

TENDER DOCUMENT

NAME OF WORK :
EXTENSION (Construction) OF D.A.V PUBLIC SCHOOL,
SECTOR-18 INDIRA NAGAR, DISTT-LUCKNOW

EMPLOYER

D.A.V PUBLIC SCHOOL

REGIONAL OFFICER
SECTOR 18 INDIRA NAGAR, LUCKNOW, UTTAR PRADESH

M/S CONCEPT DESIGNER'S

ARCHITECTS, ENGINEERS, INTERIOR DESIGNERS, PROJECT MANAGER & VALUERS

426 B, SAHARA SHOPPING CENTRE,
FAIZABAD ROAD, LUCKNOW.
Tel.: 0522-2311748 / 4009712
Fax: 0522-2311748

LETTER OF SUBMISSION FROM CONTRACTOR

To,

**The ARO
D.A.V PUBLIC SCHOOL
SECTOR-18 INDIRA NAGAR,
LUCKNOW**

Sub. EXTENSION (Construction) OF D.A.V PUBLIC SCHOOL, SECTOR-18, INDIRA NAGAR, DISTT-LUCKNOW

Dear Sir,

We refer to the tender invited by you for the execution of above mentioned work. Having visited the Site and examined the Drawings, Conditions of Contract, technical specifications and Bill of Quantities. We offer to carry out and complete the whole of the work in conformity with Specification, and bill of Quantities for the sum stated in Bill of Quantities included in this Tender Documents.

We undertake to complete and deliver the field test, laboratory tests & reports within the time stated in the Appendix hereto.

We understand that you are not bound to accept the lowest or any tender you may receive.

We send your herewith tender duly filled and hereby agree to pay all charges of whatever nature connected with preparation, stamping and execution of the said contract.

We agree not to employ 'Sub-Contractors' as per tender condition.

Dated this _____ day of _____ 2021

Signature _____ in the capacity Partner/ Proprietor/ Director

Duly authorised to sign tenders for and on behalf of

(IN BLOCK CAPITALS)

Witness:

Signature _____ Address of _____

Name _____ Tenderer _____

Occupation _____

Names of the Partners of the Firm or Directors of Contractors Company

Name(s) of the Bank(s) in which the Tenderer maintains an Account(s)

INDEX SHEET

S.No.	DESCRIPTION	PAGES
01.	Tender Notice	3-5
02.	Instructions to Tenderers	6-8
03.	Articles of Agreement	9-11
04.	Form of offer / Appendix to form of offer – Annexure 1	12-13
05.	Special Note and Condition of Contract – Annexure 2	14-17
06.	General Conditions of Contract – Annexure 3	18-40
07.	Special Conditions of Contract – Annexure & Appendix 4	41-50
08.	Contractors labour regulations – Annexure 5	51-56
09.	Format of Bank Guarantee for bid offer security – Annexure 6	57
10.	Form of performance bank guarantee – Annexure 7	58
11.	Technical Specifications I. Civil Works II. Plumbing Works III. Electric work	59-137 138-166
12.	Preamble to Boq	167-175
13.	List of Approved Makes & Materials	176-177
14.	List of Drawings	178

NOTICE INVITING TENDER**To,****M/s.**

Name of Work: - EXTENSION (Construction) OF D.A.V PUBLIC SCHOOL, SECTOR-18, INDIRA NAGAR, DISTT-LUCKNOW

EMPLOYER: D.A.V PUBLIC SCHOOL.

- 1.1. Sealed tenders are invited from reputed short listed contractors on behalf of our Employers, for the said above job EXTENSION (Construction) of D.A.V Public School, at Sector-18, Indira Nagar, Distt-Lucknow
- 1.2. Sealed tender - envelopes should be addressed to **The ARO, DAV Institutions UP Zone-A, C/O DAV Public School, Sector-18 Indira Nagar, Lucknow (U.P.)-226016** & should be superscribed "Tender for Construction for Educational Building for D.A.V Public school" and should be sent to the office of **The ARO, DAV Institutions UP Zone-A, C/O DAV Public School, Sector-18 Indira Nagar, Lucknow (U.P.)-226016** on or before 1500 hrs on 08.11.2021
- 1.1. Tender documents consisting specifications, General Conditions, Bill of Quantities and Architectural drawings could be obtained from the office of **The ARO, DAV Institutions UP Zone-A, C/O DAV Public School, Sector-18 Indira Nagar, Lucknow (U.P.)-226016. Mobile No.- +91 9935104067** from 03.10.2021 to 08.11.2021 on any working day from 10.00 to 1700 hrs. Payment of Rs.3000/- (Rupees Three thousand only) by BC/ DD which is not refundable. The tender documents shall be submitted in sealed envelopes duly superscribed as 'Technical & Price Bid' for "Tender for EXTENSION (Construction) OF D.A.V PUBLIC SCHOOL, SECTOR-18, INDIRA NAGAR, LUCKNOW".
- 1.2. The Tenderer must obtain for himself on his own responsibility and at his own expenses all the information that may be necessary for the purpose of filling of this tender and before entering into a contract for execution of the same must scrutinize the drawings and inspect the site of work and acquaint himself with all local conditions & matter pertaining thereto.
- 1.3. Conditional Tenders will be rejected.
- 1.4. Each page of the tender documents is required to be signed by the person/duly authorized persons submitting the tender in token of his/their having acquainted himself/themselves with the general conditions etc. as lay down. Any tender with any of the documents not so endorsed may be rejected.
- 1.5. The tender forms must be filled in English and all entries must be made by hand and written in ink. If any of the documents is missing or unsigned, the tender shall be considered invalid.
- 1.6. All erasures and alterations made while filling the tender must be attested by the initials of the tendered. Over writing of figures is not permitted. Failure to comply with either in any change in rates or conditions after submitting of the tender will not be entertained.

1.7. **Earnest money deposit (EMD):-**

1.7.1. Tenderer shall deposit an amount of Rs.56,050/- (Rupees Fifty Six Thousand Fifty only) in the form of Bank Demand Draft/Banker's Cheque drawn on any scheduled Bank in favour of **BANK OF BARODA along with the Technical papers.**

1.7.2. **Initial Security Deposit:-**

The successful Tenderer to whom the contract is awarded shall deposit as Initial Security Deposit by bank demand draft a sum to make up 2% of the value of accepted tender after the appropriation of the Earnest Money deposited along with Tender by him. The successful Tenderer shall pay Initial Security Deposit within 15 days after receiving the **letter of acceptance** of his Tender. Contractor may deposit FDR of equivalent amount of 2% of contract value in Favour of Bank valid upto Completion Period in place of EMD&ISD). After submission of FDR of 2% amount in Bank's favour, Bank will return EMD amount to the Contractor

1.7.3. **Retention Money:-**

Apart from the Initial Security Deposit to be made by the contractors as aforesaid, the Retention Money shall be deducted from Progressive Running Account Bills at 8% of the gross value of the work done and claimed in each Running Account bill provided that the total Security Deposit i.e. the Initial Security Deposit amount + the Retention amount shall both together not exceed 5% of the Contract price as determined after considering all variations as approved.

