the compound. Earth useful for filling shall be separately stacked as directed by the Architect from time to time. Approved quality earth shall e used in the filling. It shall be consolidated as detailed and approved by the Architect.

Rate for excavation shall include sorting out of useful materials.

Alt surplus and unusable earth shall be disposed off outside the plot but at a location approved by local authority and confirming to their specification. The constructor shall quote his rate for disposing off or carting away the items considering requirements and

Standards of the local authority with whose permission surplus and unusable earth shall have to be disposed off.

DEWATERING

Bailing or pumping out of water that may have accumulated due to rains, subsoil seepage, tidal waves, or any other means shall be carried on continuously and the area shall be kept dry for the following operations.

a) Measurements
b) Concreting or masonry work
c) Shuttering and reinforcement
d) Backfilling
e) Line out
f) Any other reason deemed fit by the Bank/Architect/.

SAND FILLING

The sand shall be free from any organic and deleterious materials as detailed in BIS It should be suitable for compaction. Filling shall be in layers of 15 to 20 cm. Watered with optimum moisture content and mechanical rammers. Measurement shall be for compacted volume in cubic meters.

MEASURMENT

The following shall not be measured separately and allowance for the same shall be deemed to have been made in description of the main item.

b) Setting outworks, erecting profiles, etc.

c) Site clearance such as clearing of shrubs, brushwood, small trees not exceeding 30cm in girth measured at one meter above ground.

d) Unauthorized battering or benching of excavation.

e) Forming (or leaving) DEAD MEN or TELL-TALES in borrow pits and their removal after measurements.

f) Forming or leaving steps in the sides of deep excavation and their removal after measurements.

g) Excavations for insertion of planking and strutting.

h) Removing slips or falls in excavations.

i) Dewatering by bailing or pumping out of water in excavations from rains, sub-soil water, tides undercurrents etc.

j) Slinging or supporting pipes electric, cables etc met during excavation or while carrying out any other item of work.

k) Dressing, trimming of sides, leveling or grading and ramming of bottoms.

Soils, soft rocks, hard rocks shall be measured as per SP 27 Part I except for the followings:

a) Filling shall be in cubic meter for consolidated volume. The lift shall be considered from made up ground level

b) Planking and strutting required to be left in position shall be measured separately. The Architect's permission in writing shall have to be obtained for this. In no other case shall payment be made for planning and strutting, if carried out.

c) Lead and lifts shall be as per the BOQ.

d) Post holes, trenches for cables and pipes shall be measured as detailed in clause 5 and clause 4.6 and shall be part of the respective piping, cabling item.

e) Excavation shall be paid for in the PCC area, and level shown in drawings or as approved by the Architect Working space shall not be considered.

f) Back filling of foundation is part of excavation and not paid separately. Void percentage considered for computing net quantities shall be

- Loose Earth 20%
- Hard Rock 40%

These deductions shall be made from actual measurements. The Architect may at his discretion conform at start ofwork other predetermined percentage for deduction for particular project.

2 Anti-Termite Treatment

General:

Anti-Termite Treatment shall be as per ISl-6313 (Part ll)-1971 land latest revisions AND shall be carried out by an approved specialist agency as approved and directed by the Architect to the following general specifications:

Materials:

'CHLOROPYRIPHOS' mollifiable concentrate conforming to IS: 6439-1978 in approved concentration in water emulsion shall be used. Chemicals shall be brought to site of work in sealed original containers. The material shall be brought in at a time in adequate quantity to suffice for Hand operated pressure pump shall be used for uniform spraying of the chemical. To have proper check for uniform spraying of chemical, graduated containers shall be used. Proper check should be kept that the specified quantity of chemical is used for the required area during the operation.

Time of Application:

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

Treatment of Junction of Wall and Floor:

To achieve continuity of the vertical chemical barrier on inner wall surfaces from the ground level, small channel 30 * 30 mm shall be made at all the junctions of wall and columns with the floor (before laying the sub-grade) and rod holes made in the channel up to ground level 150 mm apart and the chemical emulsion poured along the channel @ 7.5 liters / Sq.mt of the vertical wall or column surface so as to soak the soil right to bottom. The soil shall be tamped back into place after this operation.

Treatment of Soil along External Perimeter of Building:

After the building is complete, provide holes in the soil with iron rods along the external perimeter of the building at intervals of about 150 mm and depth 300 mm and filling these holes with chemical emulsion at the rate of 75 liters per Sq Mtr of vertical surface.

Vertical Surface:

In the event of the depth of the wall filling being more than 300 mm, the external perimeter treatment shall be extended to the full depth of filling up to the G.L. so as to ensure continuity of the chemical barrier.

Horizontal Surface along Perimeter:

Treatment of soil under apron (Plinth Protection) along external perimeter of building, top surface of the consolidated earth over which the apron is to be laid shall be treated with chemical emulsion at the rate of 5 liters per Sq Mtr of the vertical surface before the apron is laid. If consolidated earth does not allow the emulsion to soak through, holes up to 50mm to 75 mm center both ways may be made with 12 mm diameter mild steel rod on the surface to facilitate saturation of the soil with the chemical emulsion.

Treatment for Expansion Joints:

Anti-termite treatment shall be supplemented by treated through the expansion joint after sub grade has been laid 2 liters per linear meter of expansion joint.

Treatment of Soil Surrounding Pipes and Conduits:

When pipes and conduits enter the soil inside the area of the foundations, the soil surrounding the points of entry shall be loosened around each such pipe or conduit for a distance of 150 mm and to a depth of 75 mm before treatment is commenced. When they enter the soil external to the foundations, they shall be similarly treated unless they stand dear of the walls of the building by about 75 mm for distance of over 300 mm from Ground level.

3. CONCRETE AND MORTARS

INDIAN STANDARDS

All relevant Standards as specified elsewhere in this Volume are applicable.

Indian Standards to be followed are:

(1)	IS 269	Specification for Ordinary and low heat, Portland cement.
(2)	IS 383	Specification for Coarse and fine aggregates from natural Sources for concrete.
(3)	IS 456	Code of practice for plain and reinforced concrete.
(4)	IS 460 (Part I, II &III)	Specification for test sieves: i) Wire doth test service ii) Perforated plate lest sieve iii) Method of examination of test sieve
(5)	IS 516	Method of test for strength of concrete
(6)	IS 1199	Method of Sampling and analysis of concrete.
(7)	IS 1489	Specification for Portland pozzolana cement
(8)	IS 1542	Specification for Sand for plaster
(9)	IS 2116	Specification for Sand for masonry mortars
(10)	IS 2386 (Part I, II, & III)	Method of tea for aggregate concrete. i) Particle size and shape ii) Estimation of deleterious materials and organic impurities iii) Specific gravity, density, voids, absorption and bulking
(11)	IS 2646	Specification for Integral cement water proofing compound.
(12)	IS 3025	Methods of Sampling and test (Physical and Chemical for Water used in Industry
(13)	IS 3068	Specification for Broken brick (burnt clay) coarse Aggregate for use in lime concrete

(14)	IS 4031 (Part i to xii)	Method of Physical test for hydraulic cement
(15)	IS 4032	Method of chemical analysis for hydraulic cement.
(16)	IS 6452	Specification for high Alumina cement for structure use
(17)	IS 6909	Specification for super sulphated weather
(18)	IS 7861	Code of practice for extreme weather concreting i) Recommended practice for hot weather concreting ii) Recommended practice for cold weather concreting
(19)	IS 8041	Specification for Rapid hardening Portland cement,
(20)	IS 8112	Specification for high strength ordinary port land cement.
(21)	IS 9103	Specification for admixture for concrete
(22)	IS 11433	Specification for one part gun grade i) Poly sulphate based joint sealant: general requirements.
(23)	IS 12118(part l)	Specification for two parts poly sulphide based sealant: General requirements.
(24)	SP 23	Handbook on concrete mix
(25)	SP 24	Explanatory handbook on Indian Standards code for plain And reinforced concrete (IS 456)
(26)	SP 27	Handbook of method of measurement of building works.

MATERIALS

CEMENT

i) Cement shall be Ordinary Portland Cement (OPC) conforming to IS 269 for all purpose.

It shall be received in bags of 50 kg and each batch shall be accompanied with a test certificate of the factory. Also it shall e tested before use to ascertain its strength, setting time, etc. In no case cement has been stored over -4 -weeks shall be used unless tested as per the direction of the Bank/Architect/ prior to use in the works.

ii) Cement shall be stored in such locations so as to prevent deterioration due to moisture dampness. A dry and water proof shed shall be best suited for this. Bags shall be stacked on rigid water-proof platforms about 15 to 20 cm clear above the floors and 25 to 35 cm dear or away from the surrounding walls. A maximum high stack of 12 bags is permitted Stacks shall be so arranged that the first batches are used first, and (FIFO) that they permit easy access for inspection and handling.

iii) The following other types of cement may be used in works if specified or with prior approval of the Bank/Architect/ in writing purpose. Specialist literature shall be consulted for guidance regarding use of these types of cement.

Rapid hardening Portland cements conforming to IS 8041.

Portland Pozzolana Cement (PPC) conforming to IS 1489-Part-1

High strength Ordinary Portland Cement conforming to IS 8112.

High alumina cements conforming to IS 6452.

Super sulphated cement conforming to IS 6909.

COARSE AGGREGATE

i) Coarse aggregate shall be obtained from natural sources such as stone, gravel etc, crushed or uncrushed or a combination thereof from approved quarried. Aggregate shall be hard, strong, dense, durable, clean and free from veins and adherent coating. It shall be free from soft, feeble, thin, elongated or laminated pieces and shall be roughly cubical in shape. It shall consist of coarse material most of which is retained on 4.75 mm IS sieve

ii) Coarse aggregate shall not contain any harmful material such as iron, pyrites, coal, mica shale or similar laminated material neither shall it contain clay, alkali, soft fragments, sea shells, organic impurities etc. in such quantities that adversely affects the strength and durability of the concrete. In addition to the above, in reinforced concrete the aggregate shall not contain any material, which might attack the reinforcement. The maximum quantities of deleterious materials in the coarse aggregate when determined in accordance with IS 2386 Part I and Part II "Method of test for aggregates for concrete' shall not exceed the limits laid down in table 1 of Annexure.

iii) Aggregate crushing value, impact value, abrasion value and soundness of aggregate shall respectively be in accordance with Para 3.3, 3.4, 3.5 and 3.6 of IS 383.

iv) Grading of coarse aggregate shall be in conformity with the requirements laid down in IS 383. See Table 2 and Table 3 of Annexure.

v) Source of aggregate shall be from an approved Government location. It shall be tested prior to the approval of the Architect from an approved testing laboratory. In case available aggregates do not meet certain requirements of IS 383 or any other specification, required processing shall be carried out by the contractor at his cost. No extra cost towards these processes, treatment or combination of both shall be paid, it shall be the duty of the contractor to make sure that aggregate material received by him is from Government approve quarries and with fully paid royalties, taxes, duties etc. as may be in force from time to time for respective locations.

vi) Aggregates shall be stored in such a way that it does not get mixed with mud, grass vegetables and other foreign matter. The best way is to have a hard surface platform made out of concrete, bricks or planks. It should be to the approval of the Architect.

vii) Coarse aggregate shall have a minimum specific gravity of 2.6 (Saturated surface dry basis). Aggregate below this specific gravity shall not be used without the special permission of the Architect.

viii) One a specific source of supply of coarse aggregate is approved; the source shall not be changed without the prior approval of the Architect.

FINE AGGREGATE

i) Natural sand deposited by stream or glacial agencies as a result of disintegration of rock is the best form of fine aggregate. The fine aggregate shall confirm to following standards.

i. For plain and reinforced concrete: IS 383 Specification for coarse and fine aggregates from natural sources for concrete.

ii. Mortar and grout : IS 2116 Specification for sand for masonry mortars.

iii. For plastering : IS 1542 Specification for sand for plaster (Class A grading)

3.1.3.1

i) Some times it is obtained from crushed stone screening but often contains a high percentage of dust and clay. It tends to be flaky and angular. This type produces harsh concrete and should be avoided.

ii) Sea sand should not be used unless approved by the Architect. If approved, the required treatment shall be done at the contractor's cost.

Sand shall be hard, durable, clean and free from adherent coatings and organic matter and shall not contain any appreciable amount of clay. Sand shall not contain harmful impurities such as iron, pyrites, coal particles, lignite, mica shale or similar laminated material, alkali, and organic impurities in such form or quantities as to affect the strength of durability of concrete or mortar. Also it should not contain any material liable to attack the steel reinforcement.

i) When tested as per IS 2386 Part I and Part II, fine aggregate shall not exceed permissible quantities of deleterious materials as given in table 1 of Annexure.

ii) Fine aggregate shall be thoroughly washed at site with clean fresh water such that the percentage of all deleterious materials is within the permissible limits laid down.

Grading of fine aggregate shall conform to IS and shall fall within limits of one of the four zones given in table 4 of IS 383 and of Annexure.

Damp and moist sand increases the volume and is called bulking. Due allowance is to be made while preparing the mixes based on volume measurements. It shall be determined as per IS 2386 Part III Appendix A- For rough guidance table 5 of Annexure gives the relation between moisture content and percentage of bulking.

Storing of aggregate shall be as given in clause 2.2.6.

WATER

i) Water used for mixing and curing shall be clean, reasonably clear and free from objectionable quantities of silt, oils, alkalies, acids, slats so as not to weaken mortar, or concrete or cause efflorescence or attach the steet in RCC while curing. It shall be free of elements, which significantly affects the hydration reaction or otherwise interferes with hardening of concrete during curing or those elements, which produced objectionable stains or deposits. Potable water is generally satisfactory but is shall be tested prior to use in the works.

ii) Water tested shall be in accordance with IS 3025. Maximum permissible limits of deleterious materials in water as given in IS 456 are reproduced for ready reference in table 6 of Annexure.

iii) Suitability of water shall be ascertained by the compressive strength and initial setting time test as specified under:

a) Average 28 days compressive strength of at least three 15 cm concrete cubes prepared with water proposed to be used shall not be less than 90% of the average strength of three similar concrete cubes prepared with distilled water. Preparation and testing in accordance of IS 516.

b) The initial setting time of tests blocks made with proposed cement and water to be used shall not be less than 30 minutes and shall not differ by ± 30 minutes from the initial setting time o f control test block prepared with the same cement and distilled water Preparation and testing of block shall be in accordance with IS 4031 iv) The PH value of water shall not be less than 6 and more than 9

v) Water storage tanks shall be such as to prevent any deleterious materials getting mixed with it.

vi) Water shall be tested and approved in writing by the Bank/Architect/ prior to use in the works.

vii) Sea Water

Seawater in concrete shall not be permitted unless specifically approved in writing by the Bank/Architect/ for purpose stated. The Bank/Architect/ under unavoidable circumstances may allow mixing or curing of seawater in concrete construction, which are permanently under seawater.

ADMIXTURE

i) These are substances other than cement, aggregate and water and shall be permitted to be used to modify the properties of concrete for single or a combination of purposes. This shall be used only on the written approved for specific purpose and at the cost of the contractor. Good concrete shall be achieved without the aid of any admixtures.

ii) Admixtures should be free from chlorides and sulphate, which might affect concrete or any other material which may cause problems to the concrete in the due course of time. Also it should have no effect on the reinforcement in case of Reinforced Cement Concrete.

iii) Admixtures generally in use are classified as under

a) Accelerators

b) Retarders

c) Workability agents

d) Water -repelling agents

e) Air-entraining agents

f) Gas-forming agents.

These are manufactured and sold by various companies under brand names. The contractor proposing to use any of them shall submit to the Architect technical literature with its chemical composition, purpose of use and method recommended by the manufacturer and what he proposes to follow at site for strict control,

iv) The contractor's proposal shall accompany the following with his request to use admixture.

a) The trade name of the admixture, its source and the manufacturer’s recommended method of use.

b) Typical dosage rates and the possible detrimental effects of under and over-dosage.

c) Whether the admixture contains chloride in any free form or any other chemical present as an active ingredient, which is a likely cause of corrosion of reinforcement or deterioration of concrete

d) The average expected air content of freshly mixed concrete containing an admixture, which causes air to be entrained when used at the manufacturer's recommended rate of dosage.

CONCRETE

Concrete is prepared by mixing graded aggregate stone along with cement, in a specified proportion. Mixing shall be done by a mechanical mixer. Manual hand mixing shall be permitted in specific cases with the

written permission of the Architect on account of small quantity or location or any other reason acceptable to the Architect.

CEMENT CONCRETE

This shall be classified as plain cement concrete or reinforced cement concrete. Plain cement concrete shall be in leveling course under foundations, floors, copings etc. and shall include form work as part of the work-Reinforced cement concrete shall be at all locations and comprises form work, reinforcement and concrete Payment of reinforced cement concrete may be composite or item wise as specified in the BOQ.

Concrete shall be classified its compressive strength at the 28th day. The concrete grades shall be as designated in table 2 of IS 456:2000 and are given as ready reference in table -7- of Annexure.

BOQ shall specify various types of concrete aimed to be used in works. It shall be the responsibility of the contractor to carry out design mixes and approval of the same shall be obtained from the Architect at least 35 days in advance from the actual pouring of concrete at site in the permanent works. The basic aim of mix design shall be to find the most economic proportion of cement, aggregates and water which will give the desired strength of concrete, proper workability and durability. Also it is important that the mix should be easily worked with the help of equipment available at site. The operations involved at site are, measurement of materials, their mixing, placing, compacting, finishing required and curing. The design shall be carried out strictly to IS specifications and IS code practice 456, SP 23 and SP 24

Further the contractor should ensure that the minimum cement content per cubic meter of reinforced concrete should not be less than that stipulated in table 23, 24, 25 and 26 of SP 23. For ready reference refer table 8 and 9of Annexure, but the BOQ shall specify minimum cement content for each item.

For expected strength of cubes tested on the 28"1 day the design mix at preliminary test and work site shall be as per table 10 of Annexure. The water cement ratio shall be 0.5 to 0.52. Additional water may be permitted only at the discretion of the Structural Engineer The slump shall be 25 mm to 35 mm depending upon the location and type of work Higher slump with use of plasticizers shall be permitted

Design mix and trial mixes

As stated above in clause 3-1.2 the contractor shall submit, at least 5 weeks in advance, to the Architect the mix design that the proposes to use at site. The mix design shall also give basic details (when tested according to IS 1199 and IS 2386 - Part III, 1963) such as,

a) Slump

b) Bleeding

c) Compacting factor

d) Vee-Bee time

e) Cement required for one cubic meter of concrete.

3.2.4.2 On receipt of this, the Architect may immediately order to carry out work site test before the final approval. This shall be done with mixer and materials actually being used at site.

This shall give the contractor additional chance to check for himself actual workability and make sure that the mix proposed by him will be fully satisfactory with regards to slump, segregation, bleeding, water - cement ratio and workability.

5 cubes shall be taken from each of the 3 batches to test the mix. Cubes shall be cast, stored, cured, transported and tested to IS 516. The test may be carried out at site or laboratory as approved by the Architect.

Trial mixes shall be approved provided that average strength of 3 consecutive cubes is not less than that specified and that one out of three may give a value less than specified but limited to a maximum of 90% of the specified strength.

In case the trial mix falls below the above criteria, the Architect shall order fresh trial mixes to be made as before, until the desired strength is arrived at.

This design mix and trial mix hold good so long as the materials continue to be of the same quality and from the same sources. For any change, the Architect may order fresh design mix and trial mixes to be carried out before the same is used at site.

It is the responsibility of the contractor to prepare and get the cubes tested and to provide all the material,labour, moulds, equipment, casting and curing facility, charges for testing etc.

Further, the contractor shall have to provide and maintain all the equipment and staff at the site throughout to cany out the following tests in a small laboratory or get these tests from approved laboratories without extra cost to the contract.

a) Slump

b) Grading of coarse and fine aggregates.

c) Silt content of sand.

d) Moisture content of coarse and fine aggregates.

e) Slump test of concrete.

f) Concrete cube test.

The contractor shall maintain full records of all above tests in a register.

The format of records shall be prepared in consultation with the Architect and either he or his representative shall have full access to the contractor's laboratory.

The contractor shall include charges for the above work in his rates and no extra whatsoever shall be admissible on this account of designing, testing maintaining laboratory etc.

Concrete Mix

1 READY MIX CONCRETE (RMC)

CEMENT

The type of cement used for this work shall be **Ordinary Portland Cement (OPC)** only.

Cement shall be used in the order in which it is received. Cement in bags in storage for more than -3- months shall be re-tested before use.

Aggregates: Used for concrete shall be in accordance with the requirements of IS 456.Ref. IS 4926:2003 R.M.C .code of practice clause 4.4

TESTING:-

A sample taken once for every 1000 bags shall be tested. Tests shall be carried out for Fineness, initial and final setting time, compressive strength (IS: 4031) and the results approved by the Engineer, before use of the cement in permanent works. Samples shall be taken immediately on receipt of cement at site. The methods and procedure of sampling shall be in accordance with IS: 35S55

1.1.4 The Engineer may specify other forms of sampling and tests including chemical analysis (IS. 4032). If in his opinion the cement is of doubtful quality, the costs of such additional tests shall be bome by the contractors.

MIXERS AND VIBRATORS:-

For all structural concrete work the contractor shall provide platform types of weighing machinery of a capacity not less than 200 kg.

The contractor shall provide concrete mixers (!S:l79l)-Batch type concrete mixers (ls>2439)-roller APN mixer and vibrators (IS :2505)-concrete vibrators Immersion type (IS:20506) -screed-board concrete-vibrators(IS 250) - screed board concert vibrators (IS :4656)-form-vibrators for concrete supplied by recognized manufacturers.

CONVEYING:

Concrete shall be conveyed from mixer to forms as rapidly as practicable by methods which will prevent segregation and/or loss of ingredients. In case such segregation occurs invade concrete shall be remarked before being placed in final position. 11 shall be deposited in final position as early as practicable, but always within a period of 30 minutes after mixing. When initial set has taken place in Concrete before it is placed in final position, such concrete shall be rejected and taken away from the site to a distance and disposed off as ordered by the Engineer's Representative.

GRADE OF CONCRETE:

The Concrete is designated as M-15, M-20, M-25, M-30. The letter M refers to the Mix and the number represents the characteristic compressive strength in mpa (Mega Pascal's). Minimum content of cement as per table 5 of IS 456; 2000

TRIAL MIXES:

The Contractor is entirely responsible for the design of Concrete mixes. The designs however to be approved by the Architect at least B weeks before commencing any concreting in the works and which have been tested in an approved laboratory. A dean dry mixer shall be used and the first batch discarded.

The required average strengths of different grades of concrete at 28 days, for which the mixes shall be designed, are specified below:

Grade Concrete	Characteristic strength at 28 days (mpa)	Target Mean Strength at 7th day(mpa)	F' cm (Mpa) at 28 days
M15	15	18	24
M25	20	21	29
M25	25	23	24
M30	30	26	39
M35	35	31	44
M40	40	36	49
M45	45	40	54

The mixes are designed to yield mean strengths (F'cm) greater than the corresponding specified characteristic strengths (F' ck) as indicated in above table. The difference between F'cm and F'ck is called the current Margin. The value of the cur margin has been set at 9 Mpa for all grades of concrete. The concrete mixes shall be designed on the basis of required strength, desired workability, the maximum size of aggregate and also upon the various grades of cements as specified in IS 10262-1982. Accordingly the required cement content shall be ascertained. The Contractor may be allowed to use either 7proved plasticizers or increased cement content to achieve the required strengths at his own cost.