- 1.8. Within ten days of the receipt of intimation from the Architect/ EMPLOYER of the acceptance of tender, the successful Tenderer shall be bound to implement the contract by signing agreement in accordance with the Terms & Conditions of the contract attached therewith, on the written acceptance by the employer and the person so tendering, whether such formal contract is subsequently entered into/or not.
- 1.9. All the compensation of other sums of money payable by the contractor to the Employers under the terms of this contract may be deducted from the Security Deposit or from any sums that may become due to the contractor on any account whatsoever in the event of the Security Deposit being reduced by reason of any such deduction; the contractor shall within 15 days of being asked to do so make good by Demand Draft any such sums which may have been deducted from the security deposit.
- 1.10. Unless otherwise agreed or stipulated in this tender Employers are not concerned with any rise or fall in the prices of any materials or labour. The rates quoted shall include all costs, allowances, excise, duties, sales tax, central taxes, service tax, VAT or any other taxes, octroi or any other charges including any enhanced labour rates etc. which may be enacted from time to time by the State and/or the Central Government and shall remain valid till Virtual Completion of the work. Under no circumstances shall Employer be held responsible for compensation or loss to the contractor due to any increase in the cost of labour and/or material etc.
- 1.11. The tenderer should thoroughly study works, conditions of contract, relevant specifications and rates quoted should cover cost of executing the items as per the relevant specification.
- 1.12. The tender drawings have been included in the tender document for general guidance of the contractor for basic reference and evaluation at our office. Detailed working drawings, details of construction features etc. shall be supplied from time to time for execution of works, which shall be deemed to be with provision of contract and scope of work.
- 1.13. The tender shall remain valid for acceptance for a period of 120 days from date of opening the tender.
- 1.14. Employers do not bind themselves to accept the lowest or any tender and reserve to themselves the right to accept or reject any or all tenders, either in whole or in part, without assigning any reasons whatsoever for doing so.

- 1.15. Tender document in which tender is submitted by a Tenderer shall become the property of the Employer and the Employer shall have no obligation to return the same to the Tenderer.
- 1.16. Tenders not giving the full particulars as mentioned above or as called for in the special Conditions or not complying with any of the conditions set forth above or therein are liable to summary rejection. For any clarification of technical details you may contact Ar. Sarvesh Srivastava (M/s Concept Designer's Phone no.0522-2311748). Regarding location and inspection of the project site the Tenderers / Bidder may contact **The ARO, DAV Institutions UP Zone-A, C/O DAV Public School, Sector-18 Indira Nagar, Lucknow (U.P.)-226016**

2. INSTRUCTIONS TO TENDERER

- 2.1. Tenders must be submitted in sealed envelopes marked "Tender for EXTENSION (Construction) OF D.A.V PUBLIC SCHOOL, SECTOR-18 INDIRA NAGAR, LUCKNOW and addressed to **The ARO, DAV Institutions UP Zone-A, C/O DAV Public School, Sector-18 Indira Nagar, Lucknow (U.P.)-226016** Mobile- +91 9935104067 and be submitted in **Tender Box** kept in the Zonal Office at the address above mentioned at or before 1500 hrs on 08.11.2021. The tenders will be opened on 22.11.2021 at 1600 hrs on the same day in the presence of the Tenderers or their authorised representatives.
- 2.2. Any tender delivered or sent otherwise will be at the risk of the Tenderers.
- 2.3. The Employer reserves the right to postpone the date for presentation of tenders and will give timely notice of any such postponement to the prospective Tender.
- 2.4. The following tenders are liable to rejection:-
 - a) Tender forms containing "over written" or "erased" rate or rates and amount shown in "figures and "words" in English.
 - b) Tender quoting rates on units different from those prescribed in the schedules.
 - c) Tender containing clerical or arithmetical mistakes.
 - d) Tender which omits a quotation on one or more of the items in the schedule.
 - e) Tender which is incomplete, obscure or irregular.
 - f) Tender with rates which are obviously unbalanced.
 - g) Tender in respect of which any request from the Tenderer is received in of additions, alterations, modifications, corrections, etc., of the term conditions or rates after opening of tenders.
 - h) Tender in respect of which canvassing in any form is resorted to by the Tenderer
 - i) Tender received after the time and date specified above even if due to pay or other Delays.
- 2.5. If the Tenderer deliberately gives wrong information in his tender or circumstances for the acceptance of his tender the Employer reserves the right to reject such tender at any stage.
- 2.6. If a Tenderer seeks to clarify his quotations or rates, this should only be done in a separate covering letter. No material modifications to the specifications, item descriptions, contract clause etc., will, however, be entertained. Other clarifications may be considered. The contents of a covering letter sent along with the tender will be considered as part of the quotation. If any of these conditions admitted for consideration has a financial bearing on the cost quoted, the additional cost arising out of this condition will be added for comparative evaluation of tenders.
- 2.7. By submitting a tender for the work, a Tenderer will be deemed to have satisfied himself by actual inspection of the site and locality of the work, that the rates quoted by him in the tender will be adequate to complete such work according to the specifications and conditions attached thereto and he has taken into account all conditions and difficulties that may be encountered during its progress and to have quoted labour and material rates, which shall include cost of materials with taxes, Octroi, VAT and other duties, lead, lift, loading and unloading freight for materials, and all other charges including the furnishing of all plant, equipment, tools, scaffolding and other facilities and services necessary or proper for the completion and maintenance of the work, except such as may be otherwise expressly provided in the contract documents for the completion and maintenance of the work to the entire satisfaction of the Architect. The TDS amount on prevailing rate and work contract tax/VAT etc. shall be deducted from Contractor's Running Account / Final

bills and paid to the Government. Necessary Certificates shall be issued to the Tenderers by the Bank.

- 2.8. The successful Tenderer shall make his own arrangements for all materials except as specified in the contract if any.
- 2.9. The quantities shown if any in the attached schedule are given as a guide and are approximate only and are subject to variation according to the needs of the Employer. The Employer accepts no liability for their accuracy. The Employer does not guarantee work under each item of the schedule.
- 2.10. Each tender shall be signed by the Tenderer with his usual signature. Tender by partnership or Hindu joint family firm may be signed in the firm's name by one of the partners or the Karta or Manager as the case may be or any other duly authorized representative followed by the name and designation of the persons so signing. Attested copy of the Partnership Deed must accompany the tender of any Partnership firm. Tenders by a Company shall be signed with the name of the Company by a person authorized in this behalf and a Power of Attorney or other satisfactory proof showing that the person signing the tender document on behalf of the Company is duly authorized to do so, shall accompany the tender. The Employer will not be bound by any Power of Attorney granted by the Tenderer contract. It may, however recognize such Power of Attorney and changes after obtaining proper legal advice, the cost of which may be chargeable to the Contractor.
 - 2.10.1. With their quotations the Tenderers shall sign all schedules, specifications, special conditions, etc, in token of acceptance thereof. The signature on the tender schedule alone shall also be deemed to be taken as acceptance of all these.
 - 2.10.2. Signature of the Tenderer shall be attested by the signature and address in English of two responsible individuals who shall be persons of status, and their address, names, occupations shall be stated below their signatures.
- 2.11. Tenderers must also submit with the tender, Copies of testimony also with registration their experience, and satisfy the D.A.V PUBLIC SCHOOL. The following points if and when called upon to do so:-
 - 2.11.1. His position as an independent contractor or as the properly accredited of a responsible firm, in proof of which he must produce the requisite registered Power of Attorney and the expressed authority from the same firm to accept as its agent.
 - 2.11.2. His ability, either as Principal or Agent to undertake and carry out the satisfactorily vouched for either by a responsible firm or an official.
 - 2.11.3. His ability to supervise his work personally, or in the event of ill-health authorized absence there from, to employ a competent and responsible agent who is specially named and approved beforehand.
- 2.12. If a Tenderer expires after the submission of his tender or after the acceptance of his tender the Employer may deem such tender as cancelled. If a partner of a firm expires after the submission of their tender, the Employer may deem such tender as cancelled the firm retains its character.
- 2.13. If the Tenderer has a relative employed in any capacity in M/s. Designer's Wing. he shall inform the authority calling for tenders of the fact when submitting his tender, failing which his contract may be rescinded, if the fact subsequently comes to, he shall be liable to make good to the Employer any loss or damage from such cancellation to the like extent provided in the case of cancellation under clause of General Conditions of Contract.
- 2.14. No contract work, however petty, may be carried out except under or in accordance with a duly executed agreement or on a special written authority from authorized officer of the Employer.
- 2.15. No agreement is valid unless signed by the Contractor or his duly authorized agent and by a competent person on behalf of the Employer.