3 for each grade a total of 18 cubes shall be made. Of these 18 cubes made, not more than 6 may be made on any day and further of the 6 cubes made in one day, not more than 2 cubes, each representing a different batch of concrete shall be tested at the age of -7 - of 28 days. The making of the cubes, their curing, storing, transporting and testing shall be in accordance with Indian Standards IS. 516. The test shall be carried out in a laboratory approved by the Architect.

If the average strength of the concrete cubes falls below the required strength, fresh preliminary mixes for that grade shall be made as before, until the trial mixes yield cubes of compressive strength at 28 days greater than the required average strength at that age.

Whenever there is a significant change in the quality of any of the ingredients for concrete, the Architect may at his discretion, order the carrying out of fresh trial mixes. All costs for trial mixes and tests shall be to the Contractor's account and held to be included in the contract rates,

Before commencing the work, the contractor shall submit to the Architect for approval full details of all preliminary trial mixes and tests.

When the proportions of a concrete mix have been approved by the Architect, the Contractor shall not vary the quality or source of the material or the mix without written approval of the Architect.

CONCRETE CUBE TEST:

Quality of hardened concrete will be certified by the following procedures

1.6,1. The Engineer or his representative shall select random batches of concrete for examination without warning the Contractor and sampling will generally be done at point of discharge from the mixer.

Rom the batches thus selected, 6 concrete cubes shall be made from any single batch, of these. 6 cubes may be made from any single batch. Of these 6 cubes thus made, 3 cubes (each cube representing Concrete of different batches) shall be tested at 7 days and the remaining 3 cubes shall be tested at 28 days.

All cubes shall be made, cured, stored, transported and tested in accordance with Indian standards. The tests shall be carried out in a laboratory approved by the Engineer.

At least 6 cubes shall be made on each days concreting until 60 cubes have been made for each grade of concrete. This is lie initial period.

After the initial period, subject to the acceptance of the Engineer, the frequency at which the I cubes shall be made may be reduced as follows: 1 set of 6 cubes, on each day's Concreting consisting of.

a) 1 set for every 10 Cum. or part thereof of concrete for critical structural elements like columns, large cantilevers, plus:

b) 1 set for every 40 Cum, or part thereof for all other elements. If concrete is latched at more than one point simultaneously, the above frequency of making cubes shall be followed at each point of batching.

c) Of the cubes if each set shall be tested at 7 days and the remaining 3 cubes shall be tested at 28 days from the day of casting the cubes.

ACCEPTABILITY CRITERIA:

The strength requirement of any particular grade of concrete will be considered satisfactory if the 28 days compressive strengths of individual sets (each set consists of 3 cubes) and of individual cubes satisfy the following requirements:

FOR THE FIRST FIVE SETS:

a) The average strength determined from any group of three consecutive test cubes exceeds the specified characteristic strength (f ck) by not less than 0.8.

b) Only one individual cube test result in any set may fall below the specified characteristic strength provided that this value is not less than 95 % of the specified characteristic strength.

Provided that the average strength of any fifteen consecutive cubes exceeds the specified characteristic cube strength by at least 0.9 times the current margin. All the subsequent test results may be considered acceptable if.

a) The average strength as determined from any group of three consecutive lest cubes exceeds the specified characteristic strength (V ck) by not less than 0.6 limes the current margin.

b) Only one individual cube test result in any set may fall below the specified characteristic strength provided this value is not less than 90 % of the specified characteristic strength.

Whenever a mix is redesigned due to a change in the quality of Aggregate or of cement or for any other reason, it shall be considered a new mix and initially be subject to the acceptability criteria as stated above.

The above specification is based on an assumed standard deviation of 5.5 Mps, and a probability of concrete strengths failing below the desired minimum strength of 1 to 20. In case quality control is very good at site and the cube test results consistently show a standard deviation better than the standard deviation assumed here, the Engineer may in his discretion reduce the required target strength fcm for any particular grade of concrete, and in current the current margin.

If the concrete produced at site does not satisfy the above strength requirements, the Architect will reserve the right to require the Contractor to improve the methods of batching, the quality of the ingredients and redesign the mix with increased cement content if necessary. The Contractor shall not be claimed any extra cost for the extra cement used for the modifications stipulated by the Engineer for fulfilling the strength requirements specified.

1.7.1 .6.It is the complete responsibility of the Contractor to design the concrete mixes by approved standard methods and to produce the required concrete conforming to specifications and the strength requirements approved by the Engineer. It is expected that the contractor will have competent staff to carry out this work.

As frequently as the Architect may require, testing shall be carried out in the field for

1. Moisture content of sand
2. Moisture content of Aggregates
3. Silt content of sand.

1.9 FAILURE TO MEET SPECIFIED REQUIREMENTS:

If from the cube-test results it appears that some portion of the works has not attained the required strength, the Architect may order that portion of the structure be subjected to further testing of any kind whatsoever as desired by the Architect including, if so desired by him, full load testing of the suspected as well as adjacent portions of the structure as specified in the Conditions of contract. Such testing shall be at the contractor's cost. If the strength of concrete in any portion of the structure is lower than the required strength, but is considered nevertheless adequate by the Architect so that demolition is not necessary, the Contractor shall be paid a lower rate such lower strength concrete as determined by the Architect.

As frequently as the Engineer's Representative may require, testing shall be carried out in the field for

1. Moisture content of sand
2. Moisture content of Aggregates
3. Silt content of sand
4. Grading of sand
5. Slump test of concrete
6. Grading of Aggregates

7. Concrete cube test

The Contractor shall provide and maintain at all times, until the works are completed, equipment and staff required for carrying out these tests at his own cost. The Contractor shall grant the Architect or his representative full access to this laboratory at all times and shall produce on demand complete records of all tests carried out on site. Before concreting commences on any section of the works the contractor shall obtain approval of the Architect or his Representative as regards the form and reinforcement confirming with the drawings. He shall also indicate to Architect in writing and obtain his approval for position of construction joints the Architect or his representative's approval shall not relieve the Contractor of any of his obligations to comply with the provisions of this Specification or contract.

ADMIXTURES:

Approved admixtures and air entraining may be permitted by the Engineer at his discretion provided that the strength requirements are not affected by their use. Any cement saving due to their use will be to the benefit of the EMPLOYER. The admixture will not be paid for separately. (IS 4926: 2003 Ready mix concrete code of practice clause 4.50)

TRANSPORTING, PLACING, COMPACTING AND CURING:

Transporting, placing, compacting and curing of concrete shall be in accordance with IS: 456. For workability ref to clause 6.2 of IS 4926:2003 RMC code of practice

All rubbish etc. Inside the shuttering and curing of concrete shall be washed out immediately prior to placing of concrete. A layer is placed and separate batches shall follow each other so closely that the succeeding layer shall immediately below have taken initial set. The method of segregation, concreting of any portion or section of the work shall be carried out in one continuous operation and no interruption of concreting work will be allowed without approval of the Engineer or his representative. It should be held in position until air bubbles cease to come to the surface and then slowly withdrawn so that the concrete can flow into the space previously occupied by the vibrator. The vibrator shall not be dragged through the concrete nor used to help heaps of concrete to spread out. It may be used vertically, horizontally or at an angle depending on the nature of the work.

To secure even and dense surfaces free from aggregate pocket, vibration shall be supplemented by tamping or rodding by hand in the comers of forms and along the form surfaces while the concrete is plastic.

A sufficient number of spare vibrators shall be kept readily accessible to the place of deposition of concreteto assure adequate compaction in case of breakdown of those in use.

Form vibrators wt used shall be clamped to the sides of formwork and shall not be fixed more than 450 mm.above the base of the new formwork and concrete shall be filled not higher than 230 mm. above the vibrator. The formwork must be made serially strong and watertight where this type of vibrator is used. Care must be taken to guard against over vibration especially where the workability or the concrete mix is high since this will encourage segregation of the concrete. All concrete shall be protected from falling earth during and after placing Concrete placed in ground containing deleterious substances shall be kept free from contract with such ground and with water draining there from during placing and for a period of seven days or as otherwise instructed thereafter. Approved means shall be taken to protect immature concrete from damage by debris, excessive loading, abrasion, vibrations, deleterious ground water, mixing with earth or other materials and other influences that may impair the strength and durability of the concrete.

2. CONCRETE AT SITE

Weight batching shall be preferred at site but the Architect may permit designed mix to be converted to volumetric if requested by the contractor on specific grounds. The contractor shall provide required boxes tomeasure the ingredients of concrete.

The contractor shall provide concrete batch mixes, vibrators, weight batches conforming to relevant IS specification. The capacity and number of mixers and vibrators required at site from time to time shall be to

the approval of the Architect. No equipment from site shall be removed without the prior written approval of the Architect. The contractor shall also maintain a platform weighing scale of capacity 300 kg with fraction upto 100 Gms at the site

As directed by the Architect, a weekly or periodic calibration of all machines shall be done and records of these calibrations shall be maintained in a register.

Regular maintenance of machinery shall also be carried out on a weekly basis or as directed by the manufacturer of machines

The mixer shall be run for a minimum period of 2 minutes after all materials are loaded in full quantity. The concrete produced shall be uniform in colour and consistency.

The placing temperature of concrete shall not be more than 34° C. If it is more, the Architect may order addition of ice or chilled water to the concrete. Also the contractor shall take the following precautions.

a) Mixers and weight batches shall be painted with white colour

b) Aggregate storing bins shall not be exposed to the Sun.

c) Water shall be sprinkled on aggregates well before concreting to keep the temperature low.

3. LAYING OF CONCRETE

Concreting shall commence only after form work is approved, reinforcement is recorded and permission to proceed with concreting has been approved in writing from the Bank//Architect.

Formwork should be clean, free from sawdust, pieces of wood or any other foreign material. It should have been treated by form releasing agent prior to the laying of reinforcement and concrete.

Concrete shall be as gently deposited as is practically possible. In its final position to avoid re-handling and shall be so deposited that segregation of aggregates does not occur. In case of deep trenches and footing, if may be done with the help of a chute. Columns and walls shall be so adjusted in form work so that maximum depth is 1.5 meter unless consented to by the Bank//Architect. Concrete from wheelbarrows shall not be dumped away from the face concrete already in place. It shall be dumped into the face of concrete already in place.

Concrete onto a sloping surface shall be discharged by providing a chute with a baffle and a drop at its end so that the concrete remains on the slope.

Columns and walls shall be concreted in the operation to their full height to avoid any horizontal construction joints as far as possible.

All slabs, beams, wooden planks and cat-walk shall be provided clear of reinforcement

Concrete shall be placed in position within 30 minutes from the time it is produced. Concrete shall be laid during normal working hours- Concreting at night or on holidays shall be permitted only on the written approval of the Bank//Architect

4. COMPACTION OF CONCRETE

Concrete shall be thoroughly compacted, as depositing shall proceed by means of suitable vibrators. The vibrators shall maintain the entire concrete under treatment in an adequate state of agitation and shall continue during the whole period occupied by placing of concrete. Care shall be taken not to over- vibrate the concrete. While withdrawing needles no holes should be visible in concreting. Compacting shall be completed before the initial setting time. Concrete already set shall not be disturbed by successive vibrations.

It shall be ensured that the needle vibrators are not applied on reinforcement, which may destroy the bond between concrete and reinforcement. When electric vibrators are in use, the standby petrol vibrator must always be available at the concreting point.

5. SHRINKAGE CRACKS

Concreting shall be avoided in very warm weather, if necessary; it shall be covered with damped Hessian within 2 hours of placing of concrete.

To achieve good results the concrete shall be immediately covered with a plastic sheet and not allowed any direct wind contact. This shall eliminate shrinkage cracks.

6. CONSTRUCTION JOINTS

In large pours, it is practically not possible to carry on concreting continuously. Hence construction joints shall be provided. Location of construction joint shall be submitted by the contractor for approval of the Architect Such joints shall be kept to a minimum The joints shall be at places where shear forces nil or minimum and these shall be straight and at right angles to the direction of the main reinforcement. Slop ends provided shall be with necessary slots for reinforcement bars to pass feely without bending or any other obstruction. Also a trapezoidal fillet nailed on stop board shall be provided to form a regular keyed joint. Joints shall be straight and truly vertical or horizontal.

Before commencement of concrete, adjacent concrete stopper and surfaces shall be chipped and roughened to expose aggregate, then wire brushed and cleaned. The concrete surface shall be sprayed with water for 24 hours before casting and kept wet until casting.

True horizontal joints shall also be provided with a keyed joint by inserting planed greased timber.

It shall be treated as above prior to the start of fresh concreting.

For vertical joints neat cement slurry shall be applied on the surface just before concreting- For horizontal joints, the surface shall be covered with a layer of mortar about 10 to 15 mm thick composed of cement and sand in the same ratio as the cement and sand in the concrete mix. This layer of cement slurry shall be freshly mixed and applied just before concreting.

7. EXPANSION JOINTS

Expansion joints shall be formed and located as detailed in the drawing.

8. CURING

Curing of concrete is most important. There shall be no compromise on this activity and It is for the contractor to arrange for everything necessary to make sure that the concrete is cured to the complete satisfaction of the Architect. As said above in clause 3.1.8, after concrete has begun to harden i.e. about 1 to 2 hours after laying. It shall be protected from quick drying with moist or damped Hessian doth or any other material approved by the Architect. After 24 hours of laying of the concrete. the surface shall be cured by flooding with water or covering with damp Hessian cloth for a period of 7 days to keep it moist.

For the next 7 days the surface shall be kept wet all the time by sprinkling water continuously.

For membrane curing, details as listed in 12.5 of SP 24 shall be followed.

9. FINISHING

Concrete shall be finished keeping in mind the next operation to be carried out over the surface. For guidance the following points shall be noted but the Architect shall be consulted prior to start of concreting and his decision in this regard shall be final.

a) Roof slab shall be troweled even and smooth with a wooden float

b) The surface that will receive plaster shall be roughened immediately.

c) Surfaces that will be in contract with any masonry work shall be roughened immediately.

d) The surface that will receive mosaic floor or IPS or any other type of tiled work shall be roughened while it is green. Every care shall be taken not to disturb the freshly laid concrete.

10. INSPECTION AND CORRECTIVE MEASURES

On removal of form work, the surface shall be examined by the Architect. Till such time, no remedial measures shall be carried out by the contractor. All patching, rectification or chipping shall be done only on the Architect's instructions. In case of any violation of this rule, the concrete poured stands rejected. The decision of the Architect in this regard shall be final and binding on all parties.

Sagged, bulged, patched, honeycombed work shall stand to be rejected for surface that are exposed, or required fair face finish or decorative textured finish. The Architect may permit any work found structurally safe and areas of unexposed faces, for repairing. As directed by the Architect these works shall be retained and the cost of repair shall be at the contractor's account.

Cracks observed shall be brought to the notice of the /Architect who shall examine them. It shall be kept under observation and a record shall be maintained for a period of 45 days. It shall be shown to the Structural Engineer and the following procedure shall be followed.

i) Cracks not developing further and in the opinion of Structural Engineer not detrimental to the strength of the construction shall be grouted with non-shrinking cement slurry or as directed by the Architect.

ii) Cracks developing further and in the opinion of the Structural Engineer, detrimental to the strength of construction, shall be tested as per the relevant Indian Standard.

i) Based on result of the test, the /Architect in consultation with the structural engineer shall order remedial measures or order the contractor to dismantle construction, cart away the debris, replace the construction and cany out all the consequential works thereto.

iv) Cost of the above shall be borne by the contractor if the failure was on his part In case it is due to design faults, it shall be borne by the employer.

v) The decision of the Bank//Architect in this matter shall be final and binding on all parties. This decision shall not be open for arbitration.

11. QUANTUM OF CUBES AND TESTING

The minimum frequency of cube casting shall be as follows. Each sample shall consist of

6 cubesConcrete quantity	Number of Samples.
Up to 5 cum in a day	1
5 cum. to 15 cum.	2
15 cum. to 30 cum.	3
30 cum. to 50 cum	4
More than 50 cum.	4 + one additional per each 50 cum. or part thereof.

Three cubes shall be tested on the 7^{tfl} day and other three cubes on the 28th day.

12. ACCEPTANCE OF WORK

It shall be as given in IS 456:2000, SP 23 and SP 24. The guidance brief is as under;

Part or element of work shall be deemed to be accepted, provided the results of the 28th day cube testing conform to the criteria stated as under

a) The average of the three consecutive cube's strength shall not be less than the specified strength

b) No individual cube strength shall be less than 90% of the specified strength.

c) If the individual cube strength exhibits more than 33% of the specified strength, such a cube shall be classified as freak and the criteria in (a) and (b) shall be applied to the remaining two cubes and their acceptability determined.

d) If the concrete tests fail to meet the acceptance criteria of the minimum strength required for respective grades of concrete, the Architect may take one of the following decisions:

i) Instruct the contractor to carry out such additional tests (e.g. core tests, load tests etc) and / or remedial measures to ensure the soundness of the structure at the contractor's expense.

ii) Any decision to accept the work shall be entirely at the discretion of the engineer who may a reduction in the rate of the appropriate item.

ii) The work will be rejected and any consequential action as needed shall be taken at the contractor's expense including cutting out and replacing a part or whole of the work.

CONCRETING UNDER SPECIAL CONDITIONS

WORK IN EXTREME WEATHER CONDITIONS

During hot or cold weather the concreting should be done as per the procedure set out in IS 7861 Part I or IS 7861 Part II or as directed by the Bank//Architect.

UNDERWATER CONCRETING

The procedure set out under 132 of IS 456 shall be followed or as directed by the Bank//Architect.

CONCRETING IN SEAWATER

The procedure set out under 13.3 of IS 456 shall be followed or as directed by the Bank//Architect.

CONCRETING IN AGGRESSIVE SOILS AND WATER

Guidelines laid down in 13.4 of IS 456 shall be followed together with the instruction of the Bank//Architect.

MEASUREMENTS

All works shall be measured in the decimal system.

a) Dimensions shall be measured to the nearest 0.01 meter except for thickness of slab which shall be measured to the nearest 0.005 meter.

b) Areas shall be worked out to the nearest 0.01 sq. m.

c) Cubic contents shall be worked out to the nearest 0.01 cu. m.

All measurements of cutting shall, unless otherwise stated, be held to include the consequent waste.

3.4.5.3.Cement concrete work shall be classified as under

a) Concrete cast-in-situ Plain and reinforced

b) Precast concrete Plain and reinforced

c) Pre-stressed concrete Cast-in-situ or pre-cast

3 .4.5.4 All concrete, except as hereinafter provided, shall be measured in cubic meters.

The price of concrete shall include ingredient material, mixing, transporting, hoisting to any height and lowering to any depth, pouring or laying, consolidating, leaving pockets, holes and protecting them till the

next operation or completion of work, hacking the surface to provide key for further work including cleaning, wetting surface etc. and preparing construction joints as described in clause 3-19 of this section.

Concrete processed in a special manner for any specific purpose, such as cooled, heated, waterproofed, acid-proofed, heat-resistant shall be measured separately.

3.4.5.7 Admixtures shall be used if necessary at the request of the contractor for workability and the price for that shall deemed to be included in the contractor's quoted price of concrete.

No reductions shall be made for;

a) Ends of dissimilar materials (for example beams, posts, girders, purlins, corbels and steps) up to 500 sq, cm in section.

b) Opening up to 0.1 Sq Mtr

c) Volume occupied by reinforcement

d) Volume occupied by drainage, water pipes, conduits, etc. not exceeding 100 sq.cm in cross sectional area.

e) Small voids each not exceeding 40 Sq.mt. in section.

f) Small moulds, drip moulds, chamfers, splays, rounded or covered angles, beads, grooves and rebates upto 10 cm in depth and width.

Expansion joints shall be measured in running meter or sq. m. as the case may be. Price shall include required shuttering, special treatment if any, filler and finishing material as detailed in drawing or the BOQ.

Water proofing of concrete shall be measured separately as an extra over ordinary concrete stating the quantity of water proofing material inliers or kilograms.

Surface treatment shall be measured in square meters stating number of coats and proportioning of water proofing liquid to water

Cement grouting shall be measured in square meters and the mix specified.

Grouting of holding-down bolts and providing temporary boxing or wedges to form holes shall be enumerated. The mix shall be specified. The price shall include required shuttering, grouting etc.

To keep surface dry while concreting, dewatering due to rains and seepage shall be included in the price of concrete.

4 MORTARS

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

Mortars shall be specified by proportion only and not by strength, volumetric mixing shall be based on dry volumes of each ingredient. For convenience, measurement shall correspond to volume of one cement bag i.e. 0.035 Cu.mt. Boxes shall be of size of 40 x 35 x 25 cm. These shall be marked as mortar mixing boxes by red paint and shall be used throughout the contract. Hand mixing or mechanical mixing proportions shall be done with the use of these boxes.

CEMENT MORTAR

Cement mortar shall be prepared by mixing cement and sand in specified proportions. Proportioning shall be carried out as detailed above. Sand shall be added suitably to allow for bulk age, if required. Bulk age shall be determined as specified in IS 2386 Part III. Cement and sand added to mixer shall be thoroughly

mixed and water shall be added to it gradually after addition of water the mixer shall run for a minimum of 3 minutes. The mortar mixed shall be consumed within 30 minutes of its mixing.

5. Reinforced Cement Concrete & Mortar Works General:

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

INDIAN STANDARDS

All relevant Standards as specified elsewhere in this Volume are applicable. Indian Standards to be followed are:

(1)	IS 269	Specification for Ordinary and low heat, Portland cement.
(2)	IS 383	Specification for Coarse and fine aggregates from natural Sources for concrete.
(3)	IS 456:2000	Code of practice for plain and reinforced concrete.
(4)	IS 460 (Part I, II &III)	Specification for test sieves: i) Wire doth test service ii) Perforated plate lest sieve iii) Method of examination of test sieve
(5)	IS 516	Method of test for strength of concrete
(6)	IS 1199	Method of Sampling and analysis of concrete.
(7)	IS 1489-PART1	Specification for Portland Pozzolana cement
(8)	IS 1542	Specification for Sand for plaster
(9)	IS 2116	Specification for Sand for masonry mortars
(10)	IS 2386 (Part I, II, & III)	Method of tea for aggregate concrete. i) Particle size and shape ii) Estimation of deleterious materials and organic impurities iii) Specific gravity, density, voids, absorption and bulking
(11)	IS 2646	Specification for Integral cement water proofing compound.

(12)	IS 3025	Methods of Sampling and test (Physical and Chemical for Water used in Industry
(13)	IS 3068	Specification for Broken brick (burnt clay) coarse Aggregate for use in lime concrete
(14)	IS 4031 (Part i to xii)	Method of Physical test for hydraulic cement
(15)	IS 4032	Method of chemical analysis for hydraulic cement.
(16)	IS 6452	Specification for high Alumina cement for structure use
(17)	IS 6909	Specification for super sulphated weather
(18)	IS 7861	Code of practice for extreme weather concreting i) Recommended practice for hot weather concreting ii) Recommended practice for cold weather concreting
(19)	IS 8041	Specification for Rapid hardening Portland cement,
(20)	IS 8112	Specification for high strength ordinary port land cement.
(21)	IS 9103	Specification for admixture for concrete
(22)	IS 11433	Specification for one part gun grade i) Poly sulphate based joint sealant: general requirements.
(23)	IS 12118(part l)	Specification for two parts poly sulphide based sealant: General requirements.
(24)	SP 23	Handbook on concrete mix
(25)	SP 24	Explanatory handbook on Indian Standards code for plain And reinforced concrete (IS 456)
(26)	SP 27	Handbook of method of measurement of building works.