- 2.16. Details of drawings as are not supplied with the Tender documents for the work may be seen in the office of M/s. Concept Designer's during office hours.
- 2.17. The Form of Agreement, Form of Tender, Invitation to Tender, Instruction to Tender, General Conditions of Contract, Special Conditions of Contract, Specifications, Drawings, Time Schedule and the rates and amounts accepted against the items of the Tender Schedule together with the Tender covering letter, and all correspondence entered into between the Employer and the Tenderer prior to the issue of the Letter of intent and the Letter of Intent awarding the work shall form the contract.
- 2.18. If there is any conflict between any of the provisions in the Special Conditions and those in any of the other documents referred, the provisions in the Special Conditions shall prevail.
- 2.19. If there be any difference between the description in the Specification, drawings and the works items in the Tender Schedule, the order of precedence shall be as under: a) B.O.Q. b) Tender Drawings c) Technical Specifications. Relevant I S Code/ NBC shall be followed wherever not specified/covered in this tender.
- 2.19.1. Acceptance of the tender will be intimated to the successful Tenderer through a letter of acceptance. The Contractor shall then be required to execute an Agreement within the time specified in the letter acceptance. In the event of failure on the part of the Contractor to sign the Agreement within the specified time, the amount of Earnest Money shall be forfeited and the acceptance of his tender shall be considered as withdrawn.
- 2.19.2. The forfeiture of Earnest Money is to be considered as covering all losses, and liquidated damages notwithstanding any other provisions envisaged for losses, or penalties implied in the provisions of the contract.

3. ARTICLES OF AGREEMENT

1. Articles of Agreement made this 2021 between D.A.V PUBLIC SCHOOL (hereinafter called 'The Employer') of the one part and M/s (hereinafter called 'The Contractor') of the other part.

Whereas The Employer' desires to engage one contracting agency for EXTENSION (Construction) OF D.A.V PUBLIC SCHOOL, SECTOR-18, INDIRA NAGAR, LUCKNOW as per Drawings /Designs, BOQ, specification,etc given in Tender Specification.

2. The term 'Architect' in the said conditions shall mean the said M/s Concept Designer's shall include their successors and assignees or in the event of its being wound up/dissolved/liquidated or ceasing to be the architect for the purpose by the employer, such other person as shall be nominated for that purpose by the Employer, not being a person to whom the contractor shall object for reasons considered to be sufficient by the Arbitrator, mentioned in the said conditions provided always that no person subsequently appointed to be entitled to disregard or overrule any previous decisions or approvals or directions given or expressed by the Architect for the time being.
3. In response to the tenders invited by Employer / Architect, the Contractor have inspected the site and surroundings of the works specified in the tender documents and have before accepting the Contract, satisfied themselves by careful examination about the nature of the work and nature of the site and local conditions, quantities nature and magnitude of work, the availability of labour and material necessary for the execution of work, the means of access to work site, the supply of power and water there to, dismantling, disposal of malba, electric, etc and the accommodation they may require and have made local and independent enquiries and obtained complete information as to the matters and things referred to or implied in the Contract or having any connection therewith and have considered the nature and extent of all probable and possible situations, delays, hindrances or interferences to or with the execution and completion of work to be carried out under the Contract being awarded hereunder and have examined and considered all other matters, conditions and things and probable and possible contingencies thereto affecting the execution and completion of work and which might have influenced them in accepting the Contract.
4. The following documents annexed hereto shall form the integral part of this agreement as if these were fully incorporated herein and this Agreement together with all its Annexure are hereinafter referred to as the Contract.
- 4.1 Executed Tender copy
 4.2 Initial Security of Rs ----- and EMD of Rs
 4.3 Performance bank guarantee of`
 4.4 Letter No- dated from
 4.5 Letter of Intent No.
5. The Employer has accepted the offer of the Contractor and the Contractor has agreed to execute the said works, subject to the terms and conditions contained herein and those referred in para1.5 above for the provision and the execution of the works mentioned in the Contract to an amount of Rs ----- (inclusive of all Taxes)
6. NOW THESE PRESENTS WITNESSETH AND IS HEREBY AGREED AND DECLARED AS FOLLOWS
7. 1.6 The Contractors shall provide, execute and complete all the works mentioned in the Contract and shall do and perform all other acts and things mentioned or described in the Contract or which are to be implied there from or may be reasonably necessary for the completion of the said works and the times and in the manner and subject to the terms and conditions or stipulations mentioned in the Contract.

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 works without prejudice to the Contract. Notwithstanding anything to the contrary contained in any of the Annexure hereto the Contractors shall commence the work as per point no 3 of letter of intent dated and shall complete the same on or before ----- and the time shall be the essence of the Contract. In consideration of the due provision, execution and

completion of all the works, in terms of the Contract the Employer does hereby agree with the Contractors that the Employer will pay to the Contractors the respective amounts for the work actually done by them and approved by the Employer. Such payments shall be made at such time and in such a manner as provided for in the Contract.

8. 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 as set out in the Contract.
9. The contractors do hereby agree that the amount of liquidated damages specified 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.
10. 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 work 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 in the site.
11. The Contractors and its agent/servants/workers/employees 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 the site of construction for any other purpose without assigning any reason thereof.
12. The dispute or differences 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 or any rules and regulations framed there under and the venue of arbitration shall be the city of Lucknow /or decided by DAV Public School.
13. In Witness WHEREOF the parties have executed these presents of the day and the year first above written.

Signed and delivered for and on
behalf of Employer
Witnesses

Signed and delivered for
and on behalf of Contractor
Witnesses

- 1.
- 2.

4. FORM OF OFFER - ANNEXURE 1

To
The ARO,
DAV Institutions
UP Zone-A, C/O DAV Public School,
Sector-18 Indira Nagar, Lucknow (U.P.)-226016

Subject : EXTENSION (Construction) OF D.A.V PUBLIC SCHOOL, SECTOR-18 INDIRA NAGAR, LUCKNOW.

Sir,

1. Having visited the site and examined the Drawings, format DAV Public School guarantee for bid offer security, form bank guarantee for advance payment, technical specifications for Extension (Construction) of D.A.V PUBLIC SCHOOL, SECTOR-18 INDIRA NAGAR, LUCKNOW, bill of quantities / schedule of rates, 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 in this tender Document or such other sum as may be ascertained in accordance with the said Conditions of Contract.
2. We undertake to complete and deliver all the works comprised in the contract within the time stated in the Appendix and Annexure 1 here to.
3. We have independently considered the amount of liquidated damages shown in the Appendix here to 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. If our Tender is accepted, we will, when required, obtain the guarantees in approved format from a DAV Public School (to be approved by you) to be jointly and severally bound with us in the sum named in the Appendix hereto for the due performance of the Contract under the terms of a Bond to be approved by you.
5. We agree to abide by this Tender for the period of three months from the date fixed for receiving the same and it shall remain binding upon us and may be accepted at any time before the expire of the period or any extended period thereof.
6. Unless and until a formal Agreement is prepared and executed this Tender together with your written Acceptance thereof shall constitute a binding Contract between us.
7. We agree and that if our Tender is accepted, we are to be jointly and severally responsible for the due performance of the Contract.
8. We reserve stand that you are not bound to accept the lowest or any tender you may receive, or you may regret on your tender without assuring any terms.

Datedday of2021

Signature.....in the capacity ofduly authorized to sign tenders for an on behalf of.....
 (IN BLOCK CAPITALS)

WITNESS:

Signature.....Address of.....

Tender
 Name.....

Occupation.....

5. APPENDIX TO FORM OF OFFER - ANNEXURE 1

Sr. No.	Description of work:	
		EXTENSION (Construction) OF D.A.V PUBLIC SCHOOL, SECTOR-18, INDIRA NAGAR, LUCKNOW
1.	Name of Employer	: D.A.V PUBLIC SCHOOL
2.	Time allowed for execution of work	: 4 Months
3.	Cost of Tender Document	: 3000/- inform of DD/BC in favour of Assistant Regional Officer, UP Zone-A, D.A.V PUBLIC SCHOOL, A/c No: 25640100011837 , IFSC: BARB0BABRAL
4.	Period of Sale of Tender Document	: 03.11.2021
4A	Clarification, if any, to be sought from Bank	: By 15.04.2021.After this no clarification will be entertained.
5.	Last date and time of receipt of Tender Document (: 08.11.2021 by 3 PM, in Tender Box kept at The ARO, DAV Institutions UP Zone-A, C/O DAV Public School, Sector-18 Indira Nagar, Lucknow (U.P.)-226016
6.	Date and time of opening of Tender Documents	: 22.11.2021 by 4 PM at The ARO, DAV Institutions UP Zone-A, C/O DAV Public School, Sector-18 Indira Nagar, Lucknow (U.P.)-226016
7.	Earnest Money	: 56,050/- in the form of DD/BC in favour of Assistant Regional Officer, UP Zone-A , , DAV Institutions UP Zone-A, C/O DAV Public School, Sector-18 Indira Nagar,lucknow Bank of Baroda , TCL COMPLEX BARBRALA Branch, Distt.-Lucknow A/c No: 25640100011837 , IFSC: BARB0BABRAL
8.	Validity of the tender	: 120 days from the date of submission / as may be extended
9.	Retention Money	: The retention money @ 5% shall be deducted from every certified amount of RA bill which shall be released after the expiry of Defect liability period. 50% security will be released at the time of handing over of the project and 50%shall be released after the Defect liability period.
10.	Period of Commencement	: 10 days from the date of work order or the date of instruction for taking possession of site, whichever is later
11.	Amount of liquidated damages for delay.	: 0.5% of the Contract value per week subject to maximum of 5% of contract value.
12.	Defects liability period.	: 12 months from the date of virtual certificate issued by Architect/DAV Public school for the completion of building.
13.	Interval of interim bills.	: Every month/ as per minimum bills amount which ever first
14.	Minimum Gross Amount of Interim Bill.	: Rs. 3 Lakh
15.	Period of certification of interim bills by Architect	: 10 working days after submission of Bill along with measurement sheets by Contractor
16.	Payment to the Contractor	: The R/A Bill due to the contractor shall be paid within 30 days after receiving of the bill by the school. However in case, delay of payment/verification of the bill 75% payment shall be released to the contractor against the submitted R/A bill after payment certificate of Architect.
17.	Periodicity & Limit of RA Bills	: Payment shall be made for work, estimated to cost up to Rs. 3 Lac or more till after the whole of the work shall has been completed and certificate of completion given. For work estimated to cost over Rs.3 Lac, the interim of running bills shall be submitted by the contractor for the work executed on the basis of such recorded measurements on the format of the school in triplicate on or before the date of every month fixed for the same by the school

		Authorities. The contractor shall not be entitled to be paid any such interim payment if the gross work done together with net payment is less than the amount specified, in which case the interim bill shall be prepared on the appointed date of the month after the requisite progress is achieved.
17.	Secured Advance against supply of material on site	: 75% of basic cost or 60% of item rate whichever is less. Secured advance will be given over cement & tile only.
18.	Performance Guarantee (Bank Guarantee)	: Performance Guarantee: 5% of Contract Amount to be submitted as Bank Guarantee/ FDR (in joint name with Bank as the first party) within 28 days of receipt of Letter of Award (valid up to completion period of the contract/extended period if permitted). This Performance Guarantee shall be refunded within 14 days of the issue of Defect Liability Certificate (Taking Over Certificate with a list of Defects).
19.	Escalation for Material & Labour	: No escalation/PVA is applicable .The Rates will remain firm
20.	Release of Total Security Deposit (EMD, ISD & Retention Money) :-	: “50% of the Total Security Deposit (EMD,ISD& Retention Money) shall be refunded to the contractor on”: i) Issue of Virtual Completion Certificate by the Architects ii) Contractor’s removal of his materials, equipment, labour force, temporary sheds/ stores etc. from the site, (excepting for a small presence required if any for the Defect Liability Period and approved by the Bank.)The remaining 50% of the amount shall be refunded 14(fourteen) days after the end of defects liability period provided he has satisfactorily carried out all the works and attended to all defects in accordance with the conditions of the contract, including site clearance.
21	Insurance	CAR Policy (in joint name with Bank as the first party) within 28 days of receipt of Letter of Award (valid up to completion period of the contract/extended period if permitted).Other Policies is given in annexure N.

6. SPECIAL NOTE & CONDITIONS OF CONTRACT – ANNEXURE 2

Name of Work : EXTENSION (Construction) OF D.A.V PUBLIC SCHOOL, LUCKNOW

EMPLOYER/Developer: M/S D.A.V PUBLIC SCHOOL.

General:

1. The site is situated at SECTOR-18, INDIRA NAGAR, LUCKNOW.
2. M/s. Concept Designer's (having their office at 426 B, Sahara Shopping Centre, Faizabad Road, Indira Nagar, Lucknow) are engaged as an architect.
3. Brief Scope of Work
 - . Construction for D.A.V PUBLIC SCHOOL includes following major items forms part of Contract.
 - Excavation on Site
 - PCC, RCC work with foundation including Form Work
 - Reinforcement Work, Masonry Work
 - Plaster Work
 - Subframes for Windows – doors windows.
 - Electric work
 - Water Proofing
 - Any other work if required at site
 - Fire Fighting work
 2. The other agencies shall be appointed for other trade during the progress of work. The contractor shall work in close coordination and co-operation to complete the project under the guidance / instruction of Incharge/Architect.
 3. Program shall be well coordinated through In-charge/Architect for various activities in completing the work on schedule.
4. The payment shall be made as per actual execution of works/ Measurement of Bill .
5. 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 which shall be valid till completion from the date of commencement of work. In case of extension in the time period for execution of the contract beyond 2 months, for the reasons of delay attributed to the contractor he shall not be eligible for escalation and the D.A.V PUBLIC SCHOOL decision in this respect shall be final and binding on the contractor.
6. All works are to be completed in **4 (Four) Months** time.
7. All or any extra work involved shall be got approved in writing from the Architect/EMPLOYER before executing the same.
8. The contracted rate shall be inclusive of State/Central Sales Tax, Service Tax, Turnover Tax, Works Contract Tax, VAT and other Taxes, levies applicable during construction period and completion of the work.