REINFROCEMENT AND FORM WORK

1.0. INDIAN STANDARDS

All relevant Standards as specified elsewhere in this Volume are applicable.

Indian Standards to be followed are:

(1)	IS 226	Specification for structural steel standard quality
(2)	IS 228	Methods for chemical analysis of steels
(3)	IS 280	Specification for mild steel wire for general engineering purpose
(4)	IS 303	Specification for plywood for general purpose.
(5)	IS 432	Specification for mild steel and medium tensile steel bars and hard drawn steel wires for concrete reinforcement.
	Part-1	Mild steel and Medium tensile steel bars.
	Part-2	Hard drawn steel wire
(6)	IS 456	Code of practice for construction and design of reinforced concrete
(7)	IS 723	Specification for steel counter sunk head wire nails.
(8)	IS 808	Dimensions for hot rolled steel beams, channels and angle section
(9)	IS 814	Covered electrodes for metal arc welding of structural steel.
(10)	IS 961	Specification for structural steel: high tensile steel bars.
(11)	IS 1139	Hot rolled MS. medium tensile steel and high field strength deformed bars for concrete reinforcement.
(12)	IS 1387	General requirements for supply of metallurgical materials.
(13)	IS 1599	Method for bend test for steel products other than sheets, strip, wire and tube.
(14)	IS 1608	Method of tensile testing: steel products
(15)	IS 1730	Dimensions for steel plates, sheets and strip for structural and general engineering purpose.
	Part-1	Plates
	Part-2	Sheets
	Part-3	Strips
(16)	IS 1786	Specification for cold worked steel high strength deformed steel bars for concrete reinforcement (Superseding IS 1139)
(17)	IS 1977	Specifications for structural steel: ordinary quality.
(18)	IS 2062	Specification for structural steel: fusion welding quality.
(19)	IS 2502	Code of practice for bending and fixing of bars for concrete reinforcement

(20)	IS 3696	Safety Code of scaffolds and ladders :
	Part-1	Scaffolds
	Part-2	Ladders
(21)	IS 4014	Code of practice for steel tubular scaffolding.
	Part-1 &2	
(22)	IS 4082	Recommendation on stacking and storage of construction materials at site.
(23)	IS 8989	Safety code for erection of concrete framed structures
(24)	IS 9417	Recommendations for welding cold worked steel bars for reinforced concrete construction.

2. REINFORCEMENT

2 1. Reinforcement bars used in construction shall be mild steel or medium tensile round bars and high strength deformed bars.

M.S. Plain

Rolled mild steel and medium tensile steel plain round bars used in concrete shall conform to IS 432 Part I. Steel received shall conform to the following IS with regards to manufacturing and chemical composition.

i) M.S. bar Grade I Steel designation Fe 410-S of IS 226

ii) M.S. bar Grade II Steel designation Fe410-O of IS 1977

iii) Medium Tensile Steel designation Fe 540 W-HT IS 961 Steel bars

National sizes and tolerances shall be as specified in IS 432 Part I. Physical requirements shall be determined in accordance with IS 1608 read in conjunction with IS 226. For ready reference of minimum requirements, properties are tabulated in table 11 of the Annexure.

Tor Steel

High strength deformed bars for use as reinforced in concrete shall be of grade Fe 415, Fe 500 and Fe 550 conforming to IS 1786.

Chemical composition shall conform to IS 1786 when made as a relevant part of IS 228. Permissible limits shall be as shown in table 12 of the Annexure,

Welding of cold work steel bars in reinforcement shall be permitted as per IS 9417 (Recommendation for welding cold worked steel bars for RCC)

Nominal sizes, cross sectional areas and their mass shall be as specified in IS 1786, allowing due consideration for tolerance specified therein.

Physical properties

a) !t shall satisfy IS 1599 test for bend and re-bend test in conjunction with IS 226

b) Bond requirements shall be deemed to have been satisfied if it meets clause 4.0 of IS 1786

c) Tensile, proof stress and percent elongation shall be as per table 3 of IS 1786 and reproduced as table 13 of Annexure for ready reference.

Quality of Material

Material received at site shall have ISI certification mark. Each bundle or coil containing the bars shall be suitably marked with ISI certification mark Also bars shall be marked to identify categories. This shall be done as per IS 1387

In case bars are without ISI certification mark, the manufacturer shall give a certificate stating process of manufacturer, chemical composition and mechanical properties. Each certificate shall indicate the number or identification mark of the batch production / cast to which it applied. Corresponding number or identification mark should be found on the material-

All reinforcement material shall be free from loose mill scale, excessive rust, loose rust, pitting, oil, grease, paint, mud or any foreign deleterious material present on the surface. Cleaning shall be done to the satisfaction of the Architect.

Each batch brought at site shall be tested prior to use for respective specification/ Physical properties Cost of all such tests shall be borne by the contractor. Material acceptable as per IS shall be allowed into the works. All rejected material shall be removed from site by the contractor within 3 days of rejection. If the same is not done, the Architect shall impose a penalty of Rs. 5007- per metric ton per day. This will be without any appeal and shall not be subjected to arbitration.

Reinforcement bars received at site shall be stored on hard concrete platform and clear of the ground with the use of timber sleeper, concrete sleeper or any other means. Reinforcement material shall be kept covered by tarpaulins or plastic to avoid corrosion and other contamination. It is advised to follow storage methods as described in IS 4082.

Miscellaneous

Cover blocks shall be of non-corrosive material such as plastic but not wooden or broken bricks or stone. Specially PVC made cover spacers shall be used in the Works. Concrete cover spaces may me permitted by the Architect. Such concrete spaces shall be cast from concrete and not cement mortar. Strength of these blocks shall be equal to the strength of concrete in use. These should be fully cured prior to use in works.

Binding wire shall be 16 gauge annealed wire conforming to IS 280. Binding shall be done with double wire. It shall be free from rust, Oil, paint, grease, loose mill scale or any other deleterious material undesirable for the reinforcement and concrete or which may prevent adhesion of concrete with reinforcement.

Deformed bars for concrete reinforcement and rolled mild steel and medium tensile steel conforming to IS 1139 shall be allowed in construction provided they are approved by the Architect.
Weight payable for reinforcement per meter shall be as follows:

1	8 mm	0.395 kg/Rmt
2	10 mm	0 617 kg/Rmt
3	12 mm	0.888 kg/Rmt
4	16 mm	1.578kgYRmt
5	20 mm	2.467 kg/Rmt
6	22 mm	2 984 kg/Rmt
7	25 mm	3.853 kg/Rmt
8	28 mm	4. 834 kg/Rmt
9	32 mm	6. 313 kg/Rmt
10	36 mm	7.990 kg/Rmt

11	40 mm	9.865 kg/Rmt

Fabrication of reinforcement

Reinforcement shall be fabricated as per the drawing. Bending shall be done mechanically with use of machine or if approved with hand but to the correct radius, with proper tools and platform and shall conform to IS 2502. Bending of material shall be cold bending only. Material shall be inspected for visible defects such as cracks, brittle, excessive rust, loose mill scale etc. Cracked ends of bars shall not be used in Works. Also the bars should be free from any deleterious material and hence the best practice shall be to hose down reinforcement just prior to concreting.

It is important that bending, straightening, cutting etc. shall be carried out in a manner not injurious to the material and the safety of the persons working should be ensured.

Anchoring of bars and stirrup shall be provided exactly as detailed in the structural drawing or as directed by the Architect.

Lapping of bar

Laps shall be strictly as per the drawing or as directed by the Structural Engineer for general guidance, the following principles shall be followed as given in IS 456.

a) Splices shall be provided as far as possible away from sections of maximum stress and be staggered.

b) Not more than half of the total bars shall be spliced at a section

c) Where more than one half of the bars are spliced at a section or where splices are made at points of maximum stress, special precautions shall be taken, such as increasing the length of lap and / or using spirals or closely spaced stirrups around the length of the splice.

d) Lap splices shall not be used for bars larger than 36 mm diameter, for larger diameters, bars may be welded. In cases where welding is not practical, lapping of bars larger than 36 mm diameter may be permitted and additional spirals should be provided around the lapped bars.

e) Lap length including anchorage value of hooks in flexural tension shall be LD (as defined in 25.2.1 of IS 456) or 30 dia whichever is greater and for direct tension 2 LD or 30 dia whichever is greater. The straight length of lap shall not be less than 15 dia or 20 cm. Where LD is the development length as described in 25.2.1 of IS 456.

f) When splicing of welded wire fabric is to be carried out, lap splices or wires shall be made so that the overlap measured between the extreme cross wires shall be not less than the spacing of cross wires plus 10 cm.

g) The lap length in compression shall be equal to the development length in compression, calculated as described in 25.2.1 of IS 456 or as specified in drawing but not less than 24 dia.

Spacing of bars

Bars shall be placed in position as shown in the drawing. Following guidelines as given in IS 456 shall be followed in case of difficulties or shall be carried out as directed by the Architect.

a) Horizontal distance between two parallel main reinforcing bars shall usually not be less than the greatest of the following.

   i) The diameter of the bars, if the diameters are equal,

   ii) The diameter or larger bar, if the diameters are unequal, and

iii) 5 mm more than the nominal maximum size of coarse aggregate (by using reduced size of aggregate in congested reinforced area, conditions given hereof should be overcome)

iv) Greater horizontal distance should be provided. But when needle vibrators are used, distance between bars of a group may be reduced to two-third of the nominal maximum size of the coarse aggregate, provided sufficient space is left between groups of bars to enable the vibrator to be immersed.

v) Where there are two or more rows, the bars shall be vertically in line and the minimum vertical distance between the bars shall be 15 mm two third the nominal maximum size of the aggregate or the maximum size of bar, whichever is more.

Cover to reinforcement

Reinforcement shall have concrete cover and the thickness of such cover (exclusive of plaster or other decorative finish) shall be as specified in drawing or as directed by the Architect. The following guidelines are to be observed in the absence of the above.

a) At each end of the reinforcing bar, not less than 25 mm. nor less than twice the diameter of such bar.

b) For a longitudinal bar in a column, not less than 40 mm, nor less than the diameter of such bar. In case of columns of minimum dimension of 200mm or under, whose reinforcing bars do not exceed 12 mm, a cover of 25 mm.

c) For longitudinal reinforcing bar in beam, not less than 25 mm, nor less than the diameter of such bar

d) For tensile, compressive, shear or other reinforcement, in slab not less than 15 mm, nor less than the diameter of such bar and

e) For any other reinforcement, not less than 15 mm, nor less than the diameter of such bar.

f) Increased thickness shall be provided in case the concrete members are in the surrounding of harmful chemicals; saline atmosphere etc. and the cover shall be 50 mm or more as directed by the Architect.

g) For concrete members totally immersed in seawater, the cover shall be 40 mm more than specified above (a) to (f).

This shall be 50 mm more for periodical immersion in seawater.

h) Concrete cover should not exceed 75 mm in any case. Cover to reinforcement shall be as specified in the drawing or as directed by the Architect.

Details given in sub Para (a) to (h) are for guidance and shall be followed in absence of any specific direction.

Fixing in position

Correctly cut and bent bars shall be accurately placed in position as detailed in the drawing. Unless otherwise specified by the Architect, reinforcement shall be positioned within the tolerance as under

a) For effective depth 200 mm or less ±10 mm

b) For effective depth more than 200 mm ± 15 mm

But in no case shall the cover be reduced by more than 5 mm of that specified. There shall be no compromise on cover for foundation work

Reinforcing bars shall be held in position during the placing of concrete by use of PVC or concrete cover blocks (made of equal / of higher grade strength of well-cured concrete in use) steel chair spacers, steel hangers, supporting wires, etc. and secured by tying with an annealed binding wire of 16 to 18 gauge as approved by the Architect.

Layer of bars shall be separated by precast concrete spacer blocks or spacer bars. Reinforcement shall be in correct position prior to start of concreting. No reinforcing bar shall be placed on freshly laid concrete for adjusting bar spacing. Care shall be taken to maintain reinforcement in position and keep it clean, throughout the period till it is embedded in the concrete. For maintaining cover, pieces of broken stone or brick or wooden blocks shall not be used at any stage.

Binding wire used shall conform to IS 280.

2.7.1 Welded joints or mechanical connections

Welded joints or mechanical connections in reinforcement may be used but in all cases or important connections, tests shall be made to prove that the joints are of the full strength of the connected bars. Welding of reinforcement shall be done in accordance with IS recommendation.

Where reinforcement bars are bent aside at construction joints and afterwards bent back into their original position, care should be taken to ensure that at no time is the radius of the bend less than 4 bar diameters in case of plain mild steel or 6 bar diameters for deformed bars. Care shall be taken when bending back bars to ensure that the concrete around is not damaged / disturbed.

Welding rods used shall conform to IS 814: covered electrodes for metal arc welding of structural steel. Work shall be carried out by a competent welder. Samples from Work site shall be taken at regular Intervals and tested. Frequency and number of samples shall be as directed by the Architect.

Measurements

Reinforcement shall be measured as follows:

Lengths of different diameters of bars actually used included authorized overlaps shall be measured nearestto a centimeter and their weight calculated as given in table 2.4.4 shall be used.

Chairs and spacer bars shall not be measured and paid. The contractor shall account for all these in his quoted price.

In case of welded coupled joints, measurement for payment shall be equivalent to the length of overlap, as per design

Price build-up shall include, in addition to cost of material.

a) Cover blocks of PVC or concrete.

b) Spacer bars, chairs and unauthorized overlaps (Allowed for convenience)

c) Cutting, bending, placing and fixing in position.

d) Binding wire as approved.

e) Wastage / Rolling margin.

f) Cleaning of bars.

For purpose of reconciliation, maximum wastage permitted shall be 5% of the actual material used. Balanceamount shall be borne by the Contractors.

3. OPENING / INSERTS

All required openings and pockets should be provided as detailed in the drawing. They may be enumerated or paid on area basis as detailed in the BOQ. The contractor shall provide for the required materials,

labour, for fixing and supporting during concreting In his quoted price. It is imperative that all openings and pockets shall be de-shuttered with care and all comers of openings shall be preserved. All openings/pocked shall be in a correct line and level. After concreting, the openings shall be secured against any accident by proper covering and guardrail and warning notice, if any.

The contractor shall clean and grout the pocket at a later date with a non-shrinking compound added to the grout mix or non-shrinking cement shall be used. It shall be well-cured and protected to correct line and level till handling over.

Inserts are material such as timber, steel, plastic, and dowels. Bolts, locks, brackets, pipes, etc. left in concrete partly or fully embedded to receive connection with foreign member at a later date. These may be fabricated by the contractor or provided by the EMPLOYER as received from specialist, manufacturer, etc. These shall be protected from weathering and damage in course of the construction. The cleaning required after concreting and any treatment such as oiling, greasing or covering with paint etc. shall be carried out by the contractor at his cost.

It is very important that the providing and fixing as contemplated in the BOQ shall be carried out with the "utmost precision" and to the entire satisfaction of the Architect. Any deviation from that as shown in the drawings or instructions shall be rectified by the contractor at his own cost and responsibility

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Wood Work

1. Door Frame

Timber for door, window and ventilators frames shall be as specified. Timber shall be sawn in the direction of the grains. All members of a frame shall be of the same species of timber and shall be straight without any warp or bow. Frames shall have smooth, well-planned (wrought) surfaces except the surfaces touching the walls, lintels, sill etc., which may be left clean sawn. Rebates, rounding or moulding shall be done before the members are jointed into frames. The depth of the rebate for housing the shutters shall be 15 mm, and the width of the rebates shall be equal to the thickness of the shutters. A tolerance of ± 2 mm shall be permitted in the specified finished dimensions of timber sections in frames.

Joints

The Jamb posts shall be through tenoned in to the mortise of the transoms to the full thickness of the transoms and the thickness of the tenon shall be not less than 2.5 cm. The tenons shall closely fit into the mortise without any wedging or filling. The contact surface of tenon and mortise before putting together shall be glued with polyvinyl acetate dispersion based adhesive conforming to IS 4835 or adhesive conforming IS 851 and pinned with 10 mm dia hard wood dowels, or bamboo pins or star shaped metal pins. The joints shall be at right angles when checked from the inside surfaces of the respective members. The joints shall be pressed in position. Each assembled door frame shall be fitted with a temporary stretcher and a temporary diagonal brace on the rebated faces.

Fixing of Frames

The frames shall be got approved by the Engineer-in-Charge before being painted, oiled or otherwise treated and before fixing in position. The surface of the frames abutting masonry or concrete and the portions of the frames embedded in floors shall be given a coating of coal tar. Frames shall be fixed to the abutting masonry or concrete with holdfasts or metallic fasteners as specified. After fixing, the jamb posts of the frames shall be plugged suitably and finished neat. Vertical members of the door frames shall be embedded in the floor for the full thickness of the floor finish and shall be suitably strutted and wedged in order to prevent warping during construction. A minimum of three hold fasts shall be fixed on each side of door and window frames one at centre point and other two at 30 cm from the top and bottom of the frames. In case of window and ventilator frames of less than 1 m in height two hold fasts shall be fixed on each side at quarter point of the frames. Hold fasts and metallic fasteners shall be measured and paid for separately.

Measurements

Wood work wrought, framed and fixed shall be measured for finished dimension without any allowance for the wastage or for dimensions beyond specified dimension. However, in case of members having mouldings, roundings or rebates and members of circular or varying sections, finished dimensions shall be taken as the sides of the smallest square or rectangle from which such a section can be cut. Length of each member shall be measured over all to the nearest cm so as to include projection for tenons. Width and thickness shall be measured to the nearest mm and the quantity shall be worked out in unit of up to three places of decimal.

Rate

The rate shall include the cost of material and labour involved in all the operations described above including the hold fasts and one coat of A.T.T. at the back side.

2. Flush Door

General :

All flush doors shall be of approved make external quality, laminated full solid core block board construction as per IS:2202 to IS:1959. They shall be faced on each face with high quality decorative or commercial veneers as required and shall have approved teakwood edge lipping. Block board core stock shall be of approved species of timber, well seasoned and proofed against termites by preservative chemical treatment. Veneers of decorative flush doors and block boards adjacent to one another shall be selected so that they match, to the satisfaction of the Architect.

Size and Thickness:

Flush door and block boards shall be of the required size and thickness. Flush doors shall be ordered to a size little more in width than shown on the scheduled so that after trimming it fits the opening between rebates perfectly.

Louvers and Vision Panels:

Where shown in the drawing and schedule flush doors shall be provided with kiln seasoned hardwood louvers to match face veneer or glazed vision panels as per standard manufacturers details Size of openings shall be as shown in drawings.

Rebating:

In case of double leaves shutters, the meeting of the styles shall be rebated by one third of the thickness of shutter. The rebating shall be either splayed or square type. Where lipping is provided, the depth of lipping at the meeting of styles shall not be less than 35 mm.

Fittings

Details of fittings to be provided shall be as per the schedule of fittings shown in the drawings All fittings shall be heavy duty of approved make

Fixing in Masonry Openings:

a) Fixing with Lugs:

i) Doors, windows and ventilators unit shall not be 'built in' as the work proceeds but opening shall be left out and frames fitted afterwards so that the minimum specified clearance between opening and unit frame is left around. The size of the opening shall first be checked and cleared of obstruction, if any. The position of the unit and fixing holes shall be marked on the jamb. Necessary holes shall be made in the masonry and lugs not less than 10 cm long 15*3 mm size fixed in cement concrete blocks 15 * 10' 10 cm size of 1:3:6 mix (1 cement: 3 coarse sand: 6 graced stone aggregate 20 mm nominal size). The frames of units shall be set in the opening by using wooden wedges at the jamb, head and sill, (wedges shall preferably be placed near the points where *a* glazing bar meets the frames and be plumbed in position)

ii) After it, the frame shall be fixed with the lugs with 20 mm, long and 6.3 mm dia G.I. Counter sunk machine screws and nuts. In case of flush opening which are rendered smooth, wedges shall be removed and gap between unit and jambs shall be filled with cement mortar

iii) In case of flush jamb with external 'fair faced' finished the gap between the opening and frame shall be filled with mastic from inside till it oozes out on external face. The oozing mastic shall be cleaned and flush pointed. The internal gap shall be filled with mastic to about 1/3 rd depth and the rest with cement mortar.

iv) In case of rebated and jambs finished 'fair faced' externally the mastic shall be freely applied to the inside channel of frame, jamb and sill, so as to ensure a watertight joint. After the unit is firmly fixed in position surplus mastic shall be cleaned and flush pointed, as shown in drawing.

b) Fixing with Screws and Plugs:

In RCC work where lugs cannot be embedded due to reinforcement bars etc rawl plugs or other approved of metallic fasteners such as Dash Fasteners of the required size and type as approved shall be used.

Metal Insets in RCC & Brick Work

1 General:

Anchor bolts, rolled steel sections sleeves, pipes, inserts, etc. shall be galvanized and shall be fixed or inserted as shown or directed. The Contractor shall supply and place in the shuttering all such inserts as may be required for sanitary, electric or work of any other trade. Work shall be done exactly as required for the purpose, to the satisfaction of the Architect.

2 Miscellaneous M.S. Works

Quality of Steel:

All mild steel used in this work shall be tough with even surface and shall cleanly rolled, sound and free from flaws, cracks, crop ends and other defects.

Workmanship:

All work shall be carried out as per drawing in a neat and good craftsman like manner by specially skilled men known for good quality wont..

Measurements to be checked:

The Contractor shall check all measurements at site and with surrounding works and make necessary adjustments in the drawings, if required to suit actual site conditions to the approval of the Engineer before starting fabrication.

Assembly:

Work carried out in sections shall be carefully assembled. All members shall be secured together or to the anchors by welding or as shown in the details. AH welds shall be ground smooth and made to match surrounding surfaces and finished to the satisfaction of the Architect

Setting in Lead:

Where the work is fixed to concrete it shall be set in lead. In exterior locations, the end of the main structural support near the point of embedding shall be cleaned and covered with a solar and a bronze sleeve or umbrella shall be set on the steel upright to cover the joint and sealed by blow lamp.

3 Aluminum Doors and Windows

General:

Aluminum doors, windows, etc. shall be electro treated natural anodized free of scratches and any other blemishes or any other approved colour and shall be of sizes as shown on drawings. The details shown on the drawings indicate generally the sizes of the component parts and the general standards. These may be varied slightly on approval to suit the standards adopted by the manufacturers of the aluminum work. Before proceeding with any manufacture, the contractor shall prepare and submit complete manufacturing and installation drawings for approval of the Engineer and no work shall be performed until the approval of these drawings are obtained. All requisite materials and labour as specified here under shall be fully covered under the rates prices for proper execution and completion of the work. Weather-strip, gaskets and sealants shall

be of high quality material capable of resisting local environment exposure and performance requirements. Interior primary sea be a compression type weather seal.

Shop Drawings & Samples:

The contractor shall submit shop drawings and samples of each type of windows, ventilators and other aluminum work, to the Engineer for his approval. The shop of commencing the work.

Aluminum sections to be used for doors, windows, ventilators and fixed glazing etc. shall be fabricated from Hindalco, Indal, Jindal or equal approved extruded sections. The sections shall be extruded form aluminum alloy IS:63400 WP/AA : 6063 T6/BS:HE 9 WP approved equivalent, of commercial quality and free from all defects impairing appearance, strength and durability. The permissible dimensional tolerances of the extruded sections shall be such as not to impair the proper and smooth function/operation and appearance of doors and windows. For any excess weight of section used nothing extra shall be paid.

Fabrication:

Doors, windows, ventilators, etc. shall be fabricated by an approved specialist firm. All doors and windows shall have mechanical joints. The aluminum sections joints shall be designed to withstand a minimum wind load of 175 kg. Per Sq Mtr the designed sections shall also ensure that the maximum deflection of any framing shall not exceed L/175 of the span of the member. All members shall be accurately machined and fitted to form hairline joints prior to assembly, The jointing accessories such as cleats, brackets etc. shall be of such material as not to cause any bimetallic action. The design of the joint and accessories shall be such that the accessories are fully concealed. The fabrication of doors, windows, etc. shall be done in suitable sections to facilitate easy transportation, handling and installation. Adequate provision shall be made in the door and window members for anchoring to supports and fixing of hardware and other fixtures as approved by the Engineer. The aluminum sections shall confirm to the following parameters also:-

a) The minimum tensile strength shall be 19 kgf/ mm2,

b) The maximum allowable deviation in length from a straight line shall be 0.5 mm/meter.

c) The maximum allowable deviation from straight shall be 1 degree.

d) The maximum permissible twist shall be 0 5mm/Metre.

e) The maximum variation in flatness shall be not more than 0.125 * Width/25.

Anodizing:

All surfaces of windows, ventilators & fixed glazing etc. shall be natural anodized in approved shade to conform 615:1868-1968 Grading-8. Anodic coating shall be of a minimum thickness of 0.025mm. The testing shall be done by Eddy current method as per IS: 6012 for thickness and relevant test for sealing and colour variation measurements shall also be carried out. Sulphuric acid shall be used as the electrolyte for the anodic process. The anodizing shall be carried out in an approved manner to achieve the desired colour. Prior to anodizing all aluminum shall be rendered uniform in appearance free from disfiguring scratches, stains or other blemishes and etched in a caustic soda solution.

Protection of Anodized Finish:

Requisite tests shall also be required to be carried out at site as instructed by the Architect and contractor shall arrange all assistance and equipments required for these tests at site for which no extra payment shall be made to the contractor. All aluminum members shall be wrapped with self adhesive non staining PVC tapes manufactured by Messrs, Bhavan & Son, Bombay or equivalent, approved by the Bank//Architect.

Handling:

Fabricated materials shall be created in an approved manner to protect the material against any damage during transportation. The loading and unloading shall be carried out with utmost care.

Installation:

Just prior to installation, the doors, windows etc. shall be stacked on edge on level bearers and supported evenly.

If so specified or directed by the Bank//Architect, window/door frames shall be fixed to 25mm thick 2nd class hard wood rough ground. Width of rough ground shall be exactly the same width of the frames. Wooden rough grounds shall be fixed to masonry surrounds with approved fasteners. The face of rough ground to receive frames shall be in true line, level and plumb- Whenthe rough ground is property secured and all major internal and external finishing works are over, the assembled doors/windows shall be placed in correct final position in the opening and fixed to rough block through cadmium plated machine screws of required size and spacing. Then all joints shall be sealed with approved silicon sealants. Sizes, details, spacing, etc. given above are approximate and indicative only. They can be varied at the option of Architect to suit particular sizes and situations and the contractor shall carry out the instructions of the Architect in this regard at no extra cost to the owner. The contractor may suggest alternative methods of fixing and anchoring for consideration of the Architect, while the decision of the Architect in this regard shall be final and binding.

In the case of composite windows the different units are to be assembled first. The assembled composite units should be checked for line, level and plumb before final fixing is done. Units may have to be assembled in their final location if the situation so warrants.

Where aluminum comes into contact with masonry, brickwork, concrete, plaster or dissimilar metal, it shall be coated with an approved insulation lacquer, paint or plastic tape to ensure that is trimmed off to a dean line on completion. The contractor shall be responsible for assembling composite units, bedding and pointing with mastic inside and outside, at the transoms and mullions, placing the doors, windows, etc. in their respective openings. After the doors/windows have been fixed in their correct assigned position, the open hollow sections abutting masonry/concrete shall be filled with cement grout (1 cement :3 coarse sand) densely packed and finished neat without causing any scratch/damage to Aluminum sections. Final packing grout shall be of the expanding type made by approved additive. The contractor shall be responsible for the doors, windows etc. being set straight, plumb, level and for their satisfactory operation after fixing is complete.

Epdm Gaskets;

EPDM gaskets of approved size and profile shall be provided and installed at all locations as shown and as called for to tender the doors windows etc. Absolutely air tight and weather tight. Samples of the gaskets shall be produced for approval and procure after approval only.

Sealant:

The gaps between frames and supports and also any gaps in the window sections shall be raked out as directed and filled with approved silicon sealant of approved colour and make to ensure complete water-tightness. The silicon sealant shall be of such colour, and composition that it would not stain the masonry/concrete work, shall receive paint without bleeding, will not sag, or run and shall not set hard or dry out under any conditions of weather. Silicon sealant shall be applied with special gun as per manufacturer's recommendation by a specialist firm approved by Engineer.

Fittings:

Nylon rollers, Stainless Steel frictional hinges, shutter entilift curbs, buffers, handles, locks and other fittings shall conform to the relevant I.S. specifications and quality and manufacture as approved by the Engineer. Fittings shall retain the casements rigidly in both the open and dosed position; hinges shall be wrapped and protected until after the completion of the building. Hinges shall be close-up type and shall be opening as shown. These hinges shall work in conjunction with friction adjusters as a hold open device or additional friction for controlled operation.

Rollers shall be heavy duty type and allow free sliding movements without any friction.

Final Cleaning:

The PVC wrapping, protecting and anodized finish shall be retained till the glazing work is commenced. After the glazing and all work connected with installation of windows is complete all aluminum work shall be washed with a suitable thinner and left in a finished condition, in approved uniform appearance and free from all marks and blemishes.

Flooring

1. **Glazed Tile in Dado:**

Tiles:

The tiles shall be of approved make/manufacturer. They shall be flat, and true to shape and free from cracks, crazing, spots, chipped edges and comers. The surface shall be of uniform shade except for patterned tile

The tiles shall be of nominal sizes of 200 * 100 cm or as shown. The thickness of the tiles shall be 5 to 6 mm unless comerwise required or shown

Colour and Pattern:

The tiles shall be white, colored or patterned as specified.

Preparation of surfaces:

The joints shall be racked out to a depth of at least 12 mm in masonry walls, while the masonry is being laid. In case of concrete walls, the surfaces shall be backed and roughened with the wire brushes. The surface shall be cleaned thoroughly, washed with water and kept wet before skirting /dado is commenced.

Mortar:

12 mm thick plaster of cement mortar 1:3 shall be applied and allowed slightly to harden. The plaster shall be roughened with wire brushes or by scratching diagonal at close intervals.

Laying of Tiles:

The tiles shall be soaked in water, adequately washed clean, and a coat of neat cement slurry applied liberally at the back of tiles and set in the bedding mortar. The tiles shall be tamped and corrected to proper plane and lines. The tiles shall be set in the required pattern and butt jointed. The joints shall be as fine as possible and uniform. Top of dado shall be truly horizontal and joints truly vertical except where otherwise indicated. Where full size tiles cannot be fixed these shall be cut to the required size and their edges rubbed smooth. Care shall be taken to ensure that as far as possible cut tile are in non-exposed locations. Works shall be carried out in all areas only after a sample panel has been approved by the Architect.

Pointing:

After laying is complete, the joints shall be cleaned off the gray cement grout with wire brush and all dust and loose mortar removed. The joints shall then be flush pointed with white cement slurry added with approved pigments to match the colour of tiles.

Curing and Finishing:

The surface shall be deemed and kept wet by sprinkling water for seven days. The finished surface shall be clear, free of patches and glossy and shall not sound hollow. Finished dry surfaces shall be washed with mild organic acid, if so required. The finished surface shall meet the approval of the Architect.

WATERPROOFING

Waterproofing will be done as per specification given in BOQ which will be specified in DSR & BSR work will be done as per these specifications.

Plastering and Rendering General

1 Scope:

This section shall cover internal and external plastering/rendering works as shown in the drawings.

2. Mortar:

The mortar of specified mix shall be used. Cement and sand shall be tested as specified.

3. Scaffolding:

Stage scaffolding shall be provided for plastering work as per Standard Practice and as directed by Engineer. This shall be independent of the walls.

4. Plaster to Extend:

All interior plaster shall be extended up to 12 mm below the skirting or dado level at no extra cost wherever required.

5. Preparation of Surface:

Joints of Concrete block work walls shall be raked-out properly. Dust and loose mortar shall be brushed out. Efflorescence if any shall be removed by brushing and scraping.

Shuttering imperfections of all concrete shall be roughened by hacking with chisel and all resulting dust and loose particles cleaned and the surface shall be thoroughly hacked or bush hammered to the satisfaction of Architect. The surface shall be thoroughly cleaned and kept wet as specified before plastering is commenced.

6 Approval of Engineer to be taken:

No plastering work shall be started before all conduits, pipes, fittings and fixtures clamps, hooks, doors and window frames etc. are embedded, grouted and cured and all defects removed to the satisfaction of Architect. A sample of plasterwork shall be prepared and got approved before proceeding with the work. Special approval shall be taken from Architect before starting each plastering work. No cutting of finished plaster shall be allowed. No portion shall be left out initially to be patched up later on.

7 Exterior Plaster:

General:

Exterior plaster shall be 20 mm thick, unless otherwise specified, generally sand faced the base coat shall be about 12 mm thick with coarse sand applied after the base coat has set but not dried. The base coat shall be 1:6 (1 cement: 6 coarse sand) and second coat shall be 1:4 cement mortar (1 cement: 4 coarse sand). Acrylic water proof chemical @ 0.5 kg. Per 50 kg. of cement or as recommended by the manufacturer shall be admixed with the plaster, wherever specified in the item.

Mixing:

The ingredients shall be mixed in specific proportions by volume. The mixing shall be done in a mechanical mixer or by hand mixing on water-tight platform. The cement and sand shall first be mixed thoroughly dry in the mixer. Water shall then be added gradually and wet mixing continued for at least a minute until mortar attains the consistency of a stiff paste and uniform colour. Mortar shall be used within 30 minutes of addition of water Mortar which has partially set shall not be used and removed from the site immediately.

Application of Plaster

General:

Wall plastering shall be started after the completion of ceiling plaster from top and gradually worked down towards floor. It shall not, at any place be thinner than as specified. To ensure even thickness and a true surface, plaster pads of about 75 mm * 75 mm shall be first applied horizontally and vertically at not more than 2 m interval over the entire surface to serve as gauges. The mortar shall then be applied to the wall/surface between the gauges and finished even. All comers, junctions and rounding shall be truly vertical or horizontal and finished carefully. Generally work in an enclosure shall be completed in one day. For larger areas if the work has to be suspended at the end of the day, plaster shall be cut clean to line. Where recommencing, the plastering, edge of old work shall be scrapped, cleaned and wetted with cement putty before restarting plastering.

Base Coat:

The mix shall be stiff enough to cling and hold when laid. On walls, the mix shall be laid in long even spreads upwards and across using sufficient pressure to force it into the key on the backgrounds. The mortar shall be laid as uniformly as possible. The average thickness shall not exceed that specified. This coat shall be allowed to stand firm till before scratching for key. The surface shall then be combed or cross-scratched with a wire scratchier.

Second Coat:

A reasonable time (not more than 48 hours) shall be allowed after the application of the base coat for thorough drying before the application of the second coat. After soaking base coat thoroughly with water the mortar for second coat shall be applied with a feather edge rule to a true and even surface. The surface shall then be thoroughly scoured with a wood hand float, and any inequalities filled in. Over working shall be avoided

Single Coat Work:

Single coat work shall be finished smooth as specified in second coat work. Special care shall be taken to secure bond with the concrete/brick wall.

Plastering over Steel Surfaces:

Where plastering is to be done over steel surface, suitable expanded metal covering the steel surface and secured to the adjoining wall/concrete surface with an overlap of 200 mm shall be provided.

Plastering at Junction of Masonry/ R-C.C:

All junction of Masonry wall with R.C. structures e.g. column, beam etc. shall be plastered after providing and fixing of approved G.I. chicken Wire mesh 250 mm wide centrally over the length of junction either vertically or horizontally to the satisfaction of Engineer. G. I. Chicken Wire Mesh of required width shall also be fixed over the chasing for conduits, pipes etc. on masonry wall before plastering is commenced.

8. Neeru Finish:

Material:

Wherever specified, the plastered surface shall be finished with Neeru Lime class C (i.e. pure fat lime) conforming to IS: 712-1964 shall only be used and sand shall be of approved quality passing through IS Sieve No.60 (0.599 mm) for preparation of Neeru. Water shall be free from chemical impurities and salts' conforming to relevant IS code. Lime shall be slaked and mixed with sufficient water to form thick paste. It shall be reduced to a fine paste by grinding. It shall then be passed through a fine sieve (3 mm mesh) to remove all unslaked particles and foreign matter and allowed to mellow under water for at least 10 days in large slaking tanks. The surplus water on the top shall be prepared by mixing together 4 parts of this lime paste and 1 part of fine sieved sand by volume. Jute fiber finely chopped shall be added to the mixed mortar at the rate of 4 kg of Jute to every cubic meter of lime sand mixture. The mixture shall then be properly ground to a fine paste between two stones or *a* mill.

Preparation:

The Neeru thus prepared shall be kept moist till used and this moist neeru must be consumed within a period two weeks.

The plaster surface shall be combed lightly by wire brushes or nails before it is completely set to form key for Neeru. The under coat shall be only combed evenly but not soaked before the application of Neeru.

Application:

Neeru shall be applied to the prepared and partially set plastered surface with steel trowel to a thickness slightly exceeding 1.5 mm and rubbed down to 1.5 mm (1/6") thickness finally and polished to perfectly smooth and even finish, working from top to bottom. While toweling, soap stone powder contained in thin muslin bags shall be dusted over the surface and work on. Moistering shall be commenced as soon as the plaster has hardened sufficiently and is not susceptible to injury, socking of wall to be avoided and only as much water as can be readily absorbed shall be used. The surface shall be kept sprinkled with water for 14 days minimum Instant Neeru of approved make can also be used in the manner recommended by the manufacturers.

9. Painting, Varnishing and Rendering General

Materials:

All materials shall be the best of their kind and of approved manufacture for each item. Painting materials such as shellac, thinner, oils, driers, rollers, brushes, etc. shall be of the best approved quality and type. If for any reason, thinning is necessary in case of ready mixed paint, the brand of thinner recommended by the manufacturer or as instructed by Engineer shall be used.

Sealed Containers:

Approved paints, oils or varnishes shall be brought to the site of work by the Contractor in their original containers in sealed condition. The material shall be brought in at a time in adequate quantities to suffice for the whole work or at least a fortnight's work. The empty containers shall not be removed from the site of work, till the relevant item of work has been completed and permission obtained from Engineer.

Storage:

All materials shall be stored in a neat and orderly fashion in one single dean space. Care shall be taken to maintain this place as clean and dust-free as possible

Specialized Workmen:

All work shall be done by the specialized skilled workmen experienced in the trade.

Works as per Manufacturer's Instructions:

All work shall be done strictly as per this specification and manufacturer's printed instructions. In case these specifications differ in any way from manufacturer's instructions, the latter shall apply.

Finished Surface to Engineer's Satisfaction:

AH finished surface shall be required texture (smooth, rough or any other) and of even shade to the satisfaction of Engineer

Protection:

Alt work done shall be thoroughly protected from damage at all times by suitable methods approved by Engineer. All other adjacent work or materials not received the finish at that time shall also be thoroughly protected by suitable canvas or paper covering or by other approved method.

Damages to be made good:

Any damage or disfigurement of other works shall be immediately made good. Alt paint and varnish spots and other stains shall be thoroughly and carefully removed from all floors, doors, windows, fittings, furniture, glass, hardware and all other surfaces required, by approved paint removers and the places left dean and tidy to the satisfaction of Engineer.

Intimation before Starting:

No work under this section shall start without approval from Engineer.

Samples:

Before starting work under this section large size samples of all work shall be prepared by the Contractor for approval. Only after specific approval has been given to the samples, work shall commence. The actual work done shall be done as per the approved samples.

Preparation:

All surfaces to be finished shall be thoroughly brushed and cleaned of mortar drops, dust, dirt, fungi, rust, mill-scale, efflorescence and all other extraneous material all loose places and scales shall be removed by scrapping. Surfaces shall be thoroughly, sand-papered to a smooth finish. Further preparation work shall be done as specified under different types of finishes. Before starting printing all floors shall be washed clean and wiped dry.

10. White Washing & Colour washing:

Surface Preparation:

The surface shall be thoroughly brushed free from mortar droppings and foreign matters. All plaster damages shall be made good to the satisfaction of Engineer by cement sand mortar and curing till sufficiently before the painting work is taken up.

Material:

The white wash shall be prepared from fresh shell time to which shall be admixed with sufficient quantity of whiting and gum. The lime and whiting shall be made into thin cream and screened through dean coarse cloth.

Fevicol DDL as per manufacturer's instructions shall be added to the cream, Indigo up to 3 gms per kg. Of lime dissolved in water shall then be added to the composition. Water at the rate of about 5 liters per kg. of lime shall be added to produce a milky solution.

Application:

In case of colour washing approved mineral colours not affected by lime shall be added to the white wash in required quantities instead of indigo.

The wash shall be applied with approved brushes in 3 coats Each coat shall be allowed to dry before applying the next. In case the surface does not present a smooth and uniform finish throughout to the satisfaction of Engineer more coasts shall be added as required at no extra cost.

11. Cement Paint:

Preparation of Surface:

For new work, the surface shall be thoroughly cleaned of all mortar dropping, dirt, dust algae, grease and other foreign matter by brushing and washing. The surface shall be thoroughly wetted with clean water before the cement paint is applied.

In the case of old work, all loose pieces and scales shall be removed and the surface shall be cleaned of all dirt, algae, oil etc. by brushing and washing. Pining in plaster shall be made good and a coat of best quality water proof cement paint shall be applied over patches after wetting them thoroughly.

Preparation of mix:

Cement paint shall be mixed in such quantities as can be used up within an hour of its mixing as otherwise the mixture will set and thicken, affecting flow and finish.

Cement paint shall be mixed with water in two stages The first stage shall comprise of 2 parts of cement paint and one part of water stirred thoroughly and allowed to stand for 5 minutes. Care shall be taken to add the cement paint gradually to the water and not vice versa. The second stage shall comprise of adding further one part of water to the mix and stirring thoroughly to obtain a liquid of workable and uniform consistency. In all cases the manufacturer's instructions shall be followed meticulously. The lids of cement paint drums shall be kept tightly closed when not in use, as by exposure to atmosphere the cement paint rapidly becomes air set due to its hygroscopic qualities.

Application:

The solution shall be applied on the clean and wetted surface with brushes or spraying machine. The solution shall be kept well stirred during the period of application. It shall be applied on the surface which is on the shady side of the building so that the direct heat of the sun on the surface is avoided. The method of application of cement paint shall be as per manufacturer's specification. The completed surface shall be watered after the day's work.

The second coat shall be applied after the first coat has been set for at least 24 hours. Before application of the second or subsequent coats, the surface of the previous coat shall not be wetted.

For new work, the surface shall be treated with three or more coats of water proof cement paint as found necessary to get a uniform shade.

For old work, the treatment shall be with one or more coats as found necessary to get a uniform shade.

Precaution:

Water cement paint shall not be applied on surfaces already treated with white wash, colour wash, distemper dry or oil bound, varnishes, paints etc. It shall not be applied on gypsum, wood and metal surfaces.

12. Painting with Synthetic Enamel Paint

General:

Synthetic enamel paint (conforming to 15:1932-1964) of approved brand and manufacturer and of the required colour shall be used for the top coat and undercoat of shade to match the top coat as recommended by the manufacturer shall be used.

Commencing Work:

Painting shall not be started until Engineer has inspected the items of work to be painted, satisfied himself about their quality and given his approval to commence the painting work. Painting of external surface should not be done in adverse feather condition like hail storm and dust storm. Painting except the priming coat, shall generally be taken in hand after practically finishing all other builder's work.

The rooms should be thoroughly swept out and the entire building cleaned up, at least one day in advance of the taint work being started.

Painting on New Surface:

Preparation of surface shall be as specified above or as the case may be.

Application:

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

a) Undercoat:

One coat of the specified paint of shade suited to the shade of the top coat shall, be applied and allowed to dry overnight. It shall be rubbed next day with the finest grade of wet abrasive paper to ensure a smooth and even surface, free from brush marks and all loose particles dusted off.

b) Top Coat:

Top coats of specified paint of the desired shade shall be applied after the undercoat is thoroughly dry. Additional finishing coats shall be applied if found necessary to ensure properly uniform glossy surface.

Preparation of Surface

a) Wood Work:

The surface shall be cleaned and all unevenness removed as specified above. Knots if visible shall be covered with a preparation of red lead. Holes and indentations on the surface shall be filled in with glazier's putty or wood putty and rubbed smooth before painting is done. The surface should be thoroughly dry before painting.

b) Iron and Steel Work:

The priming coat shall have dried up completely before painting is started. Rust and scaling shall be carefully removed by scrapping or by brushing with steel wire brushes. All dust and dirt shall be carefully and thoroughly wiped away.

13. Textured Wall Rendering:

General:

Where so specified or directed by the Engineer, textured wall rendering of approved make and of approved sample shall be used two or more coats as per recommendation of the manufacturer- All the coats of rendering shall have same binding medium. Different binding medium as the under coat should not be used- The rendering shall have non fading properties & shall be resistant to ultra violet rays. As the rendering is acrylic co-polymer based material therefore curing by water should not be done.

Commencing Work:

Rendering shall not be started until Engineer has inspected the items of work to be rendered and satisfied himself about the application and given his approval to commence the rendering work. Rendering of external surface should not be done in adverse weather condition like hail storm, dust storm and rain.

Rendering except the base coat, shall generally be taken in hand after practically finishing all other builder's work.

The rooms should be thoroughly swept out and the entire building cleaned up, at least one day in advance of the paint work being started.

Application:

Number of coats including the under quote shall be as specified by the manufacture & approved by the Engineer. Base quote is to be applied with brush. Finishing coats of rendering shall be applied with smooth rollers in desired shade given uniform finish ensuring minimum consumption of 0.25 kg. of material per Sq.mt.

Scaffolding

Double scaffolding having two sets of vertical supports shall be provided. The supports shall be provided. The supports shall be sound and strong, tied together with horizontal pieces over which scaffolding planks shall be used.