9. Contractor shall extend all sorts of help within his purview including scaffolding materials (free of cost) and labourers (chargeable basis) to other agencies working simultaneously in the same project.
10. The contractor shall at his own cost arrange to obtain temporary electric supply from local electricity board authorities and shall bear all cost (deposit for temporary supply) Miscellaneous charges & consumption charges during the construction period and up to the stage of handing over the site shall be borne by the contractor.
11. Water connection shall be arranged by contractor at his own cost. Consumption charges during the construction and up to the stage of handing over of the site shall be borne by the contractor.
12. If the Water & Electricity of School is used by the contractor for the construction purpose. The same shall be deducted from the vendors each bill @0.3% of billing amount. The school shall provide water and electricity required for the work at once point and contractor will arrange his own arrangements for water and electricity required at site.
13. In the event of necessity of water by tankers, electricity by generators, the same shall be arranged by the contractor at his cost for the purpose of construction and consumption etc. and the same shall not be payable by the EMPLOYER.
14. Contractor shall at his own cost construct temporary cement and material storage godown, site office and temporary separate bath/WC for Architect's/ARCHITECT'S staff and for his site labourers' use at his cost, including demolition and clearance after completion of work. Contractor shall restrict his facilities within the said area.

9. Insurance: - As per details given in Annexure at end of tender Document

10. Necessary PF & ESI contribution of contractor's labours will have to be paid by contractor as per statutory authority's regulations and EMPLOYER shall be absolved of all the risk. (also refer clause no.23 of GCC)
11. The defect liability period shall be as mentioned in appendix to condition of contract, annexed to this document
12. Contractor shall appoint as approved by the Architect and maintain a full time, qualified and experienced (minimum 5 years in similar types of work) "Civil Engineer" in site of works. (Such Engineer shall be approved registered Site Engineer as per Local Regulation).
13. EMPLOYER and Architect have got right to appoint separate contracting agencies for (1) Civil Work, (2) Plumbing, Water supply, Sanitary and drainage works.
14. In the event of work being split between the agencies like Civil/Plumbing/ Works etc. The Contractor for civil work shall provide all co-operation, liaison / coordination and relevant scaffolding etc. to the other sub agencies appointed like lift, installation, by the Employers and the rate of the civil contractor shall be covered to be inclusive of such co-ordination, assistance etc. to be provided to the other agencies.
15. Since this is Item rate tender, the contractor will not claim any extra on account of Price variation /escalation due to fluctuations in price of materials labour etc., through out the period of contract from commencement to final completion. The rates will also be valid till extension of maximum 6 months if given by DAV Public School beyond completion period of 12 months.
16. Total security deposit

The total Security Deposit shall comprise

- a) Earnest Money Deposit.
- b) Initial Security Deposit.
- c) Retention Money

Earnest money deposit (EMD):-

Tenderer shall deposit an amount of Rs.56,050/- (Rupees Fifty Six Thousand Fifty only) in the form of Bank Demand Draft drawn on any scheduled Bank other than our Bank, in favour of Assistant Regional Officer , (UP ZONE-A) DAV Public School, Lucknow along with the Technical bid. No interest on Earnest Money Deposited by the tenderer shall be paid. Tenders submitted without Earnest Money Deposit along with the technical bid shall not be considered. The EMD of the unsuccessful Tenderers will be refunded within a reasonable period of time after the decision to award the work is taken. The EMD shall stand absolutely forfeited if the tenderer revokes his tender at any time during the period when he is required to keep his tender open for acceptance by the Employer, or if, the tender is accepted, the Contractor fails to pay the security deposit as stipulated/or if he fails to commence the work within stipulated time.

Initial Security Deposit

The successful tenderer to whom the contract is awarded shall deposit as Initial Security Deposit by bank demand draft a sum to make up 2% of the value of accepted tender after the appropriation of the Earnest Money deposited by him. The successful Tenderer shall pay Initial Security Deposit within 15 days after receiving the letter of acceptance of his Tender. No Interest shall be paid on this Security Deposit. The Security deposit, either in whole or in part thereof, shall be forfeited in the event of the Contractor's failure to observe any terms of this Contract/ or non compliance with the conditions of the Contract. The Security Deposit amount will be adjusted or included in the Retention Money as per contract clause mentioned elsewhere in this Tender.

Retention Money

Apart from the Initial Security Deposit to be made by the contractors as aforesaid, the Retention Money shall be deducted from Progressive Running Account Bills at 8% of the gross value of the work done and claimed in each Running Account bill. Provided that the total Security Deposit i.e. the Initial Security Deposit amount + the Retention amount shall both together not exceed 5% of the Contract price as determined after considering all variations as approved.

On Virtual Completion of the job and on the contractors submitting to the ARCHITECT, the as-built drawings, the ARCHITECT shall declare the job to be virtually complete, endorsed by the Project Architects and accepted by the Employer and upon this an amount equivalent to 50% of the total security deposit will be refunded to the contractors and balance shall be retained by the Employers till the end of the Defects Liability Period and the contractors shall have option to have the balance Retention Money replaced by Bank Guarantee which shall be valid till the end of Defects Liability Period and the same shall be released only upon successful completion of the Defects Liability Period and on finalizing the Final bill.

If the Contractors do not carry out the rectification work during the Defects Liability Period, the Employer shall have the right to get such defective work rectified after giving due notice in writing to the Contractors and recover the cost of repairs from the money so retained.

17. Value of all interim bills shall be minimum Rs .One crore twelve Lakhs (Rs. 1,12,00,000). 75% of the net payment to be released within 10 working days on date of receipt of Architect's certificate. Balance 25% to be released after 20 working days from the date of receipt of Architect's certificate. The Architects shall endorse the bill certified by the ARCHITECT to enable the Employers in releasing the payment.
18. The ARCHITECT shall have power to withhold any certificate, if the works or any parts thereof are not carried out to the satisfaction. The ARCHITECT may revise any certificate; make any correction in any previous certificates, which have been issued by him.
19. All respective contract rates under various works include rents, deposits, premiums and other cost of transport, hiring loading and unloading, of all material including all type of taxes, testing

charges, Octroi charges, wastages and damages etc and the same shall be borne by the contractors only.

20. The contractor shall appoint/retain at their own cost, licensed plumbers who shall work out and prepare and submit to Architect through ARCHITECT necessary shop drawing details for all plumbing, sanitation, drainage, works and shall take approval of the architect/ARCHITECT before execution of all such works.
21. The Employers reserve their right of adding, altering or deleting any items form the scope of the contractor works for which no compensation of whatsoever type will be paid to the contractor. This shall also include the profits and over heads or any other claims by the contractors.
22. Time shall be the essence of the contract and the decision of the architect/ARCHITECT and/or the employer in the matter of date of start, suspension and completion of the work shall be final and binding upon the contractor.
23. Security/Watchman:-The Contractor shall maintain at his cost at least two persons, 24 hours/watchman/security system or watch and ward of materials/property works and shall not allow any unauthorized persons to encounter the premises/building and failure of the same, the contractor shall be held liable for all costs & damages.