TABLE - 1 (Sec. I 2.2.2, 2.3.2.1)
LIMITS OF DELETERIOUS MATERIALS (AGGREGATES)
[IS 383 - Table 1]

SR. No.	Deleterious substance	Method of test	Fine Percentage Aggregate		Coarse Percentage Aggregate	
(1)	(2)	(3)	(4) Weight, Max Uncrushed	(5) Weight, Max Crushed	(6) Uncrushed	(7) Crushed
i)	Coal and lignite	IS : 2386 (Part-ll)	1.00	1.00	1.00	1.00
ii)	Clay Lumps	-do-	1.00	1.00	1.00	1.00
iii)	Material finer than 75 - (MU) IS Sieve	IS : 2386 (Part-1)	3.00	15.00	3.00	3.00
iv)	Soft fragments	IS : 2386 (Part -II)	-	--	3.00	-
v)	Shale	IS : 2386 (Part -II)	1.00	--	-	-
vi)	Total of percentage of all deleterious materials (except mica) including SI. No. (i) To (v) for Col. 4, 6 and 7 and SI, No. (i) and (ii) for Col. 5 only	-	5.00	2.00	5.00	5.00

Note: - 1 The Presence of mica in the fine aggregate has been found to reduce considerably the durability and compressive strength of concrete and further investigations are underway to determine and extent of the deleterious effect of mica, It is advisable, therefore, to investigate the mica content of fine aggregate and make suitable allowance for the possible reduction in the strength of concrete mortar,

Note: - 2 The aggregate shall not contain harmful organic impurities (tested in accordance with IS: 2386 [part - ii]) in sufficient quantities to affect adversely the strength or durability of concrete. A fine aggregate which fails in the test for organic impurities may be used, provided that, when tested for the effect of organic impurities on the strength of mortar, the relative strength at 7 and 28 days, reported in accordance with 7 of IS : 2386 [Part - VI] - 1963 is not less than 95% percent.

TABLE - 2 (Sec. I 2.2.4)
GRADING OF COARSE AGGREGATES
[IS 383 - Table 2]

IS Sieve Designation	Percentage passing for single - sized Aggregate of Nominal Size						Percentage passing for Graded Aggregate of Nominal Size			
	63mm	40 mm	20mm	16 mm	12.5mm	10 mm	40 mm	20mm	16 mm	12.5 mm
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
80mm	100	------	------	------	------	------	100	------	------	------
63 mm	85 to 100	100	------	------	------	------	------	------	------	------
40 mm	0 to 30	85 to 100	100	------	------	------	95 to 100	100	------	------
20 mm	0 to5	0 to20	85 to 100	100	------	------	30 to 70	95to100	100	100
16 mm	----	----	----	85 to 100	100	------	------	------	90 to100	------
12.5mm	----	----	—	--	85 to 100	100	------	------	------	90 to 100
10 mm	0 to 5	0 to 5	0to20	0 to 30	0 to 45	85 to 100	10 to 35	25 to 55	30 to 70	40 to 85
4.75 mm	----	----	0 to 5	0 to 5	0 to 10	0 to 20	0 to 5	0 to 10	0 to 10	0 to 10
2.36 mm	----	----	----	----	----	0 to 5	----	----	----	----

TABLE - 3 (Sec. I 2.2.4)
ALL-IN AGGREGATE GRADING
[IS 383 - Table 5]

IS Sieve Designation	Percentage for ALL IN Aggregate of	
	40mm Nominal Size	20 mm Nominal Size
(1)	(2)	(3)
80mm	100	----
40mm	95 to 100	100
20 mm	45 to 75	95 to 100
4.75mm	25 to 45	30 to 50
600 micron	8 to 30	10 to 35
150 micron	0 to 6	0 to 6

TABLE - 4 (Sec. I 2.2.3)
GRADING OF FINE AGGREGATES
[IS 383-Table 4]

IS Sieve Designation	Percentage Passing for			
	Grading Zone I	Grading Zone II	Grading Zone III	Grading Zone iv
10mm	100	100	100	100
4.75 mm	90 to 100	90 to 100	90 to 100	95 to 100
2.36 mm	60 to 95	75 to 100	85 to 100	95 to 100
1.18mm	30 to 70	55 to 90	75 to 100	90 to 100
600 micron	1 5 to 34	35 to 59	60 to 79	80 to 100
300 micron	5 to 20	8 to 30	12 to 40	15 to 50
150 micron	0 to 10	0 to 10	0 to 10	0 to15

NOTE - 1 for crushed stone sands, the permissible Limit on 150 micron IS Sieve is increased to 20 percent. This does not affect the 5 percent allowance permitted in 4.5 applying to other sieve sizes.

NOTE - 2 Fine Aggregate complying with the requirements of any grading zone in this table is suitable for concrete but the quality of concrete produced will depend upon a number of factors including proportions.

NOTE - 3 where concrete of high strength and good durability is required, fine aggregate conforming to any one of the four grading zones may be used, but the concrete mix should be properly designed. As the fine aggregate grading becomes progressively finer, the is, from Grading Zones I to IV, the ratio of fine aggregate to coarse aggregate should be progressively reduced. The most suitable fine to coarse ratio to be used for any particular mix will, however, depend upon the actual grading, particle shape and surface texture of both fine and coarse aggregates.

NOTE - 4 it is recommended that fine aggregate conforming to Grading Zone IV should not be used in reinforced concrete unless tests have been made to ascertain the suitability of proposed mix proportions.

TABLE - 5 (Sec. I 2.3.4)

MOISTURE CONTENT & BULKING PERCENTAGE RELATION FOR SAND

Moisture- Content % by weight	Bulking & (Volume)
2	15
3	20
4	25
5	20

TABLE - 6 (Sec. I 2.5.2)

PERMISSIBLE LIMITS FOR SOLIDS (in water)

Particulars	Permissible Limit, Maximum
Organic	200 mg/l
Inorganic	3000 mg/l
Sulphates (as SO_4)	2000 mg/l for plain concrete work and 1000 mg/l for reinforced concrete work
Suspended matter	2000 mg/l

TABLE-7 (Sec I 3.1.1)
GRADE OF CONCRETE
[IS 456 - TABLE 2]

GRADE DESIGNATION	SPECIFIED CHARACTERISTIC STRENGTH AT 28 DAYS COMPRESSIVE (N/mm2)
M 10	10
M15	15
M20	20
M25	25
M30	30
M35	35
M40	40

NOTE - 1 in the designation of a concrete of mix, letter M refers to the mix and the number to the specified characteristic compressive strength of 15 cm cube at 28 days, expressed in N/Sq. mm.

NOTE - 2 M 5 and M 7.5 grade of concrete may be used for lean concrete bases and simple foundations for masonry walls. These mixes need not be designed.

NOTE - 3 Grades of concrete tower than M 15 shall not be used in reinforced concrete.

TABLE-8 (Sec. I 3.1.1)

MINIMUM CEMENT CONTENT REQUIRED IN CEMENT CONCRETE TO ENSURE DURABILITY UNDER SPECIFIED CONDITIONS OF EXPOSURE

[SP - 23 - Table 23 & IS 456 - Table 19]

EXPOSURE	PLAIN CONCRETE		REINFORCEMENT	
	MINIMUM CEMENT CONTENT	MAXIMUM WATER CEMENT RATIO	MINIMUM CEMENT CONTENT	MAXIMUM WATER CEMENT RATIO
(1)	(2)	(3)	(4)	(5)
	Kg/m^3		Kg/m^3	
Mild - for example, completely protected against weather, or aggressive conditions, except for a brief period of exposure to normal weather conditions during construction.	220	0.7	250	0.65
Moderate - for example, sheltered from heavy and wind driven rain and against freezing, whilst saturated with water; buried concrete in soil and concrete continuously under water.	250	0.6	290	0.55
Severe - For example, exposed to sea water, alternate wetting and drying and to freezing whilst wet, subject to heavy condensation or corrosive fumes.	310	0.5	360	0.45

NOTE -1 when the maximum water cement ratio can be strictly controlled, the cement content in the above table may be reduced by 10 percent.

NOTE - 2 the minimum cement content is based on 20 mm, aggregate. For 40 mm aggregate, it should be reduced by about 10 percent; for 12.5 mm aggregate, it should be increased by about 10 percent.

TABLE-9 (Sec. I 3.1.2)

REQUIREMENT FOR CONCRETE EXPOSED TO SULPHATE ATTACK
[SP - 23 - Table 24 & IS 456 - Table 20]

CLASS	CONCENTRATION OF SULPHATES EXPRESSED AS SO_3			TYPE OF CEMENT	REQUIREMENTS FOR DENSE FULLY COMPACTED CONCRETE MADE WITH AGGREGATE COMPLYING WITH IS : 383-1970"	
	IN SOIL		IN GROUND WATER			
	TOTAL SO_3 (PERCENT)	SO_3 IN 2:1 WATER EXTRACT g/l	(PARTS PER 100 000)		MINIMUM CEMENT CONTENT	MAXIMUM FREE WATER / CEMENT RATIO
1)	Less than 0.2	-----	Less than 30	Ordinary Portland cement or Portland slag cement or Portland Pozzolana cement	280 kg/m^3	0.55
2)	0.2 to 0.5	-----	30 to 120	Ordinary Portland cement or Portland slag cement or Portland Pozzolana cement Super sulphated cement	330 kg/m^3 310 kg/m^3	0.50 0.50
3)	0.5 to 1.0	1.9 to 3.1	120 to 250	Super sulphated cement	330 kg/m^3	0.50

TABLE-10 (Sec. I 3.1.3)

COMPRESSIVE STRENGTH OF CUBE EXPECTED FOR PRELIMINARY & WORK SITE

CONCRETE MIX	SPECIFIED STRENGTH	28th DAY CUBES TEST		7th DAY WORK
	Kg/Sq. cm.	PRELIMINARY TEST Kg/Sq. cm.	WORKSITE TEST Kg/Sq. cm.	Kg/Sq. cm.
M 10	100	135	100	70
M 15	150	200	150	100
M20	200	260	200	135
M25	250	320	250	170
M30	300	380	300	200

NOTE -1 This table applies only to concrete made with 20 mm aggregate complying with the requirement of IS : 383 - 1970* placed in near-neutral ground water of pH 6 to 9, containing naturally occurring sulphates but not contaminants, such as ammonium salts. For 40 mm aggregate the value may be reduced by about 15 percent and for 12.5 mm aggregate, the value may be increased by about 15 percent. Concrete prepared from ordinary Portland cement would not be recommended in acidic conditions (pH 6 or less). Super sulphated cement gives an acceptable life, in minerals acids, down to pH 3.5, provided that the concrete is dense and prepared with water / cement ratio of 0.4 or less.

NOTE- 2 The cement contents given in class 2 are the minimum recommended. For SO3 contents near the upper limits of class 2, cement contents above-these minimum are advised.

NOTE - 3 where the total $S0_3$ in Col. 2 exceeds 0.5 percent, then a 2:1 water extract may result in a lower site classification if much of the sulphate is present as low solubility calcium sulphate.

NOTE - 4 For severe conditions such as thin sections under hydrostatic pressure on one side only and sections partly immersed, considerations should be given to a further reduction of water-cement ratio, and if necessary an increase in the cement content to ensure the degree of workability needed for full compaction and thus minimum permeability.

NOTE- 5 Portland slag cement conforming to IS: 455 with slag content more than 50 percent exhibits better sulphate resisting properties.

NOTE - 6 Ordinary Portland cement with the additional requirement that C3 A content be not more than 5 percent and 2 C_3 A + C_4 AF (or its solid solution 4 Gao, Al_2 O_3 Fe_2 O_3 + 2CaO, Fe_2 O_3) be not more than 20 percent may be used in place of super sulphated cement.

* Specification for coarse and fine aggregates from natural sources for concrete (second revision)

TABLE-11 (Sec. II 2.1.2)
MECHANICAL PROPERTIES OF BARS
MILD STEEL & MEDIUM TENSILE STEEL BARS
[IS 432 Tables - 1]

SR. NO.	TYPE AND NOMINAL SIZE OF BARS	ULTIMATE TENSILE STRESS	YIELD STRESS	ELONGATION" PERCENT
		MIN.	MIN,	MIN.
I.	Mild Steel Grade I For bars up to and including 20 mm For bars over 20 mm, up to and including 50 mm	410 410	250 240	23 23
2	Mild Steel Grade II For bars up to and including 20 mm For bars over 20 mm, up to and including 50 mm	370 370	225 215	23 23
3	Medium Tensile Steel For bars up to and including 16 mm For bars over 16 mm, up to and including 32 mm For bars over 32 mm, up to and including 50 mm	540 540 510	350 340 330	20 20 20

* Elongation on a gauge length 5.65 √So where so is the cross sectional area of the test piece.

TABLE -12 (Sec. II 2.2.2)
CHEMICAL COMPOSITION
HIGH STRENGTH DEFORMED BARS
[IS 1786]

Constituent	For ladle analysis of steel when made as per relevant parts of IS 228 Percent Maximum*			For product analysis Variation, Over Specified Maximum Limit, Percent, Max
	Fe 415	Fe 500	Fe 550	Limit % Maximum
Carbon	0.30	0.30	0.30	0.02
Sulphur	0.060	0.055	0.055	0.005
Phosphorus	0.060	0.055	0.050	0.005
Sulphur & Phosphorus	0.11	0.105	0,10	0.010

NOTE - 1 For guaranteed weld ability, the percentage of carbon shall be restricted to 0.25 percent maximum.

NOTE - 2 Addition of micro alloying elements is not mandatory for any of the above grades. When strengthening elements like Nb, V, B and Ti are used individually or in combination, the total contents shall not exceed 0.30 percent; in such case manufacturer shall supply the purchaser or his authorized representative a certificate stating that the total contents of the strengthening elements in the steel do not exceed the specified limit.

TABLE-13 (Sec. II 2.2.5)
MECHANICAL PROPERTIES OF HIGH STRENGTH DEFORMED BARS AND WIRES
[IS 1786 Table-3]

SR. NO.	PROPERTY	GRADE		
		Fe 415	Fe 500	Fe 550
(1)	(2)	(3)	(4)	(5)
I)	0.2 percent proof stress/yield stress, Min, N/Sq. mm	415.0	500.0	550.0
II)	Elongation, percent, min, on gauge length 5.65 VA, where A is the cross sectional area of the test piece	14.5	12.0	8.0
III)	Tensile strength, Min	10 percent more than the actual 0.2 percent proof stress but not less than485.0N/Sqmm.	8 percent more than the actual 0.2 percent proof stress but not less than 545.0 N/Sq mm.	6 percent more than the actual 0.2 percent proof stress but not less than 585.0N/Sq mm.

TECHNICAL SPECIFICATATION FOR SANITARY / WATER SUPPLY WORK

Salt Glazed Stone ware Pipes

Stoneware pipes shall be salt glazed, free from cracks, deformities and imperfections in glazing they shall be cylindrical, straight and to standards dimensions. They shall be made of hard burnt stoneware of dark grey color and thoroughly glazed and shall give sharp color more when struck with a light hammer. The pipes shall conform to the requirements of Indian Standard no. IS:651-1980 and shall be of Perfect Potteries of Dalmia or approved equivalent make.

Cement Concrete Pipes

Cement concrete pipes where called for on the drawing shall be centrifugally spun reinforced cement concrete pipes. Pipes shall be perfectly sound, cylindrical, straight with uniform bore throughout. Cracked or wrapped pipes with uneven texture shall not be used. Pipes shall be of NP2 class manufactured by Indian Rume Pipe Co. or approved equivalent and shall conform to Indian Standard IS:458-1971. Adequate number of suitable collars as required shall also be supplied along with the pipes.

Cast Iron Pipes

C. I. Pipes where called for on the drawings shall be good tough quality dark grey on fracture and capable of being worked with a drill or file. CI pipes and fittings shall be sound with smooth inner and outer surface free from laps, pinholes and other imperfections and shall ring clearly when struck all over with a light hard hammer. The CI pipes shall be provided with a coating of tar or similar material. The coating shall be smooth and tenacious and hard though not to flow when exposed to a temperature of 77 degree centigrade but not so brittle at temp. of 0 degree centigrade so as to chip off when lightly scribed with a pen knife. CI water main pipes shall conform to Indian Standard IS: 1536 and IS: 1537 the fittings shall conform to Indian Standard IS: 1538. Pipes and fittings for drainage (soil, waste, and vents) shall conform to IS: 3989-1870 and /or IS: 1729-1864 as specified. The pipes shall be of socket & spigot type.

Galvanized Iron Pipes

Galvanized Iron pipes and fittings where called for on the drawings shall be of galvanized mild steel or galvanized wrought iron. The pipes shall be medium or heavy class as required as per item. Galvanization of pipe shall conform to IS 4736. The fittings shall be 'R' brand fittings.

All pipes and fittings shall be of heavy class manufactured by Indian Tube Company or Bharat Steel Tubes. The fittings shall be R brand fittings for all as approved (heavy class) ISI make. The pipes and fittings shall conform to Indian Standard IS: 1239 Part I and Part On delivery to site, the pipes shall be painted with one coat of approved set aside primer.

Copper Pipes

Copper pipes where called for shall be light gauge copper pipes suitable for hot water distribution. The fittings shall be of copper other compression type or capillary type. The pipes and fittings shall be obtained from an approved manufacturer. The pipes shall generally conform to Indian Standard IS: 1545-1969.

1.6. **PVC Pipes**

PVC pipes where called for small be either unplasticised PVC pipes or high density polythene pipes supplied with appropriate fittings. The pipes & fittings shall be of 10 Kg per Sq Mtr pressure class.

PVC pipes shall be handled with care and stored in a place protected from the sun. All PVC pipes and fittings shall be manufactured by NOCIL or WOVIN or approved equivalent. PVC pipes and fittings shall conform to Indian Standards IS: 4958-1972 or IS: 4958-1968.

Asbestos Cement Pipes

Asbestos cement pipes for drainage purposes shall conform to Indian Standard IS:1626-1960. The pipes shall be perfectly sound, strength, free of cracks with a uniform bore through out. The pipes shall be of socket & spigot type. Asbestos cement pipes for water supply shall conform to Indian Standard IS:1992-1960 and of approved make to be approved by Architect. Suitable fittings as recommended by the pipe manufacturer shall also be supplied along with pipes.

Sanitary Fixtures

All glazed vitreous china Sanitary ware fixtures shall be of best Indian make of approved manufacture conformity to IS:2556. These shall be nonporous and fully vitreous with all the visible portions perfectly glazed and should be absolutely free from hairline cracks, pinholes and local depressions. These shall have perfectly symmetrical uniform and smooth curves.

Water Supply Fittings

All supply fittings, including mixing fittings and accessories shall be brass/ copper, heavy chromium plated of the make and design specified. The fittings shall be cast fittings of screw type, machined and threaded properly for fixing to the supply pipes. The plating shall conform to Indian Standard IS: 4827-1968.

The fittings shall be supplied complete with chromium plated matching flanges, nuts and extension piece of required lengths. Metallic washers where required shall also be of chromium plated brass. All bib cocks and top cocks shall conform to Indian Standard IS : 781 – 1967, pillar cocks to filler, shower arm, rose, spouts and other fittings shall match the supply fittings and screws shall be similar to fittings . All washers shall conform to Indian Standard IS : 4326-1967.

Waste Fittings

All waste fittings, (waste, chain, pop-up, overflow, spreaders, caps etc) shall be of brass/ copper, heavy chromium plated of the make and design specified and matches the supply fittings. They shall conform to Indian Standard IS: 2963 – 1964.

Bottle Traps

Bottle trap (for wash basins, sinks, urinals etc) shall be deep seal (minimum 6cm seal, cast brass bottle traps, heavy chromium plated. All bottle traps shall be provided with suitable cleaning eye, extension piece, flare nuts- all chromium plated. Bottle traps shall be of approved make and design. Traps for wash basins shall be 32mm (1 – ¼”) for sinks and urinals 40mm (1-1/2inch dia).

Wall Flange

Wall flange shall be provided on all walls, floors, columns etc. wherever supply and disposal pipes pierce through them. These wall caps shall be of chromium plated brass supply fittings the receiving pipes and shall be large enough to cover the punctures properly.

Valves

All valves (gate, globe, check) shall be either all brass or gun metal valves suitable for the particular service. All valves shall be of the particular duty and design called for similar to leader or approved equivalent valves shall be tested to 21 kg/Sqm pressure at manufacturer’s works.

Valves shall either be of screw type or flange type with suitable flanges and non corrosive bolts and gaskets. Tail pieces as required shall be supplied along with valve. Gate, globe and check valves shall conform to Indian Standard IS : 778-1971 and non return valves to swing check type reflex non return valves IS : 5312 (Part I 1969).

Sluice Valves

Sluice valves where called for shall be flanged sluice valves or GI body. The spindle, wall seat and edge nuts shall be of non metal. They shall generally have rising spindle and shall be of the particular duty and design called for. The valves shall be supplied with suitable flanges, non corrosive bolts sand asbestos fiber gaskets. The valves shall be of Kirloskar make or other approved equivalent as specified Sluice valves shall conform to Indian Standard IS : 7090 – 1969 and IS : 2906 – 1969.

Ball Valves with floats

Ball valves with floats to be fixed in storage tanks shall consist of cast brass lever arms having copper balls (28 SWB) screwed to the arm integrally. The copper ball shall have bronze welded seams. The closing / opening mechanism incorporating the piston & cylinder shall be of a non – corrosive metal and include washers. The size and construction of ball valve and float shall be suitable for desired working pressure operating the supply system. Ball valves shall be supplied with brass hexagonal blackouts to secure them to the tanks and a socket to connect the supply pipe. Al ball valves with floats shall conform to Indian Standard IS : 1703 – 1968. The polyethylene float shall conform to IS : 9762.

Floor Traps and Urinal Traps

Floor traps and urinal traps shall be of CI of the size required of approved design incorporating a deep seal (6 cm minimum) and venting device unless otherwise indicated. The traps shall be supplied with a specially CI extension piece with required number of sockets in appropriate directions to receive the waste/ soil pipes from wash basin / bath tub / urinal.

Fire Hydrant Landing Valves

Fire hydrant landing valves shall be of gun metal, 63mm dia instantaneous coupling type with blank caps. They shall be with single or double outlet 'as called for' where indicated all hydrants shall be supplied with standard stand posts. All fire hydrants shall conform to Indian Standard IS: 909 – 1965 and IS : 936-1965 and stand pipes to IS : 5714 – 1970. All hydrants shall be of approved make and designs and should carry fire insurance Association approval.

LAWN HYDRANTS

Lawn hydrants shall be of 2.5cms size unless otherwise indicated. All hydrants shall be provided with gate valves and threaded nipple to receive hose pipes where called for lawn hydrants shall be located in masonry chambers of appropriate size as indicated.

Water Meters

Water meter of approved make and design shall be supplied and installed at locations as shown. The water meters shall meet with the approval of the local supply authorities. Suitable valves and chambers to house the meters shall also be provided along with meters.

Pipe Hangers Brackets etc.

Sturdy hanger, brackets and saddles of approved design shall be installed to support all pipe lengths which are not embedded over their entire run. The hangers and brackets shall be fabricated from suitable MS rolled sections. The hangers and brackets shall be adjustable heights and painted with red oxide primer. Clamps, collar & saddlers to hold pipes shall be provided with suitable gaskets. The brackets and hangers shall be designed to carry the weight of pipes safely. All pipes and fittings shall be secured near every joint and half way through every pipe length, unless otherwise specified.

Grating for floor traps, Urinal traps & floor drains.

Grating made of 3mm thick brass heavily chromium plated shall be installed to cover all floor traps and floor drains. The gratings shall be of size required and the square or circular in shape as called for. The gratings shall be supplied complete with matching chromium plated brass screws and brass rings to fasten the gratings to the floor in traps.

Insulation Material

The material for insulation shall be vermin proof fiber glass wool. The material shall have a thermal conductivity value of K = 0.404 MW/CM/Co and a density not less than 25 kg per cum. Samples of insulating material shall be submitted for approval.

Pipe Sleeves

Adequate number of sleeves pipe insert (s) of CI or mild steel shall be provided where pipes cross through concrete, masonry and similar work. The pipe inserts shall be of a size larger than the pipe to be housed. The pipe inserts shall be of a size larger than the pipe to be housed. The pipe inserts shall have a flange welded in the center around its circumference. In order to provide water tight and secure fixing into the structure, the pipe inserts shall be provided with removable 1 plug to keep foreign matter out till installation of the service pipe across the sleeve.

COWLS

Cowls or cast iron of proper size shall be supplied to cover all open terminals of soil, waste, vent & rain water pipes. The cowls shall be of the indicated design, vent away type, bitumastic coated and provided with a tail piece to fit smoothly in the receiving pipe.

2. LAYING AND JOINING OF PIPES

Alignment of Grade

All pipes shall be laid true to alignment and gradients as shown on the drawings. No deviations from the lines, depths of cuttings or gradients called for on the drawing shall be permitted without the approval in writing by the Architect/. In subzero temperature regions the pipes shall be laid below frost level.

Setting out Trenches

The contractor shall set out all trenches, manhole and such other works to true gradient and alignment as called for. He shall provide the necessary instruments for setting out and specification of the same.

All trenches shall be laid to true grade and in straight lines and as shown on the drawings. The trenches shall be laid to proper levels by the assistance of boning rods & eight rails which shall be fixed at intervals not exceeding 10 meters or as directed by the Architect.

Excavation trenches for pipes

The trenches for pipes shall be excavated with bottoms formed to levels and gradients as shown on the drawing, or as directed by the Architect to sort & filled in ground the Architect may require the trenches to be excavated to a greater depth than shown on the drawings and to fill up such additional excavation with concrete 1:5:10 consolidated to bring the excavation to the required levels as shown on the drawings.

All excavation shall be properly protected where necessary by suitable timbering as approved by the Architect/. Excavations below water table shall be done after dewatering of the trenches.No blasting shall be allowed without prior approval in writing from the Architect/. It shall becarried out under through and competent supervision with the written permission of the

appropriate authorities taking full precautions connected with blasting operations. All excavated earth shall be kept sufficiently clear of the trenches.

Protection of Existing pipes etc.

All pipes, water mains, cables etc met in the course of excavations shall be carefully protected and supported. Care shall be taken not to disturb the cables. The removal of which shall be arranged by the contractor.

Back filling

Refilling of the trenches shall not be commenced until the length of the pipes therein has been tested and approved.

Welding

All welding shall be executed only by skilled, qualified, certified welders utilizing standard tools and accessories. Welding shall be done strictly as per Indian Standard IS : 6227 – 1966 and IS : 023-1964.

The operation of surfaces, the welding process and finishing of the joints shall be subject to the approval of the Architect/Engineer. All welded joints shall be structurally sound and absolutely seal poof.

Drilling & Cutting

Drilling & cutting or installed pipe work and masonry shall be restricted to absolute minimum. Where such cutting and drilling is unavailable, it shall be executed only with prior permission of the Employer/Architect/.

All cutting and drilling shall be predetermined and suitable sockets and specials shall be employed to effect necessary connections. All cutting & drilling shall be executed by skilled workmen with proper tools.

The disturbed surface shall be restored to the satisfaction of the Employer/Architect/.

Marker Plates

Marker plates indicating the particular service installed shall be provided along the route of pipe trenches. Marker plates shall be of mild steel with the type of service and the direction of flow painted on it. The markers shall be set firmly in a concrete base and installed at all corners and turning points. Over straight runs, markers shall be spaced at 100 meter center generally.

Laying of pipes & jointing of pipes

a. General : The pipes shall generally be laid with sockets leading uphill and shall rest on solid and even foundations for the full length of the barrel. To accommodate sockets, depressions shall be formed in the foundation sufficiently deep to allow ample space for the pipe jointer to work right round the pipes. Each separate pipe shall be individually set for line and levels as described under 'Alignment and Grade' and Selling out. Pipes shall always be installed in accessible positions except where absolutely and necessary and indicated the pipes shall be installed in wall chase / floor.

b. Salt Glazed Stoneware pipes: The laying & jointing of stoneware pipes shall be executed in accordance with code of practice for laying of glazed stoneware pies IS :4127:1967. Salt glazed stoneware pipes shall be jointed as follows:

Tarred gasket shall be first wrapped round the spigot of each pipe and the spigot shall be placed into the socket of the pipe previously laid. The pipe shall then be adjusted and fixed in the correct position and the gasket caulked tightly home so as not to fill more than quarter of the

total depth of the socket. The remainder of the socket shall then be filled with a mixture of cement mortar 1:1 one part of cement & one part of washed fine sand.

When the socket is filled, a fillet shall be formed round the joint with trowel making an angle of 45degrees with the barrel or the pipe after the joint is made. Any extraneous material shall be removed from the inside of the joint with a suitable scrapper. The newly made joint shall be protected until set from sun, drying winds, rain or dust. The joint shall be cured by keeping it continuously damp for seven days. The inside of the pipes shall be left absolutely clear in bore & free from cement mortar or any other obstruction.

The joint shall be tested to a test pressure of 100 Cm for two hour without developing leaks / fall in pressure. Before commencing of test, the pipeline shall be filled with water and maintained for 24 hours under head is 0-.6m water. In case of leaks the piping shall be re-done in such portion and the test repeated till achieving satisfactory result.

c. Cement Concrete Pipes :Concrete pipes shall be laid and jointed as described in IS : 783:1939, code of practice for laying of cement concrete pipes.

After setting out the pipes, the collar shall be centered over the joint and filled in with tarred gasket till 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 Washed Coarse Sand) and caulked by means of proper tools. All joints shall be finished at an angle of 45 to the longitudinal axis of the pipe on both sides of the collar. The joints shall be cure for at least seven days. The joints shall be tested to a head of 100 Cms for two hours without developing leaks/ fall in pressure. In case of leaks the piping shall be redone in such portions and the test repeated till achieving satisfactory result.

d. Cast Iron Pipes : CI pipes shall be laid and jointed in conformity with the code of practice for laying of cast Iron pipes IS: 3114-1965. CI pipes shall be jointed by best quality caulking lead free from all impurities. In wet trenches, joints shall be made with lead wool. The spigot shall be centered in the adjoining socket by tightly caulking in sufficient turns of tarred gaskin to leave unfilled the required depth of socket for lead. Where the gaskin has been caulked tightly home, a jointing ring shall be placed round the barrel and against the face of the socket. Melton lead shall then be poured into fill the reminder of the socket in one operation. The lead shall then be solidly caulked with suitable tools by hammering right round the joint to make up for the shrinkage of the molten metal on coping and shall preferably finish 3mm behind the socket face.
Lead for caulking shall conform to IS : 782 – 1966 . The quantity of lead to be filled per joint in various sizes of CI pipes shall be as follows:

i) **Drainage Pipes**

50mm (2”) pipe---------- 0.7 Kg / joint (35mm deep)
80mm (3”) pipe---------- 1.2 Kg/ joint (40mm deep)
100mm (4”) pipe ----------1.5 Kg/joint (45mm deep)
150mm (6”) pipe ---------- 2.4 Kg/joint (45mm deep)

ii)

Water Main Pipes	**Lead / Joint**
80mm (3”) pipe	1.8 Kg
100mm (4”) pipe	2.2 Kg
125mm (5”) pipe	2.6 Kg
150 mm (6”) pipe	3.4 Kg
200mm (8”) pipe	5.0 Kg

The joints and pipes laid for water supply system shall be tested to a pressure of 12 Kg/sq.cm for two hours without developing leaks/ fall in pressure , the drainage pipe lines and joints shall be

tested to a head of 150 Cm for two hours without developing leaks / fall in pressure. In case of leaks the piping shall be redone in such portion and the test repeated till achieving satisfactory result.

e. Galvanized Steel Pipes : Galvanized steel pipes shall be jointed with screwed and socket joints using screwed fittings. Care shall be taken to remove any burr from the ends of the pipes after thread cutting. White lead or an equivalent jointing compound of proprietary make shall be used, according to the manufacturer's instructions. With a grummet of a few strands of fine yarn while tightening. Compounds containing red lead shall not be used because of the danger of contamination of water. Any threads exposed after jointing shall be painted with bituminous paint to prevent corrosion.

Pipes & joints laid for water supply system shall be tested to a pressure of 7 kg per sq cm and that of fire fighting system to a pressure of 10.50 kg per sq cm for two hours without developing leaks/ fall in pressure. In case of leaks the piping shall be redone in such portions and the test repeated till achieving satisfactory result.

f. Mild Steel Pipes : Mild steel pipes & fittings shall be generally jointed by welding unless otherwise satisfied. All welding shall be done by qualified welders in accordance with Indian Standard IS : 824 –1964. All welded joints shall be tested to a pressure of 15 kg per sq. cm. For two hours without developing leaks/ fall in pressure. In case of leaks the piping shall be redone in such portions and the test repeated till achieving satisfactory result.

g. Copper Pipes : Copper pipes and fittings shall be binded either by compression joints or capillary joints as recommended by the pipe manufacturer. Screw threading shall not be done. Connections to pillar cocks, stop cocks and other water fittings shall be affected by using standard coupler as recommended by manufacturers where capillary joints are used, proper grade of solder as recommended by the manufacturer shall be utilized. Compression joints shall be tested to a pressure of 7 kg per sq. cm. For two hours without developing leaks/ fall in pressure.

In case of leaks the piping shall be redone in each portions and the test repeated till achieving satisfactory result. Copper pipes shall be held in position by brass on copper clips. The piping should be supported at an interval of 150 cm by approved saddles. Proper tools & suitably trained labor shall be employed for laying and jointing copper pipes.

h. **PVC pipes**: PVC pipes and fittings shall be laid and jointed by skilled workmen strictly as per the instructions of manufacturer. The installed piping system shall be subject to a low pressure testing of 4 kg / sq.cm and then to high pressure testing of 7 kg./ sq.cm. without developing leaks/ fall in pressure pipes and joints shall be tested to a pressure of 7 kg per sq. cm. without developing leaks/ fall in pressure.

i. **Asbestos Cement pressure pipes**: AC pressure pipes shall be laid & jointed as per manufacturer's instructions. Suitable specials, CI detachable joints, joint collars, rubber rings, mild steel bolts and cement concrete thrust pads shall be provided adequately to ensure tha the piping system perform efficiently under the working conditions. The asbestos pressure pipes and joints shall be tested to a pressure of 7 kg per sq cm without developing leaks / fall in pressure.

j. **Pipe Insulation** : All pipe work and fittings shall be brushed and cleaned. All dust, dirt, mortar and oil removed. The pipes shall then be cleaned with chemical solution suitable for the material of the pipe. Where insulation is to be applied over copper pipes, fiber glass wool of suitable thickness shall be applied over the entire run of piping. In case of mild steel and galvanized pipes. The pipes shall first be given a cost of Zinc Chromate primer followed by two coats of approved synthetic enamel paint. Insulation consisting of fiber glass wool of suitable thickness shall then be applied over the piping system.

Fiber glass shall have a density of 25 Kg/cm. and the value of 0.404 MW/CM/Co. Polythene sheets shall then be wrapped round the above and held in position by galvanized chicken mesh. Cement plaster 1:3 (1 Cement: 3 Coarse washed sand) shall then be applied over chicken mesh in two coats to a minimum thickness of 20mm.

The thickness of insulation to be applied shall be as follows:-

Sizes of pipes / fittings	Thickness of Insulation
a. 15mm / 20mm dia	20 mm
b. 25mm , 32mm & 40 mm dia	25 mm
c. Over 40mm dia	40 mm

The insulation shall be continuous over the entire run of piping, fittings & valves. The insulation shall be applied only after the piping systems are satisfactorily tested for the desired working pressure. The completed insulation shall restrict the heat loss heat gain in the piping system to the absolute minimum. The total heat gain or heat loss by the insulated piping system shall not exceed thirty per cent of the heat gain or heat loss by a similar un=insulated piping system.

Insulation work shall be carried out by skilled workmen special trained in this kind of work.

VALVES

Valves shall be provided at accessible locations on every branch from main lines as shown in the drawings. In case of valves with screwed female inlet/ outlet, each valve shall be provided with a union on either side and installed in piping system. On external lines, valves shall be installed in brick masonry chambers wit a frame and cover as shown in the drawings.

PIPING SYSTEMS – INSTALLATION, INSPECTION AND TESTING

Soil, Waste, Vent & Antisyphon pipes

Unless specified otherwise all soil and waste pipes in shafts, ducts and in concealed locations e.g (false ceiling) shall be of sand CI pipes, and that located in basement floor / service floor shall be of CI spun pipes class 'LA'.

The soil pipe shall be of minimum diameter of 100mm and waste pipes 80mm. Pipes shall be fixed by means of stout clamps in two sections, bolted together built into the walls
wedged and neatly pointed as directed and approved by the Employer/Architect/ keeping 50mm distance from the walls.

Where indicated, the soil & waste pipes shall be continued upwards without any diminution in its diameter without any bend or angle to the height shown in the drawings.

Unless specified otherwise soil and waste pipes from urinal / wash basin / sinks upto the floor trap shall be of GI medium class pipes. All the traps of water closets and urinal traps shall be provided with antisyphon / vent pipes as shown in the drawings and as directed by the Employer/Architect/. All terminal manholes shall be provided with vent pipes. This may be dispensed with if the upper floor soil stacks connecting to such manholes are vented. All soil, waste and vent pipes shall be given two coats of approved paint.

All connection between soil, waste & ventilation pipes & branch pipes shall be made by using pipe fittings with inspection doors & cleaning. The doors shall be provided with 3mm thick rubber insertion packing and when closed and bolted shall be air and water tight.

Where soil, waste and ventilating pips are accommodated in shafts/ ducts, adequate to cleaning eye shall be provided.

Cold water supply Pipes

A water supply piping system to cater for all domestic, requirements shall be installed as called for on the drawings. Unless specified otherwise the piping system shall consist of galvanized steel pipes and fittings of medium class and CI spun pipes and fittings of water mains (Class LA quality). As far as possible, all piping inside the buildings shall

run in shafts or ducts provided for this purpose. No unsightly exposed runs will be permitted. Outside the buildings, the piping shall be installed as far as possible 60cm. below finished grade. Where called for all galvanized steel piping embedded either in trenches or in concrete and masonry fiber glass tissue sheathing laid in bitumen. Gate valves (built into chambers were required) shall be provided as indicated on the drawings to regulate the flow of water.

The piping shall be given two coats of approved paint as mentioned under painting and color coding. All CI pipes buried on an embedded shall be given two coats of bitumastic paint.

Water Storage Tanks

The water storage tanks to be provided shall be fabricated from 10 gauge galvanised sheet steel or mild steel electrically welded, stiffened adequately with angle iron frames and rigidly built. The tanks shall be of sizes and capacities called for the capacities mentioned are net excluding boards. The water storage tanks shall be painted internally with two coats of Shalimar special purpose paint. All paint being applied over a coat of primer. Suitable rolled steel joints (duly painted) and supporting brick masonry pillars shall also be provided. All tanks shall be provided with necessary inlet, outlet, overflow, drain out connections including float valves and ball cocks. All holes shall be punched or cut neatly to correct size and provided with suitable brass check nuts and bushes to receive connection. The punctures shall be made leak proof after the connections are effected. All tanks shall be provided with suitable mosquito proof manhole covers of adequate size to facilitate cleaning and maintenance. (Overflow and vent pipe openings shall be provided with brass puff grating.

Hot Water Supply

A hot water supply system consisting of galvanized steel pipes and fittings of heavy class (C) shall be installed by the contractor. In walls, these shall be wrapped with 1mm thick fiber glass tissue set in bitumen. Adequate number of expansion fittings shall be provided to take care of expansion and contraction. Air locks releasing devices & dewatering / blows / off devices at suitable points shall also be provided in the piping system.

The completed hot water piping system shall be tested to the test pressure mentioned under laying of pipes for two hours without any fall in pressure. The insulated piping system shall be given two coats of approved paint.

Rain Water Pipes

Rain water down takes shall be galvanized mild steel pipes or CI pipes as called for in drawings. The fittings & specials for the pipes shall be of the same materials as the pipes. The installation of rain water pipes shall be carried out as described in relevant clauses under laying & jointing of pipes. Rain water pipes shall be given two coats of approved paint.

Storm Water Drainage

Contractor shall install a storm water drainage system as called for in the drawings. The system shall consist of RCC NP2 class pipes.

Colour Code Identification

All piping shall be colour coded as per IS 2065 – 1972.

4. ANCILLARY STRUCTURE

Manhole

Excavation, filling back and ramming, disposal of surplus earth, preparation or bottoms and sides etc shall be carried out as described earlier under trenches for pipes. Manholes shall be of sizes and depths as called for in drawings. The manhole shall be built on a base of concrete 1:2:4 (1

Cement : 2 Coarse Sand : 4 aggregate) of 150mm thickness for manholes from 1500mm depth to 2500 mm depth and 300mm thickness for manholes of depth greater than 2500mm.

The walls shall be of brick / stone work of thickness as shown in the drawings in cement mortar 1:3 (1 Cement: 3 Coarse Sand). The joints of brick / stone work shall be raked and plastered internally and externally with cement plaster 1:3 (1 Cement : 3 Coarse Sand) to a thickness of 13mm and finished with a coat of neat cement provided in the bottom of manholes, semi circular channels of the same diameter as the pipes. Above the horizontal diameter the sides of channel shall be extended vertically to the same level as the crown of the outgoing pipe and the top edge shall be suitably rounded off. The branch channels shall also be similarly constructed with respect to the benching but at their junction with the main channel an appropriate fall suitably rounded off in the direction of flow in the main channel shall be given. Rungs of CI of suitable dimensions shall be provided in all manholes over 800mm depth. These rungs shall be set at 30cms intervals in two vertical rungs at 380 mm apart horizontally. The top rung shall be 450mm below the manhole cover. Unless otherwise mentioned manholes shall be constructed to requirements of Indian Standard IS : 4111 (Part – I) 16/ "Code of Practice for ancillary structures in sewerage system manholes". All manholes shall be constructed so as to do water tight under test. All angles shall be rounded to a 75mm radius. The benching at the sides shall be carried up in such a manner as to provide no edgement for any splashing in case of accidental flooding.

Manholes covers and frames shall conform to the requirements of Indian Standard IS : 1726 – 1960 . Manhole covers with frame shall be of CI of an approved make. The covers and frame shall generally be double seat of 600 x 450mm or 500mm dia of 50 kg or 116 kg in weight. Where manholes are located in driveways and such other areas, the covers & frames shall be 560mm dia or 255 kg.

Gully Traps

Gully trap where called for on the drawings at the feet or all waste pipes shall be salt glazed gully traps of approved make with 100mm or 150 mm dia outlet. The gully trap shall be embedded in CC 1:2:4 and a masonry chamber of internal size 300mm x 300mm shall be built around upto ground level and plastered with CM 1:3 and finished with floating coat of neat cement. All gully trap and in the top a cast iron sealed cover 300mm x 300mm weighing 7.3 kg shall be provided.

Grease Traps

Grease traps shall be provided on kitchen waste before it confluence with the main sewer lines. Grease traps shall be built in brick masonry and shall generally have the same specification of manholes. The sizes & locations shall be as shown in the drawings. Grease traps shall be provided with drop inlet, drop outlet and baffle wall. Grease trap shall be provided with 2 nos. double seal manhole cover and frame.

Catch Basin

Catch basin shall be of sizes and depths as called for in the drawings and shall be provided in the locations as shown in the drawings. Catch basins shall be provided with CI grating with frame for effective collection and disposal of surface storm water.

Intercepting Tap

Building sewer line connection to main Municipal sewer shall be made through Intercepting trap provided in the manhole as shown in the drawing.

Intercepting trap shall be of approved make salt glazed stoneware with suitable outlet fitted with brass airtight stopper with galvanized iron chain. The intercepting traps shall be set in and surrounded with cement concrete 1:2:4 150mm thick built into brick work and connected to drain.

Septic Tank

The contractor shall provide septic tanks as indicated on the drawings. The septic tanks shall be of RCC and or masonry construction and the construction shall be to the best accepted practice. Septic tank shall be constructed to Indian Standard IS : 2470 unless otherwise specified. The septic tank shall be installed in the location and at the level shown complete with all pipe connections. Suitable cast iron manhole cover and frame shall be provided to facilitate cleaning. Septic tank shall be provided with vent.

Soak Pits

Soak pits or the design and dimensions shall be constructed as shown in the drawings. The civil works shall be carried out as per accepted practice. The soak pits shall be constructed to requirements in Indian Standard IS : 2470 : 1968. Code or practice for design and construction of septic tanks unless otherwise specified.

5. SANITARY AND FITTINGS

Installation of Fixtures & Fittings

All plumbing and sanitary fixtures and fittings shall be stored in covered stores and handed carefully to prevent damage. The sanitary fittings shall be installed at the correct assigned positions as shown on the drawing and as directed to the Architects and shall fully meet with the aesthetic and symmetrical requirements as demanded by the Employer/Architect/. Fixtures shall be installed by skilled workmen with appropriate tools according to the best practice in the trade. Manufacturer's instructions shall be followed for the installation of fixtures.

Fixtures in all toilets shall be standard height mounted rigid, plumb and true to alignment. The outlets of water closet pans and similar appliances shall be examined to ensure that outlet ends are abutting properly on the receiving pipes before making the joint. It shall be ensured that the receiving pipes are clear of obstruction. When fixtures are being mounted, attention shall be paid to the possibility of movement and settlement by other causes. A check shall be made to ensure that necessary anchoring devices have been provided for supporting water closets, lavatory basins, sinks, flushing cisterns and other appliances. Where the built in types of brackets are used, they shall be securely fixed to the slabs and walls by approved means. It shall be ensured that while fixing the approved means, it shall be ensured that while fixing the fixtures and fittings no tool marks or scratch are developed.

Protection of fixtures

Care shall be taken at all times, particularly after fixing to protect fixtures from damage. All offices shall be temporarily plugged during progress of work to prevent obstruction. Fixtures shall be finally cleaned to the satisfaction of the Employer/Architect/.

6. MISCELLANEOUS WORKS

Connection to RCC water tanks

The contractor shall provide all inlets, outlet, washouts, vents, ball ducts, overflow, control valves and all such other piping connections including level indicator in water storage tanks are called for:

Suitable float controls of an approved make, securely fixed to the tank and set in a position that water inlet into the tank is cut off when filled upto the full water line. The water level in the tank shall be adjusted to 25mm below the line or the overflow pipe. Full way gate valve of approved make shall be provided as near, the tank as practicable on every outlet pipe from the storage tank except the overflow pipe.

The overflow pipe shall be placed as to allow the discharge of water being readily seen. The overflow pipe shall be of size indicated. A stop valve shall also be provided on the inlet water connection to the tank.

The outlet pipes shall be fixed above the bottom of the tank as indicated. A washout pipe shall be provided at the bottom of the tanks towards which the floor of the tank is stopping to enable the tank to be emptied for cleaning.

Connections to Pools and Cooling Towers etc.

The contractor shall provide water supply and waste disposal connections to the various pools and cooling towers as shown on drawings.

Connection to Mechanical Equipment Supplied by other Agencies

All inlets, outlets, valves, piping and other incidental work connected with installation of all mechanical equipments supplied by other agencies shall be carried out by the contractor in accordance with the drawings, requirements for proper performance of equipment, manufacturer's instructions and the directions of the Employer/Architect/.

The equipment to be supplied by other agencies consist mainly of kitchen, laundry, air conditioning, boiler, water treatment, sewerage treatment, swimming pool and other similar equipments. The connections to the various equipments shall be either with union or with flange. The work of effective connections shall be executed in consultation with and according to the requirements of equipment supplies under the directions of Employer/Architect/. The various aspects of connection work shall be executed in a manner similar to the work of respective trades mentioned elsewhere in these specifications.