24. **Addenda**

Addenda to the tender document may be issued if required to clarify documents or to reflect modifications to the design or contract terms.

Each addendum issued by the Architect will be distributed to the bidders who have been issued the tender documents for bidding. Each bidder shall submit the same along with his tender. All addenda issued by the Architects shall become part of Tender Document.

7 GENERAL CONDITIONS OF CONTRACT – ANNEXURE 3

Name of Work : EXTENSION (Construction) OF D.A.V PUBLIC SCHOOL, SECTOR-18, INDIRA NAGAR, LUCKNOW.

Employer : M/S. D.A.V PUBLIC SCHOOL

1. **Definitions and Interpretations:**

In the contract (as hereinafter defined) the following words and expressions shall have the meanings hereby assigned to them, except where the context otherwise required: -

- A. "M/S. D.A.V COLLEGE MANAGING COMMITTEE, NEW DELHI and shall include his/their heirs, legal representatives, assignees and successors.
- B. "CONTRACTOR" shall mean the individual or firm or company, whether incorporated or not, undertaking the works and shall include the legal personal representative or such individual or the persons, comprising such firm or company or the successors of such firm or company and the permitted assigns of such individual or firm or company.
- C. "ARCHITECT" shall mean M/s. Concept Designer's. (having their office at 426 B, Sahara Shopping Centre, Faizabad Road, Indira Nagar , Lucknow)) engaged by the D.A.V PUBLIC SCHOOL to act as Architect for the purpose of the contract and shall include his/their heirs, legal representatives, assignees and successors.
- D. "CONSULTING ENGINEER" means Sub-Consultant retained by the Architect or Employer for designing of Structural /ELECTRICAL/MECHANICAL /Sanitary and Plumbing works includes his/their heirs, legal representatives, assignees and successors.
- E. "CONTRACT" means the documents forming the tender and acceptance thereof together with documents referred to therein or individual works orders in the case of terms of contracts including the General Conditions of Contract, Special Conditions, the Appendix, Bill of Quantities, Schedule of rates and prices or the rates quoted on lump sum basis, scope of work in case of lump sum contract, Specifications, Drawings and the Contract Agreement if completed and all these documents correspondence prior or letter of intent awarding the work as applicable taken together shall be deemed to form to Contract and shall be complementary to one another.
- F. "CONTRACT PRICE" means the sum named in the letter of acceptance or the contract subject to such additions thereto or deductions there from as may be made under the provisions here in after contained in the contract.
- G. i) "WORK" Works means all the works specified or set forth and required in and by the said specifications, drawings and schedule here to annexed or to be implied there from and shall include both permanent works and temporary works, whether original, altered, substituted or additional, to be executed in accordance with the contract.
 ii) "PERMANENT WORKS" means the permanent works to be executed and maintained in accordance with the contract.
 (iii) "TEMPORARY WORKS" means all temporary works of every kind (other than Contractor's Equipment) required in or about the execution and completion of the Works and the remedying of any defects therein.
- H. "SPECIFICATION" means the specification referred to the tender and any modification thereof or addition thereto as may from time to time be furnished or approved in writing by the Architect.

- I. "DRAWINGS" means the drawings, maps, plans & tracings or prints there of or referred in the contract, any modification of such drawings approved in writing by the Architect and such other drawings as may from time to time be furnished or approved in writing by the Architect.
- J. "SITE" shall mean the land and/or other places on, into or through which work is to be executed under the contract or any adjacent land, path or street through which work is to be executed under the contract or any adjacent land, path or street which may be allotted or used for the purpose of carrying out the contract.
- K. "NOTICE" in writing or written notice means a notice in writing typed or printed characters sent (unless delivered personally or otherwise proved to have been received) by registered post to the last known private or business address or registered office of the addressee and shall be deemed to have been received when in the ordinary course of post it would have been delivered.
- L. "APPROVED" means approved in writing including subsequent written confirmation of previous verbal approval and "Approval" means approved in writing including as aforesaid.
- M. "MONTH" means month according to Gregorian calendar.
- N. "SCHEDULE BANK" means bank included in the second schedule to the Reserve Bank of India Act, 1934.
- O. "SUB CONTRACTOR" means any person, firm or corporation having a contract for the execution of a part or parts of the work included in the contract and a person, firm or corporation furnishing materials called for in the contract and worked to a special design according to the specifications.
- P. "VIRTUAL COMPLETION" means that the constructions of works specified are of the works is sufficiently completed in accordance with the contract, as modified by any changed or variation orders agreed to by the parties so that the Employer can occupy the same for the use it was intended.
- Q. "CONTRACT PERIOD" means the accepted period of consecutive days stated on the Form of Tender starting from the Architect or Employer's order to commence the work.
- R. "ACT OF INSOLVENCY" means any act of Insolvency defined by the Presidency Towns Insolvency Act, or the Provincial Insolvency Act or any Act amending such original act/s.
- S. "THE DATE OF COMPLETION" is the date or dates for completion of the work or works or any part of the works set out or ascertained in accordance with the individual works orders and the tender documents or any subsequent amendments thereto
- T. "SINGULAR AND PLURAL" words importing persons include firms and corporations, words importing the singular party only also include the plural and vice versa where the context requires.

2. Duties and Powers of Architect consultant: -

Architect duties are to watch and supervise the works of and to test any materials to be used or workmanship employed in connection with the works, quality control, Project Scheduling and monitoring and co-coordinating with all other Agencies and Civil Contractor, recording of measurements, certification of bills, preparing extra/deviation items, excess/ scoring statement, preparing Minutes of Meeting etc. They shall have no authority either to relieve the Contractor of any of his duties or obligations under the contract or except those expressly provided hereunder, to order any work involving delay or any extra payment by the Employer or any variation of or in the works.

The Contractor shall afford the Architect every facility and assistance for examining the works and materials and checking and measuring time and materials. The Architect shall have no power to revoke, alter, enlarge or relax any requirements of this contract or to sanction any day work,

additions, alterations, deviations or omissions unless such an authority may be confirmed by written order of the employer.

The Architect shall jointly record the measurements with Contractor's representative for all items of works and on completion hand over the records to the Employer.

The Architect shall have the power to give notice to the Contractor or his Engineer-In-Charge, about the non-approval of any work or materials and such works shall be suspended or the use of such materials should be discontinued until the decision of the Architects/ Structural Consultant/ Employer but such examination shall not in any way exonerate the Contractor from the obligation to remedy any defects which may be found to exist at any stage of the work or after the same is completed. Subject to the limitations of this clause, the Contractor shall take instructions only from the Architects

The Architect shall have such other power and discharge other functions as are specifically provided in this contract included such incidental or consequential powers or duties, subject always to such specific instructions or directions of the Employer, which shall be duly notified to the Contractors.