Disinfection of Piping System and Storage Tanks

Before commissioning the water supply system, the contractor shall arrange to disinfect the entire system as described in the succeeding paragraph. The filtered water and thoroughly flushed out. The storage tanks shall then be filled with water again and disinfecting chemical containing chlorine added gradually while tanks are being filled to ensure through mixing. Sufficient chemical shall be used to give the water a dose of 50 parts of chlorine to one million parts of water. If ordinary bleaching powder is used, the proportions will be 150 grams of powder to 1000 liter of water. The powder shall be mixed with water to a creamy consistency before being added to the water in the storage tank. If a proprietary brand of chemical is used. The proportions shall be specified by the makers. When the storage tank is full, the supply shall be stopped and all the taps on the distributing pipes opened successively, working progressively away from storage tank.

Each tap shall be closed when the water discharge begins to mell of chlorine. The storage tank shall be filled up with water from supply pipe and added more disinfecting chemical in the recommended proportions. The storage tank and pipe shall then remain charged at least for three hours. Finally the tank and pipes shall be thoroughly flushed out before any water is used for domestic purposes.

7. MODE OF MEASUREMENT

Pipes

All pipes viz stoneware RCC, AC, PVC, GI, MS,CI water main pipes etc shall be measured in linear lengths along the center line inclusive of all fittings e.g. elbows, tees, bends, reducers, bushes, unions etc . The rates shall include also the cost towards hangers, clamps, making chase / holes in walls / labs and bringing them to original condition and shape. Deductions in length of pipes shall be mad eon account of manhole chambers. Unless specified otherwise excavation and refilling shall be measured separately.

Fixtures

All fixtures shall be measured in numbers along with the fittings as specified in the respective items of schedule. The rate of fixtures shall also include cost towards mounting brackets, painting to brackets, excavation and bedding concrete.

Brass / Chromium Plated fittings etc.

All the fittings shall be measured in numbers with the accessories as specified in the respective items of schedule.

Valves

Valves shall be measured in numbers; these shall be of flagged type or down type as specified in the schedule. Rate of flagged valves shall also include cost towards the flange provided on both the sides on pipes, gaskets, drilling holes and providing bolts and nuts.

Ancillary Structures

All ancillary structures viz. Manhole, gully traps, valves chambers, catch basins shall be measured in numbers, including all the items specified in the schedule against the respective items. Earth work in excavation and refilling for ancillary structures shall be measured separately.

Earthwork in Excavation and back filling

All the excavations involved for laying of pipes and for ancillary structures shall be measured under this item. Width of excavation for pipe laying shall be internal diameter of the pipe plus 30 cms subject to a minimum width of 50 cms . Depth shall be as indicated in the drawings.

The rate for item excavation shall also include cost towards back fitting and spreading as specified in schedule.

TECHNICAL SPECIFICATION

FOR

ELECTRICAL WORKS

PVC CONDUIT

The conduits for all systems shall be high impact rigid PVC heavy duty type and shall comply with I.E.E. regulations for non metallic conduit 1.6mm thick as per IS 9537/ 1983.

All sections of conduit and relevant boxes shall be properly cleaned and glued using appropriate epoxy resin glue and the proper connecting pieces. Type conduit fittings such are M.S. so installed that they can remain accessible for existing cable for installing of the additional cables.

No conduit less than 2o mm external diameter shall be used. Conduit runs shall be so arranged that the cables connected to separate main circuits shall be enclosed in separate conduits, and that all lead and return wire of each circuit shall be urn to the same circuit.

All conduits shall be smooth in bore, true in size and all ends where conduits are cut shall be carefully made true and all sharp edges trimmed. All joints between lengths of conduit or between conduit and fittings boxes shall be pushed firmly together and glued properly.

Spacing of conduits runs from other services shall be the following minimum distances :-

-Hot Water 25cm
-Cold water 5 cm

Cables shall not be drawn into conduits until the conduit system is erected, firmly fixed and cleaned out. Not more than two right angle bends or the equivalent shall be permitted between draw or junction boxes. Bending radius shall comply with I.E.E. regulations for PVC pipes.

Conduit concealed in the ceiling slab shall run parallel to walls& beams and conduit concealed in the walls shall run vertical or horizontal.

The chase in the wall required in the recessed conduit system shall be neatly made and shall be of angle dimensions to permit the conduit to be fixed in the manner desired. Conduit in chase shall be hold by steel hooks of approved design of 60cm center. The chases shall be filled up neatly after erection of conduit and brought to the original finish of wall with cement concrete mixture 1:3:6 using 6mm thick stone aggregate and course sand.

M.S. CONDUITING

All conduits shall be of heavy gauge solid drawn on lap welded manufactured out of 16 gauge M.S. sheet up to 32mm dia and of 14 gauge for size 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 conduits shall be uniform throughout. The welding shall be uniform such that welded joints do not yield when subjected to flattening test. Welded joints shall not break when threaded or bent at an angle. Conduits shall conform to specifications of IS-1653-1972 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.

Conduit accessories such as normal bends, unions, circular junction boxes and pull boxes, lockouts etc shall be heavy gauge type and approved make. Conduit accessories shall conform in all respects to IS-3837-1966.

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 put by the contractor with the prior orders of the consultant. 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 conduit. 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 full 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 60cm. The embedding of conduits in walls shall be so arranged as to allow at least 12mm plaster over the same. All threaded joints of conduits pipes shall be treated with some approved preservative compound to secure protection against rust.

When the conduit is laid on the slab the same shall be covered with cement concrete mixture 1:3:6 using 6mm thick stone aggregate and coarse sand.

Suitable expansion joints fittings of approved make and design shall be provided at all the points where the conduit crosses any expansion joint in the building.

Separate conduit shall be used for:

a) Normal light, fan call bell and 5A 5 pin sockets.
b) Power outlets
c) Emergency lighting and power
d) Telephone
e) Fire alarm system
f) Public address system
g) Computer system.

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 water tight type with approved type adopted. A separate and accessible earth connection shall bond across the flexible conduit.

Conduit runs on surfaces shall be supported with metal 1.2mm thick saddles which in turn are properly approved on to G.I. Spacer to the wall or ceiling. Saddles shall be at intervals of not more than 50cm. Fixing screws shall be with round or cheese head and of rust proof materials. Exposed conduits shall be nearly run parallel or at right angles to the walls of the building and shall be painted in colour matching the adjoining area. Unseemly conduit bends and offsets shall be avoided by using better appearance. Gross cover of conduits shall be minimum and entire conduit installation shall clean and with good appearance.

No conduits are allowed to be run in the floor except by special permission of Consultant and this only in extra ordinary circumstances by coating of bitumen over conduit.

PVC bushes of approved quality shall be used in each conduit termination in a switch box, draw box, lighting fixtures and circular junction boxes as required.

Exposed conduits running above false ceiling shall be suitably clamped with the dropped ceiling. Perforated strap hangers 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 cross-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- ordinate with the shop drawing for dropped ceiling.

The conduits 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 berth conforming to the requirements y means of special approved type of earthling clamp efficiently fastened to conduit pipe in a workman like manner for a perfect continuity between 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 over all diameters.

The conduits shall be of ample sectional area to facilitate the drawings of wires/cables. In no case shall the total cross section of wires/ cables measured overall, be more than half the area of the conduit.
Outlet boxes shall be of 16 SWG sheet steel and so installed as to maintain continuity throughout. These shall be so protected at the time of laying that no mortar finds it was during concept concrete filling on plastering. For fluorescent fittings, 2 nos. Outlet boxes shall be provided 300mm off center of a 1200mm fitting and 150mm of center for 600mm fitting.

Draw boxed of ample dimensions shall be provided convenient points to facilitate pulling of long runs of cables. They shall be completely concealed with M.S. covers flush with plaster work painted to match the wall. These boxes will be as few as possible and located where found suitable by the consultant. All the G.I. sheet steel zinc passivity boxes used for housing switches plugs, fan regulator etc shall be five sided conforming to IS-5133 part I – 1969. The boxes shall be provided with four to six fixing lugs located at the corners and vertical sides. All fixing lugs shall be threaded to receive standard machined chromium plated brass screws. Sufficient number of knockouts shall be provided for conduit carry. Conduits carry wires of different circuit entry. Conduits carry wires of different circuit ton terminate in common J.B. having metal compartments. Necessary G.I. pull wires shall be inserted into the conduit for drawing wires.

The switch boxes used for housing switches, plugs/ fan regulator etc. shall be zinc passivity / GI five sided provision of bridge for mounting fan regulator and necessary brass earth point shall be provided on the box, as required. These shall be attached to conduits by means of check nuts on either side of their wall these shall be completely concealed leaving edges flush with all surfaces. Molded switch plates shall be fixed to these by means of chromium plated brass machine screws as required. The 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.

The entire conduit system including outlet and boxes shall be thoroughly cleaned after completion and before drawing in cables.
To safeguard against filling up with the plaster etc. al the outlet boxes and switch boxes will have to be provided with temporary covers or PVC stoppers within the tendered cost which shall be replaced by 3mm thick bakelite covers/ molded type switch plates as required.

FOLLOWING PERCETNAGE OF RATE SHALL BE ALLOWED FOR PAYMENT OF POINT WIRING ITEM IN RUNNING BILLS.

a)	Conduit in slab	10%
b)	Conduit in wall with witch boxes fixing	20%
c)	Wiring	40%
d)	Switches/ Bakelite sheet	15%
e)	Testing / Commissioning	10%
f)	Final completion submission of Completion drawings electrical inspector approval.	5%

Total	100%

Retention money / any other recovery shall be deducted separately as per terms of contract.

WIRING

PVC insulated copper conductor cable shall be used for sub circuit runs from the distribution boards at the points and shall be pulled into conduits. They shall be stranded copper conductors with thermoplastic insulation of 650/1100 volts grade. Color code for wiring shall be followed.

Looping system of wiring shall be used, wires shall not be jointed. No reduction of strands is permitted at terminations. No wire smaller than 3/.029 sq.mm shall be used. Wherever wiring is run through trucking or raceways, the wires emerging from individual distributions shall be bunched together with cable straps at required regular intervals. Identification ferrules indicates the circuit and D.B. number shall be used for sub main , sub circuit wiring the ferrules shall be provided at both the end of each sub main 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 M.C.B.'s shall not be bunched in one conduit. In large areas and other situations where the load is divided between two or three phases, no two single phase switches connected to difference phase shall be mounted within two meters of each other.

All splicing shall be done by means of terminal blocks or connectors and no twisting connection between conductors shall be allowed.

Metal clad sockets shall be of dia cast non-corroding zinc alloy and deeply recessed contact tubes. Visible scraping type earth terminal shall be provided. Sockets shall have push on protective cap. Socket shall have MCB as specified in the schedule of work.

All power sockets shall be piano type with associates' switch of same capacity. Switch and socket shall be enclosed in a M. S. Sheet steel enclosure with the operating knob projecting. Entire assembly shall be suitable for wall mounting with Bakelite be connected on the live wire and neutrals of each circuit shall be continuous everywhere having no fuse or switch installed in the line excepting at the main panels and boards. Each power plug shall be connected to each separate and individual circuit unless specified otherwise. The power wiring shall be kept separate and distinct from lighting and fan wiring. Switch and socket for light and power shall be separate units and not combined one.

Balancing of circuits in three phases installed shall be arranged before installation is taken up. Unless otherwise specified not more than ten light points shall be grouped on one circuit and the load per circuit shall not exceed 1000 watts. The earth continuity insulated copper wire in green color shall be run inside the conduit to earth the third pin or socket outlets, earth terminal of light fixtures , fan etc. as required. Light points shall be either of single control, or twin control or multiple points controlled by a single switch/ MCB as per scheduled of work. Bare copper wire shall be provided with each circuit from DB as specified in the item of work and terminated in earth bar of DB's and switch boxes with proper lugs as required maximum number of PVC insulated 650 / 1100 grade copper conductor cable which can be drawn in a conduit is given in Annexure – A.

MOUNTING HEIGHTS

The mounting heights of various electrical outlets from finished floor level shall be as follows or as directed by the Engineer/Architect-in-Charge Drawing or as mentioned in the relevant drawings :-

1.	Light points	2200mm
2.	Mirror light	1800mm

3.	5/15A light / power sockets	Above skirting
4.	5/15A switch for sockets	1000mm
5.	DBs	1500mm
6.	15A socket in toilet	1800mm
7.	15A switch outside toilet	1000mm
8.	15A power points in kitchen	150mm above cooking platform
9.	TV/ Telephone outlet	above skirting

CONDUCTOR SIZE

Wiring shall be carried out with the following size of PVC insulated copper conductor wire/ cable.

i)	Light point	-	1.5 sq.mm
ii)	Ceiling fan/ exhaust fan	-	1.5 sq.mm
iii)	Call bell	-	1.5 sq.mm
iv)	Plug point (23/ 5A socket)	-	1.5 sq.mm
v)	Circuit – Wire	-	1.5 sq.mm / 2.5 sq.mm
vi)	Power point (6 P 15A)	-	4.0 sq.mm
vii)	A/C point	-	6.0 sq.mm
viii)	Power point geyser /water cooler and hand dryers	-	4.0 sq.mm

ANNEXURE - A

Maximum number of PVC insulated 650/1100 V grade aluminum / copper conductor cable conforming to IS:649 – 1990.

-Nominal cross sectional area of conductor in sq.mm	20mm		25mm		32mm		38mm		51mm		64mm	
	S	B	S	B	S	B	S	B	S	B	S	B
1	2	3	4	5	6	7	8	9	10	11	12	13
1.50	5	4	10	8	18	12	-	-	-	-	-	-
2.50	5	3	8	6	12	10	-	-	-	-	-	-
4	3	2	6	5	10	8	-	-	-	-	-	-

6	2	-	5	4	8	7	-	-	-	-	-	-				
10	2	-	4	3	6	5			8	6	-	-	-	-		
16	-	-	2	2	3	3	6	5	10	7	12	8				
25	-	-	-	-	3	2	5	3	8	6	9	7				
35	-	-	-	-	-	-	3	2	6	5	8	6				
50	-	-	-	-	-	-	-	-	5	3	6	5				
70	-	-	-	-	-	-	-	-	4	3	5	4				

Note :

1) The above table shows the maximum capacity of conduits for a simultaneous drawing in of Cables.

2) The column headed 'S' apply to runs of conduits which have distance not exceeding 4.25m between draw in boxes and which do not deflect from the straight by an angle of more than 15 degrees. The columns headed 'B' apply to runs of conduit which deflect from the straight by an angle of more than 15 degrees.

LUMINARIES

The lighting installation has been designed in accordance with modern practice and generally in accordance with IS:3646 (part-I) 1992 for interior lighting. The scope of the work shall be supply, installation, connection and commissioning of all lighting fixtures as specified herein and shown in the drawings.

Light fixtures shall be fixed in a workman like manner as per best trade practices and according to the instruction of the manufacturers. Lighting fixtures which are recessed in the dropped ceiling shall be thoroughly matched and coordinated with the pattern and design of the dropped ceiling as shown in architectural drawings. Care shall also be taken to coordinate the lighting fixture details with all other services such as air conditioning, plumbing, fire alarm detectors etc. It has to be ensured that all light fixtures are in the same line and level and at exactly shown in the detail drawings. All luminaries shall be supplied by the contractor importer / Local as per the advice of the owner.

INSTALLATION

a) The light fixtures and fittings shall be assembled and installed in position complete and ready for service, in accordance with details, drawings, manufacturer's instructions and to the satisfaction of the construction manager/ consultants. Pendent fixtures specified with overall stem lengths are subject to change and shall be checked with conditions on the job and installed as directed. All suspended fixtures shall be mounted rigid and fixed in position in accordance with drawings, instructions and to the approval of the construction manager/ consultants. Fixtures shall be suspended true to alignment, plumb level and capable of resisting all lateral and vertical forces and shall be fixed as required.

b) All suspended light fixtures, fans etc shall be provided with concealed suspension arrangement in the concrete slab/ roof members. It is the duty of the contractor to make these provisions at the appropriate stage of construction. Exhaust fans shall be fixed at location shown on drawings. They shall be wired to a plug socket outlet at a convenient location near the fan. All switch and outlet boxes, for fans and light fittings shall be bonded to earth. The recessed type fixtures shall not be supported into the false ceiling frame work. This shall have independent support from the

socket of ceiling using conduit rods/ steel chain with provision for adjusting the level of fitting. Wires shall be connected to all fixtures through connector blocks. Wires brought out from the junction boxes shall be encased in flexible pipes for connecting to fixtures concealed in suspended ceiling. The flexible bush, double checkout at the fixture and flexible pipes, wherever used shall be of make and quality approved by the construction manager/ consultants.

DISTRIBUTION BOARDS

Distribution boards shall be of stranded make with MCB's as per approved make given in Appendix 'A' and factory assembled with latching covers flush lock. 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 plates shall provided at top and bottom to facilitate drilling holes at site to suit individual requirements. The MCB's shall be mounted on a high grade rigid insulating support and connected by electrolytic copper bus bars. Each incoming MCB isolator shall be provided with solder less cable sockets for crimping phase separation barriers made out of are resistant materials shall be provided between the phases. Bus bars shall be colour coded for phase identification.

Distribution boards shall be recessed in wall niche or if required mounted on the surface of wall with necessary clamp bolts etc as required at a height not exceeding 1600mm from finished floor level. Distribution board shall be provided with proper identification name plate, danger mark etc.

All the distribution boards shall be marked 'lighting' power or 'Emergency' 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 and phase.

Each distribution board shall have a separate neutral connection bar and a separate earth connection bar mounted within the board each having the same number of terminals as the total number of outgoing individual circuits from the distribution board. Suitable earth terminal shall be provided on the distribution board for bonding to earth.

Distribution boards shall be duly rust inhibited through a process of degreasing , acid picking, phosphate and spray primer. The entire board shall be rendered dust and vermin proof with necessary sealing gaskets.

MCB's shall have quick make and break non-welding silver alloy contacts both on the manual and automatic operation. MCB's shall be of thermal magnetic type with inverse time-delay over-current tripping having a short circuit rupturing capacity of 0KA. In case of multiple breakers the tripping must be on all the poles and shrouded, wherever MCB isolators are specified they are without he tripping elements. Necessary adopter box of suitable size shall be provided to facilitate the wiring and nothing shall be payable on this account.

TELEPHONE SYSTEM

Conduits, junction boxes, draw boxes, outlet boxes and covers to boxes for telephone system shall be at least 150mm away from the electrical conduits. The conduits for telephone wiring shall be of specified size and shall be terminated at outlets as indicated on the drawings. Telephone system conduits shall have 2mm diameter galvanized steel pull wires installed. Necessary junction boxes to be provided for easy drawing of the telephone wires from each unit to the telephone tag box and from the tag box to the open ground. The minimum size of conduit shall be 25mm dia.

a) The scope of work for telephone system shall be supply and installation of all conduits, trays, boxes, accessories and outlet devices with necessary wiring, cables etc from the telephone exchange.

Outlet boxes shall be mounted where shown on the drawings. Pull boxes shall be mounted according to the regulation and wherever needed to facilitate the pulling in of wire.

Telephone conduit specification shall be similar to the specification of electrical conduit given in preceding pages. A telephone distribution box of suitable dimensions to house the tag blocks will

be supplied and installed inside the telephone niche or shaft as indicated on the drawing. From the telephone distribution box, telephone conduit shall run to the telephone outlets and shall be completely separate from other system conduits.

Main telephone cable shall be PVC insulated and sheathed with multiple cores in twisted pairs with white tape, ripcord and color coded to Indian standards. The main cables shall have soft copper used for final extension to the hand sets. Single pair strips shall also be enclosed in a M.S. box concealed in the wall hylam bakelite sheet cover.

b) All concealed / surface installation including the conduit run above the false ceiling space shall be heavy gauge black enameled MS/ PVC conduit. The specification for materials & installation shall be same as described in the electrical section. All relevant clause are applicable for telephone system as well. The conduit for telephone system shall be installed minimum 20cm away from the power conduit. Care shall be taken so that no telephone conduits running parallel to electrical conduit in close proximity. Wherever telephone conduits cross power conduits, they shall be at right angle, to each other. All telephone conduits shall be earthed.

SIZE OF CABLE	CONDUIT SIZE
Upto 5 pair	20mm
Above 5pair up to 10 pair	25mm
Above 10 pair up to 20 pair	32mm
2 nos. 2 pair	20mm
3 to 5 nos. 2 pair	25mm
6 to 10 nos. 2 pair cable	32mm

The size of conduit shall depend upon no. of wires to be drawn. However minimum size of conduits shall be 19/20mm.

c) All telephone wires shall be 0.61mm dia annealed tinned copper conductor PVC insulated and PVC sheeted cables. All telephone cables inside the building shall be un armored. Each 0ut let shall be wired with 2 pair cables from final tag unless otherwise specified separately. From main tag block to sub tag block cabling shall be done with suitable size of telephone un armored cable laid in conduit / pipe/ cable trays.

d) BOXES & TELEPHONE OUTLETS :

All concealed boxes shall be of G.I. as described in the electrical wiring section & shall match with electrical wiring accessories. The boxes/ main junction box shall be suitable for wall mounting having opening for cable/ conduit entry. All PVC cable shall enter the telephone junction box from the bottom through brass cable glands and enough cable length shall be available for termination. Each PVC cable serving the telephone socket shall be marked for identification.

Junction boxes shall be fully enclosed, kept tight with lockable hinged doors.

Prior to the system installation the contractor shall consult telephone department for their requirements and notify the construction manager/ consultants on the same. All equipment like tag blocks, wires shall be MTNL approved makes.

TEELPHONE CABLES & WIRES

Telephone Multicare cables shall be of approved make and shall conform to following specifications.

Type of Conductor.. Electrolytic Annealed Tinned Cu conductor.
Diameter of conductor.. 0.61 mm dia uniform (minimum size)
Weight of Conductor.. 2.52 KG / Km minimum
Resistance of conductor at 20 degree .. 60 Ohms/ Km.

Radial Thickness of PVC insulation..0.3mm +/- 0.05mm uniform.
Radious thickness of PVC sheathing .. 1.2mm uniform +/- 0.2mm
Overall diameter of insulated conductor.. 1.2mm uniform.
High voltage test. Able to withstand upto 500volts D.C. up to 12 hours immersion in water.

Supply, drawing and making connections with Telephone single cord outlet and telephone junction box of 3 pair un armored telephone cable annealed tinned electrolytic copper conductor insulated and sheathed with PVC compound as per BS 6746 twisted pair bunched together in connection layers and wrapped with Melinex or PVC tape as per relevant ITD standards in existing conduit from each telephone outlet point to the telephone junction box.

Supply, drawing and making connections with Telephone Main Junction box and telephone junction box as shown on the drawings of multi paired (2x0.61mm) armored telephone cables with annealed tinned copper conductor, PVC insulated and PVC sheathed GI strip armored as per ITD specifications and armoring and sheathing as per IS : 1554 (Part I) suitable for underground use, in G.I.pipe/ laid in ground 750mm below ground level/ surface.

Providing & fixing in position required number of 1.6mm thick M.S. Telephone junction box of suitable size, suitable for fixing 100 pair Krone tag block with key lock arrangement. Also provide clamps for fixing tag blocks. Prove Krone tag block of 100 pairs inside the box.

Providing & fixing in position required number of 1.6mm thick M.S. Telephone junction box suitable size, suitable for fixing 11 pair Krone tag block with key lock arrangement. Also provide clamps for fixing tag blocks. Provide Krone tag block of 11pair inside the box.