3. Scope of Contract :

The contractor shall carry out and complete the said work in every respect in accordance with this contract and with the directions of and to the satisfaction of the Architect/Employer. The Architect may in his absolute discretion and from time to time, issue further drawings and/or written instructions, details, directions and explanations which are hereafter collectively referred to as "Instructions" reflected either in the minutes or in any other form in regard to:

- a) The variation or modification of the design, quality or quantity of works or the additions or omissions or substitutions of any work.
- b) Any discrepancy in the drawings and/or drawings and/or specifications.
- c) The removal from the site of any material brought thereon by the contractor and the substitution of any other material thereafter.
- d) The removal and/or re-execution of any works executed by the Contractor.
- e) The dismissal from the works of any person employed thereupon.
- f) The opening up for inspection of any work covered up.
- g) The amending and making good of any defects.
- h) Removal of improper works and materials.
- i) Assignment and **SUBLETTING**.
- j) The Employer shall have a right to delete or reduce any scope of work or any item from the contract and contractor shall not make any extra claim on this count
- k) Postponement of any work to be executed under the provision of the contract.

The contractor shall forthwith comply with and duly execute any work comprised in such Architect's/Employer's Instructions, directions and explanations given to the Contractor or his representative. If instructions, directions upon the works by the Architect/Employer shall, if involving a variation be confirmed in writing by the Contractor, within 7 days and if not dissented in writing within a further 7 days by the Architect/Employer, such instructions shall be deemed to be the "Employer/Architect's Instructions" within the scope of the contract. If compliance with these instructions as aforesaid involves work and/or expenses and/or loss beyond that contemplated by the contract, then, unless the same were issued.

If the Contractor fails to comply with the Employer/Architect's instructions within a fortnight after the receipt of written notice from the Employer/Architect requiring compliance with such instructions, the Employer, through the Architects, may employ some other agency to execute any work whatsoever which may be necessary to give effect to such instructions.

For the purpose of entering day to day instructions by the Employer/Architect/ARCHITECT, the Contractor shall maintain at his own cost, a 'Site Instructions Book' in quadruplicate in which the instructions shall be entered by Employer/Architect/ARCHITECT.

'Instructions' to the Contractor shall be generally issued through ARCHITECT/Architect. However Employer, for the sake of urgency as a result of inspection, may issue instructions directly with the knowledge of the Architects who should ratify the same promptly.

4. Drawings and Specifications:

The Work shall be carried out to the entire satisfaction of the Employer/ Architects or their Consultants and in accordance with the signed drawings, specifications, preambles and such further drawings and details as may be provided by the Architect/ Structural Consultant and in accordance with such written instructions, directions and explanation as may from time to time be given by the Employer/ Architect/ Structural Consultant whose decisions as to sufficiency and quality of the work and materials shall be final and binding upon all parties.

No drawing shall be taken as in itself an order for execution unless, in addition to the Architect /Structural Consultant's signature, it bears express words stating remark "VALID FOR CONSTRUCTION". No claim for payment for extra works shall be allowed unless the said work shall have been executed under the provisions of clause 9 (Authorities, Notices, Patent Rights and Royalties) or by the authorities directions in writing of the Consultant as herein mentioned.

One complete set of the drawings, certified copy of tender document together with Specifications shall be furnished by the Architects to the Contractor. The Architect/ Structural Consultant shall furnish, within such time, as he may; consider reasonable, one copy of additional drawings, which in his opinion are necessary for the execution of any work. Such copies shall be kept on the works, and the Architect/Structural Consultant or his representatives shall at all reasonable times have access to the same. The Contractor before the issue of the Final Certificate shall return all drawings, certified copy of tender document together with specifications to the Architects. The Original Contract documents shall remain in the custody of the Employer and shall be produced by him at his office as and when required.

Any additional prints of drawings in any, required by the Contractors may be supplied by the Architect /Structural Consultant but on the payments of charges.

5. Discrepancy in Various Documents:

The Contractor shall provide everything necessary for the proper execution of the works according to the true intent of and meaning of the Drawings, Specifications etc. taken together whether the same may or may not be particularly shown or described therein, provided that the same can be inferred there from. If the Contractor finds any discrepancy in the Drawings or between the drawings, Specifications etc., he shall immediately refer the same in writing to the Architect who shall decide which shall be followed, and his decision shall be final and binding on all parties.

6. Authorities, Notices, Patent Rights & Royalties: -

The Contractor shall conform to the provisions of the statutes relating to the works and to the Regulations and Bye Laws of any Local Authority and of any Water, Lighting or other Companies or Authorities with whose systems the Structure is proposed to be connected and shall before making any variation from the Drawings and Specifications that may be necessitated by so conforming, give to the Architect/Employer written notice, specifying the variations proposed to be made and the reason for making it, and apply for instructions thereon.

The Contractor shall bring to the attention of the Architect/Employer, all notices required by the said Acts, Regulations or bye laws to be given to any authority and pay to such authority or to any public offices, all fees that may be properly chargeable, in respect of the works and lodge the receipts with the Architect/Employer.

The Contractor shall indemnify the Employer against all claims in respect of patent rights, design, trade marks 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 from and against all claims, demands, proceedings, damages, costs, charges and expenses whatsoever in respect thereof or in relation thereto. The Contractor shall defend all actions arising from such claims, unless he has informed the Architect before any such infringement and received their permission to proceed and shall himself pay all royalties, license fees, damages, costs and charges of all and every part that may be legally incurred in respect thereof.

7. Contract Price:

The Contract Price shall not be adjusted or altered in any way whatsoever otherwise than in accordance with the express provisions of these conditions and subject to Clause 48 of these conditions

8. Contract Bills:

The Contract Bills for certificate of payment shall be described in mode of payment.

Any error in description or omission of items from the Contract bills shall not vitiate this contract but shall be corrected and deemed to be a variation required by the Architect.

9. General Obligations:

Contractor's General Responsibilities

- a) The Contractor shall subject to the provisions of the Contract and with due care and diligence, execute and maintain the works and provide all labour including the supervision thereof, materials, Constructional Plant and all other things whether of a temporary or permanent nature, required in and for such execution and maintenance so far as the necessity for providing the same is specified in or is reasonably to be inferred from the Contract.
- b) The Contractor shall take full responsibility for the adequacy, stability and safety of all site operations and methods of construction, 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 or for the design or specification of any Temporary works prepared by the Architect.

10. Contract Agreement:

The Contractor shall when called upon to do so enter into and execute a Contract Agreement to be prepared and completed at the cost of the Contractor in the form annexed with such modifications as may be necessary.

11. Performance Bond/Security Deposit:

The Contractor shall, (if the tender so provides) at his own expense provide or obtain a Bank Guarantee in the format approved by the Employer to be jointly or severally bound to together with him to the Employer in the sum provided in the tender for the due performance of the Contract. (Refer Appendix to form of Offer – Annexure-1)

12. Inspection of Site:

- a) The Contractor shall inspect and examine the site and its surroundings and information available in connection therewith and shall satisfy himself so far as is practicable before submitting his tender as to the form and nature of the ground, including the subsurface conditions, the

hydrological and estimate conditions, the extent and nature of work and materials necessary for the completion of the works, the means of access to the site and accommodation he may require and in general shall himself obtain all necessary information subject as above mentioned, as to risks, contingencies and all other circumstances which may influence or affect his Tender.

b) **Nature of Ground:** -

The Employer does not guarantee or warranty in any way that the material to be found in the excavations will be similar in nature to that of any samples, which may have been exhibited or indicated on the drawings or in any other Contract Documents, or to material obtained from borings or trial holes.

The Contractor shall be deemed to have made local and independent enquiries as to and shall take the whole risk of the nature of the ground subsoil or material to be excavated or penetrated and the Contractor shall not be entitled to receive any extra payment nor to rescind from the Contract nor to be relieved from any of his obligations there under by reason of the nature of such ground subsoil of material being other than that indicated on the Drawings or in any other Contract Documents or by any sample exhibited or deducted from the information provided by borings or trial holes.