SPECIFICATIONS

HT PANEL (VCB)

The HT panel boards to be supplied shall be of approved make as per list of approved make of materials. It shall be dust and vermin proof, floor mounted self supported cubical suitable for 11 KV 50 C/S 3 phase earthed materials.

The panel shall be supplied with manufacturers test certificate; date of manufacture shall be complete in all respects as per details in the schedule of quantities. The steel work shall undergo the process of degreasing, acid pickling, cold rinsing, phosphate, sand lasting, corrosion resistant primer and then receive two coats of Enamel paint of grey shade no. 631 IS-5/1978 with latest amendment.

It shall be dust and vermin proof, floor mounted, self supported free standing type cubical suitable for 11 KV 50 C/S 3 phase earthed system. It shall be horizontal isolation horizontal draw out type fully interlocked of 630 A rating suitable for indoor installation and shall have a rupturing capacity of 350 MVA at 11 KV.

Ammeter and voltmeter of size 144mm square with their respective selector switches shall be provided on the incoming panel. All meters shall conform to IS:1248-1968 and shall be tested for 2500V for one minute. On incoming panel a 100 VA burden and class-I accuracy potential transformer 11KV/110V air cooled, epoxy molded , draw-out type with fuses on high and low voltage sides shall be provided. It shall conform to latest revision of IS : 3156 with latest amendment.

The bus bar shall be of aluminum suitable for normal current carrying capacity of 400A and shall be insulated and supported properly on cast resin insulators so as to withstand thermal and dynamic stresses during system short circuits. Bus bars shall be covered with heat shrink PVC sleeves with suitable colour coding. Bus bars shall be designed to withstand temperature rise of 35 degree C. The parts of VCB which are in contact with cables shall be capable of withstanding pressure test on HT cables.

Each VCB panel shall have the following basic parameters:

2) Cast iron current transformer minimum 15VA or as required for metering and protection conforming to IS : 2705-1964 Part-I, II, III & IV shall be provided.

1 Induction type IDMT relays with 1 to 3 seconds time delay shall be mechanically operated flag indicators with all relays capable of being reset without opening the casting. Relays shall be flush mounted .Setting range for over current relay shall be 50 to 200% in steps of 10%. Earth fault relay shall have a setting range of 20 to 40% in steps of 10%.

2 Following colour indicating light shall be used with suitable series resistor :

* Breaker ON	-	RED
* Breaker OFF	-	GREEN
* Spring charged	-	BLUE
* Trip Circuit Health	-	WHITE

3 Circuit breaker shall have three positions viz : Service, Test and isolated Front door shall be fully closed while breaker is on test position, to avoid full entry of any object. Panel shall have a window for vision of circuit breaker while in service. Circuit breaker, current transformer and bus bar compartments shall be fully aggregated from each other.

4 Name plate shall be provided for each panel.

5 Trip free circuit breaker mechanism.

6 Manually charged spring closing mechanism.

7 Services trip and spring closing coil shall be 110V.

8 6 No. + 6 NC auxiliary contacts.

9 All three breaker polls to be mounted in a trolley with operating mechanism. Poles shall be insulated from the operating mechanism. Poles shall be insulated from the frame by synthetic resin insulation. Interface bakelite barriers shall be provided between the poles.

Each pole shall consist of mechanism housing and a breaking chamber. The housing shall be provided with an upper terminal, oil filler hole, oil filler gauge and a cover with an automatic exhaust gas valve. The bottom portion of breaking chamber shall consist of an oil drain plug in addition to lower terminal.

10 The breaker trolley frame shall contain following :

*Push button for closing and opening of breaker mechanically.
*Closing and opening coils to enable remote control of breaker.
*An auxiliary contact unit.

11 Cable box shall be provided for cable termination 3 core x 70 sq.mm XLPE proper arrangement for cable entry from bottom.

12 One number auxiliary relay on outgoing panel for transformer protection.

13 Trip close spring return to neutral breaker switch.

14 An earthing bar of aluminum flat with two earthing studs shall run on back side throughout the length of the panels.

15 The moving contacts shall be fully floating self aligning type for arrangement with fixed contract. The fixed contacts shall be made of tuplip contacts and the required contact pressure is obtained by springs. The moving contacts shall be of solid copper with sufficient thickness of silver plating. The tips of the moving contacts and the finger of the tuplip contacts shall be provided with high temperature resisting material.

16 The VCB shall have complete interlock to ensure the following :-

* Breaker cannot be plugged in unless it is open.
* Breaker cannot be isolated while it is closed.
* Assembly cannot be removed while the breaker is plugged in.
* Local and remote control apparatus cannot be in operation simultaneously.

The loose items to be supplied with the H.T. Panel shall comprise of the following:-

* Instruction book
* Truck operating handles.
* Handles for mechanism.
* Lifting Lugs.
* Foundation bolts.

BATTERY CHARGER WITH BATTERIES

BATTERIES:-

The battery shall be lead acid stationery batteries with plane or tubular positive plates 24 volts consisting of 12 cells of 2 V each, 180 AH each with capacity @ 10 hours rate of discharge to and voltage of 1.85 volt per cell supplied complete with inter cell connectors acid level indication floats dry charger conforming to IS : 1651 double row two tier execution arranged in wooded stands and insulators with following accessories.

1.	Syringe type hydrometer	-1no.
2.	Spanner	-1no.
3.	Acid resistive funnel	-1no.
4.	Acid resistant jug of two pints capacity	-1no.
5.	Rubber syringe	-1no.
6.	Connectors from battery of charger	-1no.
7.	Voltmeter (-3.0+3V) with lead	-1no.

Electrolyte shall be filled as per manufacturer's instructions inter row connections shall be made with lead charging discharging and recharging cycles of batteries shall be carried out under supervision of the Engineer/Architect in Charge. Suitable device for discharging shall be provided by the contractor free of cost.

BATTERY CHARGER :-

The Battery charger shall be natural air cooled, solid state type with full wave, fully controlled, bridge configuration. The charger shall be provided with automatic voltage regulation, current limiting circuitry, smoothing filter circuit and soft start feature. The voltage control shall be stepless, smooth and continuous. It shall be self protecting against all AC and DC transients and steady state abnormal current and voltages. The charger AC input and DC output shall be electrically isolated from each other and also from panel ground. Isolation shall also be provided between power and control circuits. Self contained battery charger with housing suitable for 24 volts 180 AH with incoming supply 230 V A.C. floating supply voltage 21.8 V per cell. The charger panel shall be made of sheet metal of thickness not less than 2mm and shall conform to Protection IS : 44 . Switches, meters, relays etc shall be flush mounted on the front of the panel.

The Charger shall be designed for continuous output of 10A complete with following accessories:-

1. A.C. input toggle switch with fuse.
2. Pilot lamp to indicate AC mains ON
   Varian for step less DC output.
   Double wound impregnated naturally air cooled single phase transformer.

a) Ballast Choke to give trickle charge.
b) Float cum boost charger.
   Single phase full wave bridge connected silicon rectifier stack.

Moving coil ammeter and voltmeter of D.C. output.
D.C. fuses.

TRANSFORMER (OUT DOOR TYPE)

The transformer shall be step down transformer from 11 KV to 433V, copper wound and be of approved make of materials. It shall be double wound, oil filled, natural cooled, indoor type low copper-less with delta connection on HT side and star on low tension side and having tap changing device on HT side for tapping up to plug minus 7.5% at step of 2.5% (seven tapings). The winding insulation shall be suitable for earthed 11KV system. The transformer shall be complete with the following accessories:-

a) An extremely band operated of load circuit tap changing switch with locking device.
b) Oil conservator with filling hole and cap.
c) Silica gel dehydrating breather.
d) Oil level indicator (plain)
e) One drain valve
f) One filter valve with plug
g) Thermometer pocket
h) Diagram, rating plate, terminal marketing plate of stainless steel.
i) Two earthing terminals.
j) Lifting arrangement.
k) Four unidirectional plain rollers.
l) First filling of oil as per IS : 335/1972
m) Explosive vent with single diaphragm.
n) 150mm dial type thermometers for winding and oil.
o) Double float buchol relay with alarm and trip contact.
p) Vector group Dyn II
q) Isolation valves on both sides of buchol relay
r) Air release hole with plug.
s) Marshaling box
t) Provision for winding temperature indicator along with alarm and trip contact for remote annunciation.
u) Provision for oil temperature indicator dial type

LIST OF APPROVED MAKES (Civil)

S. NO.	ITEM	DESCRIPTION
1.	REINFORCEMENT STEEL	Tata,Sail,Jindal
2.	AAC BLOCK	Biltech, JK Lakshmi,Birla AAC Block
3.	CEMENT	ordinary Portland cement 43 grade manufactured by Acc/Binani/Jaypee/ Ultra Tech/Ambuja Pozzolona cement shall not be used.
4.	POLYSULPHIDE SEALANT	Pidiseal by M/S Pidlite INDUSTRIES Ltd., Fosroc, Shalimar
5.	WATER PROOFING COMPOUND	Cico , Fosroc, Dr Fixit,
6.	SHUTTERING PLYWOOD	Green, Century, Archid
7.	TOUGHENED GLASS	Trutuf or equivalent
8.	GLASS/LACQUERED GLASS	Modi Float. St. Gobain., Ashai
9.	WIRED GLASS	6mm thk. Wired glass manufactured by Hindustan Safety Glass Works Ltd. Calcutta, Or Vallabh Glass Works Gujrat./HARYANA SHEET GLASS.
10.	WHITE CEMENT	J.K. White Cement , Birla White Cement
11.	PAINT	Enamel, Plastic Emulsion manufactured by Paint and Primer Berger Paints, Asian Paints, Nerolac Shalimar Paint, ICI.
12.	PLASTER OF PARIS	Shriram, Sakarni, Birla,J.K
13.	PUTTY	Asian Paints., JK, Birla
14.	EXPANSION BOLTS FOR FIXING	Dash Fasteners of appropriate size by HILTI OR M/S. Dev Ashish Trades
15.	WINDOW HARDWARE	Hettich, Kaff, Ebco or Approved by Architect.
16.	CERAMIC TILES	Johnson,Somany,Kajaria ,
17.	VINYL FLOOR	Armstrong/ Rikvin , Wonder Floor.
18.	VITRIFIED TILES	Johnson, Somany, Kajaria
19.	GLAZED TILES	Johnson,Somany,Kajaria ,
20.	SPECIAL CERAMIC TILES	Saraswati Ceramics, other approved pottery in Delhi/Khurja or approved by architect
21.	HINGES AND DRAWER SLIDE	Kaff, Hettich, ozone (telescopic channel for drawer and key board and slide -on hinges for wooden cabinet shutters)
22.	LOCKS, HANDLES	Godrej, Dorset, Dorma, Aspa, or Approved by Architect
23.	DOOR CLOSERS, FLOOR SPRING AND HARDWARE FITTING	Dorma, Dorset, Ozone,
24.	ALUM, TOWER BOLTS,HARDWARE FITTING	Ebco, Everite, Sigma or Eq. Approved By Architect.
25.	MS SCREW	Nettle Fold,Crab
26.	M.S. PIPES (RAILING)	Jindal, Prakash, appolo
27.	FLUSH DOORS	Duro, Century, Greenply, Archid
28	VENEER	Duro, Century, Green
29.	LAMINATE DECORATIVE LAMINATE	Archid, Greenlam, Century
30.	PLYWOOD, BLOCK BOARD ,	Duro, Century, Green, Archid.
31.	STRUCTURAL STEEL	Sail, Tisco, Jindal.
32.	TEXTURE TILES FOR FALSE CEILINGS / FIBER CEMENT BOARD	Armstrong,Everest Industries Ltd.
33.	WOOD	Teak Wood First Class of CP or Burma
34.	M.S. ALUMINIUM LINEAL CEILING	Interarch, Vista.
35.	VENETIAL BLINDS	Trac, Vista, Mac.
36.	GYPBOARD CEILING	Gypsum India, Lafaarz., St. Gobain
37.	HEAT REFLECTIVE FILM	Garware, 3M,

38	ADHESIVE	Fevicol SH, Century, Vemicol,Jivanjor
39.	TILE ADHESIVE	Unitile, Roff Chemicals, Kajaria.
40	MIRROR	Atul, Jolly, Modi Guard
41.	G.I.PIPE AND FITTINGS	Tata, Jindal, Appolo, Unik,
42.	CENTRIFUGALLY CAST (SPUN) IRON SOIL WASTE & VENT PIPE & FITTINGS	Jayaswal Neco (Nagpur), C.I.A.L. (Durgapur)
43.	WOOD PRESERVATIVE	Wood Guard or Approved EQ/ICI.
44.	ALUMINIUM COMPOSITE SHEET	Alucobond, Alstone
45.	ALUMINIUM SECTIONS	Jindal, Indal, Hindalco.
46.	C.I./R.W.P.	Neco, RIF, IIS OR EQ.
47	C.P BRASS FITTING	Jaguar, Parko ,Parryware
48.	SANITARY WARE	Parryware, Jaguar, Kohlar, Roco
49.	STAINLESS STEEL SINK	Diamond , Nirali, Jayna, Nilkanth,
50.	SANITARY FITTINGS VISIBLE	Jaguar, Grohe OR Equivalent ISI Make
51.	PVC,U.P.V.C PIPE	Supreme, Prince, Astral, Finolex
52.	CI BRASS LA PIPES	Electro Steel, Kesoram or approved
53.	STONE WARE PIPES	Bhaskar, Anand, ISI marked of approved quality
54.	R.C.C PIPES	ISI marked of approved quality
55.	LOFT TANK	Sintex, Uniplas, Polycon, supereme (three layer)
56.	CI PIPES & WORK	Neco, RIF,SIF,BIS OR Equivalent ISI Make
57.	Anti termite	Thiddan (35 E.C.), Dursban – 20 TC, Trishul,pidilite
58.	GATE VALVES	Leader, Zoloto,Valson
59.	PLASTIC W.C SEAT COVER	Commander, Diplomant
60.	GUN METAL VALVE(FULL WAY CHECK &GLEBE Valves)	Leader, Zoloto,Valson
61.	C.I VALVE (FULL WAY CHECK & GLEBE VALVES	Kirloskar, Leader, Zoloto
62.	CPVC	Prince, Astral, Finolex , Supreme,
63.	READY MIX CONCRETE	Acc, Ultratech, Rmc India ,Lafarge
64.	CONCRETE ADDITIVE	FOSROC, STP, CICO-TL, SIKA,Pidilite
65.	FIRE CHECK DOORS	GLOBAL FIRE PROTECTION COMPANY, RADIENT SAFE FIRE DOORS, GODREJ; NAVAIR; SHAKTI MET;
66.	POLY CARBONATE SHEETING	GE PLASTICS, POLYGAL, SUNLITE
67.	NONMETALLIC HARDENER COMPOUND	FOSROC, STP, CICO, SIKKA
68.	ACRYLIC SOILD SURFACE THERMOFORMED	Dupont,LG, Avonite
69.	CHAIRS/SOFA	Godrej,Featherlite,Geeken, AFC
70.	MODULAR FURNITURE/CUBICLES	AFC FURNITURE SOLUTION,FEATHERLITE AMARDEEP DESIGENS PVT. LTD.
71.	MODULAR CPU TROLLY/KEYBOARD	EBCO/UNIQUE/PINNACLE

LIST OF APPROVED MAKES ELECTRICAL WORKS

S. NO.	ITEM	DESCRIPTION
1	MEDIUM VOLTAG SWITCHGEAR	
a	MOULDED CASE CIRCUIT BREAKER(MCCB)	AAB, Schneider / Legrand/ Siemens, ,L&T Haggar, Havells (MCCB)
b	SWITCH FUSE UNIT	Havells / L & T/ EE/ Crompton / H Helcon
c	HRC FUSE	Havells/ L & T/ EE/ H Helcon
d	CHANGE OVER SWITCH	Havells/ L & T or approved equivalent
2	VRF/VRV/SPLIT/WINDOW AC System	Carrier /Mitsubishi Electric/ Daikin/ Blue Star
3	CENTRIFUGAL FANS	Kruger/Nicotra/ Green heck/Air Flow
4	INLINE FANS	Kruger/Nicotra/ Green heck/Air Flow
5	G.I. Sheets	Sail/ Tata/Jindal
6	FACTOR FABRICATED DUCTING	Rolastar/Zeco/Ductofab
7	WELDING ROADS	Advani/L&T
8	DUCT SUPPORTS	Hilti/ walraven/gripple
9	ANCHOR/ FASTENER	Hilti/Fisher/Sterling
10	ALUMINIUM TAPE	Johnson/Birla 3M
11	GRILLS/DIFFUSERS/FIRE DAMPERS / LOUVERS/EXHUST VALVE	Glenstorms/Systemair/Ruskintitus
12	INSULATION/ACOUSTIC LINING FOR DUCTING	Armacell / Urobatex /vidoflex
13	INSULATION FOR REFRIGERENT FOR PIPE	Armacell / Urobatex /vidoflex
14	COPPER REFRIGENT PIPE	Rajco/Mandev/Maxflow
15	UPVC DRAIN PIPE	Supreme/Astrals/Finolex
16	CANVAS CONNECTION	Mapro/Glenstorms/Astar
17	PROPELLER TYPE EXHUST FAN	Kruger/ havells/ Marathan/Orient/Usha/Bajaj
18	MCB/ELCB/DBS/MCCB	Schneider/Legrand/Siemens, L&T Haggar, Havells
19	AIR CIRCUIT BREAKER(ACB)	L&T,ABB, Siemens, Schneider,Legrand
21	MV CONTRACTORS/TIMER/ STARTERS	L&T/ Siemens/Legrand
22	PROTECTIVE RELAYS	L&T/ Siemens,Alstom,ABB
23	ALL METERS	Enercon/Neptune/ Siemens
24	AMMETER/VOLTMETER	A.E/ Indotech or approved equivalent
25	INDICATION LAMPS/PUSH BUTTON	L&T/ Schneider/Vashino,Concord,Siemens
26	CAPACITOR	L&T/ Siemens/ Neptune
27	TERMINAL BLOCKS	Elmex/Wago/Connect-Well
28	CURRENT TRANSFORMER	AEP/ Kappa/ Inditech
29	SELECTOR SWITCH	Kaycee/L&T/BCH/Areva/ABB
30	BUS BAR	Jindal/ Indalco/ Century
31	LT CABLES/CONTROL CABLE	Skyton/ Finolex/polycab /Gloster all FRLS
32	SWITCH SOCKET/METAL CLAD SOCKET	Legrand (Myrius) / Anchor Roma Havells,(Crabtree)
33	CABLE TRAY/RACEWAY	Pilco/ Needo, Slotco, Venus,Era Ontrol Syatem
34	HUNGS	Dowels or approved equivalent
35	CONNECTORS	ELMEC/Delcity/Waytek
36	CABLE GLAND	Stripwell/ Commet/ Siemens,Gromet,Power Engg.
37	MV PANEL (TTA)	Siemens Cpan/ ABB R2K/ Schneider Blockset
38	GI CONDUIT	BEC/ AKG/ Steel Craft
39	MOTORS	Siemens/ ABB/ Crompton
40	PVC PIPE	Finolex/ Prince/ Supreme
41	ELECTRICAL PANEL	Krypton/Risha/KEPL, Era Control System /SPT Switchgears /Eva` Engineers
42	G.I PIPE	Tata/Jindal/Bhusan
43	Earth Leakage Circuit	Hager/ Legrand/ Merlin Gerin
44	FIRE ALARM SYSTEM	System Sensor/ Edwards/Appolo/Agni
45	Data Components	AMP/ Systmatics/legrand
46	ANY OTHER ITEMS	Sample to be approved by engineer in- charge
47	ACCESS CONTROL SYSTEM/ CCTV System	Brivo/Honeywell/Dats/Lenel/Tyco/Siemens
48	Door Phone	Panasonic/Zicom/Solus(Secure)

49	Reader	Brivo/HID
50	Smart / Proximity Card	Brivo/HID
51	CAPACITOR	L&T/ SIEMENS/ALSTOM
52	PVC INSULATED COPPER CONDUCTOR STRANDED CONTROL WIRES OF 1100 V GRADE	Finolex/ Polycab /Havells, FRLS
53	COPPER LUGS HEAVY DUTY	Dowells
54	MEASURING METERS	Automatic Electric/Kappa/Enercon
55	DIGITAL METERS & KWH METERS	SECURE/L&T/ENERCON
56	PUSH BUTTONS	L & T/Siemen/ABB
57	WIRING CABLE	Finolex / Polycab / Havells all FRLS
58	M.S. CONDUITS AND ASSESSORIES	BEC /AKG /ESC
59	P.V.C. CONDUITS AND ACCESSORIES	BEC/ AKG/Polypack/ESC
60	LIGHT FIXTURES	Philips/Havells/Wipro
61	CEILING/WALL/EXHAUST FAN	Usha/Crompton/Havells
62	CHEMICAL EARTHING	Tercel Australia, Indelec,LPI, South asian enterprises
63	ADVANCE LIGHENING PROTECTION	Tercel Australia, Indelec,LPI, South asian enterprises
64	PA MUSIC SYSTEM	Bosch
65	ADDRESSABLE SMOKE DETECTON SYSTEM AND ALL ITS COMPONENTS (UL LISTED)	Apollo,Honeywell,ravel,Hotchiki,Simplex,Agni
66	UPS	Emerson,Mitsubishi,Gutor,Merlin,Gerin,Socomec, Numeric,Reillo PCI
67	TELEPHONE TAG BLOCKS	Krone Type

(All materials shall be ISI mark)

BILL OF QUANTITIES

PREAMBLE

A GENERAL

1. The Contractor shall be deemed to have visited the Site before submitting his tender and to have examined for himself the conditions under which the work will proceed and all other matters affecting the carrying out of the works and cost thereof

2. This Bill of Quantities must be read with the Drawings, Condition of contract and the specification, and the contractor shall be deemed to have examined the drawings, Specification, Condition of Contract and to have acquainted himself with the detailed descriptions of the works to be done and the way in which they are to be carried out.

3. Notwithstanding that the work has been sectioned, every part of it shall be deemed to be supplementary of every other part and shall be read with it or into it so far as it may practicable to do so.

4. The detailed description of work and materials given in the Specifications are not repeated in the Bill of Quantities, however, the work has to be carried out as per the detailed Specifications given under Materials and Workmanship.

5. Approximate only and are given to provide a common basis for tendering. Payment will be made according to the actual quantities of work ordered and carried out as measured by the actual quantities of work ordered and carried out as measured by the Engineer and valued at the rates and prices quoted in the Bill of Quantities.

B RATES AND PRICES TO BE INCLUSIVE

1 Rates and prices set against items are to be the all inclusive value of the finished work shown on the Drawings and/or described in the Specifications or which can reasonably be inferred there from and are to cover the cost of provision of plant, labour, supervision, materials, erection, insurance, maintenance, overheads and profits and every incidental and contingent cost whatsoever and all the Contractor's obligations under the Contract and all matters and things necessary for the proper completion and maintenance of the works

2 The Specifications are intended to cover the supply of material and execution of all work necessary to complete the works. Should there be any details of construction of material which have been referred to in the Specifications or in the Bill of Quantities and Drawings, the necessity for which may reasonably be implied or inferred there from, or which are usual or essential to the completion of all works in all trades, the same shall be deemed to be included in the rates and prices named by the Contractor in the Bill of Quantities

3 All the price are fixed till the completion of the work and no price variation will be given on account of delay for any reason.