13. Sufficiency of Tender:

a) The Contractor shall be deemed to have satisfied himself before tendering as to the correctness and sufficiency of his tender for the works and of the rates and prices stated in Schedule of Quantities/Scope of work and/or the Schedule of Rates and Prices, which rates and prices shall cover all his obligations under the Contract, and all matters and things necessary for the completion of the works.

b) **Contractor not Entitled to Extra Payment**

Except as otherwise as specifically provided in the Contract, the Contractor shall not be entitled to any extra payment nor to resale from the Contract nor to be relieved from any of his obligation for reasons of his misunderstanding, or his failure to obtain correct information or his inability to foresee any matter which may affect the execution or maintenance of the works.

14. Work to be to the Satisfaction of the Architect

The Contractor shall execute and maintain the works in strict accordance with the contract to the satisfaction of the Architect/Employer/ARCHITECT and shall comply with and adhere strictly to the instructions and directions from them or their representative/s.

15. Programme to be furnished:

a) Within a reasonable time after the acceptance of his Tender, the Contractor shall submit to the Project Management Consultant for his approval and/or information a BAR Chart/chart showing the order of procurement and method in which he proposes to carry out the works, a general description of the arrangements and methods which he proposes to adopt for the execution of the Works, the Constructional Plant and Temporary Works which he intends to supply, use or construct as the case may be, the scheduling of samples, Shop Drawings and approvals from concerned authorities as required under the contract.

b) If the actual progress of the works does not conform to the approved chart, the Contractor shall be required to submit a revised programme and implement the same for the completion of the works within the stipulated time for completion.

c) List of personnel I. Authorized representative II. Technical & non-technical staff III. Skilled & unskilled labours IV. Security staff, deployed at site for on schedule completion of this contract.

- d) The submission to and approval by the Project Management Consultant of such programs shall not relieve the Contractor of any of his duties or responsibilities under the contract.

16. Contractor's Superintendence:

The Contractor shall give or provide all necessary superintendence during the execution of the works and as long thereafter as the Architect/ARCHITECT/Employer may consider necessary. The Contractor or one of his competent and authorized agent or representative is to be constantly on the works and shall give his whole time to the superintendence of the same. Such authorized agent or representative shall receive on behalf of the Contractor the directions and instructions from the Architect /ARCHITECT /Employer.

17. Contractor's Employees:

- a) The Contractor shall provide and employ on the site skilled and experienced technical assistants, foremen and leading hands to give proper supervision and such skilled, semi-skilled and unskilled labour for the proper and timely execution and maintenance of the works.
- b) The Contractor shall be required to remove forthwith from the works any person employed by the Contractor in or about the execution or maintenance of the works who in the opinion of the Architect/ARCHITECT/Employer misconducts himself or incompetent or negligent and thus considered to be undesirable and shall be replaced as soon as possible by a competent substitute approved by the Architect/ARCHITECT/Employer.

18. Setting Out:

The Contractor at his own expenses set out the works accurately in accordance with the plans and to the complete satisfaction of the Architect. The Contractor shall be solely responsible for the true and perfect setting out of the works in relation to original points lines and levels of reference and for the correctness of the positions levels, dimensions and alignment of all parts of the works and for the provision of all necessary instruments, appliances and labour in connection therewith.

The responsibility for the true and proper setting out rests with the Contractor who shall rectify any error at his own cost to the satisfaction of the Architect, unless such error is based on incorrect data supplied in writing by the Architect or his Representative, in which case the expenses of rectifying shall be borne by the Employer. The checking of any setting out or of any line or level by the Architect or his Representative shall not in any way relieve the Contractor of his responsibility for the correctness thereof and the Contractor shall carefully protect and preserve all benchmarks sight rails pegs and other things used in setting out the works.

19. Bore Holes and Exploratory Excavation:

If the Architect shall require the Contractor to make bore holes or to carry out exploratory excavation such requirement shall be an addition ordered under the provision of clause 42 hereof and such anticipated works shall have been included in the scope of work.

20. Security and maintenance of Premises Lighting:

The Contractor shall in connection with the works provide and maintain at his own cost all lights/guards facing and watching when and where necessary or required by the Architect or his Representative or by any duly constituted authority for the protection of the works or for the safety and convenience of the public of others.

21. a) Care of Works:

From the commencement to the completion of the 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 from any cause whatsoever, save and except risks as defined in sub-clause (b). In this clause, shall at his own cost, repair and make good the same, so that at completion, the permanent works shall be in good order and condition and in

conformity in every respect with the requirements of the contract and the Architect's instructions. In the event of any such damage, loss or injury happening from any of the excepted risks, the contractor shall, if and to the extent required by the Architect and subject always to the provision of Clause mentioned elsewhere in the conditions hereof, Construction make good the same as aforesaid at the cost of the Employer. The Contractor shall also be liable for any damage to the works occasioned by him in the course of any operations carried out by him for the purpose of complying with his obligations under Clause 40 and 42 thereof.

b) Excepted Risks:

The "Excepted Risks" are Force majeure, exceptionally incremental weather, fire, earthquake, civil commotion, riot, lockout, strike, war, hostilities (whether war be declared or not), invasion act of foreign enemies rebellion, revolution in correction or military or usurped power civil war or a cause solely due to or use or occupation by the Employer of any portion of the works in respect of which a Certificate of Completion has been issued all of which are herein collectively referred to as "Excepted Risks".

22. Insurance in Respect of Damage to Person and Property:

From Commencement to Completion, the Contractor shall be responsible for all injury to persons, animal or things and for all structural and decorative damage to property which may arise from operation or neglect of himself or any subcontractor or of any of his or a sub-contractor's employee whether such injury or damage may arise from carelessness, accident or any other cause whether in any way connected with the carrying out of this contract. This clause shall be held to include interalia any damage to building, whether immediately adjacent or otherwise, any damages to roads, streets, footpaths, bridges, or ways as well as all damage to the buildings and works forming the subject of this contract by first or other inclemency weather. The contractor shall indemnify the Employer and hold him harmless in respect of all and any expenses arising from any such injury or damage to persons or property as aforesaid and also in respect of any claim made in respect of any award of compensation or damages consequent upon such claim.

The Contractor shall reinstate all damage of every spot mentioned in this clause so as to deliver up the whole of the contract works complete and perfect in every respect and so as to make good or otherwise satisfy all claims for damage to the property of third parties.

The Contractor shall indemnify the Employer against all claims which may be made against the Employer by any member of the public or other party in respect of anything which may arise in respect of the works or in consequence thereof and shall at his own expense effect and maintain until the virtual completion of the contract with an approved office a policy of insurance in the joint names of the Employer and the Contractor against such risks and deposit such policy or policies with the Employer on the signing of the contract. The Contractor shall also indemnify the Employer against all claims which may be made upon the Employer whether under the Workmen's Compensation Act or any other statute in force during the currency of this contract or at common law in respect of any employee of the Contractor or of any sub- contractor and shall at his own expense effect and maintain until the virtual completion of the contract, with an approved office a Policy of Insurance in the joint names of the Employer and the Contractor against such risks and deposit such policy or policies with the Employer from time to time during the currency of the contract.

The Contractor shall be responsible for anything, which may be excluded from the Insurance Policies above referred to, and also for all other damages to any property arising out of and incidental to the negligent or defective carrying out of the contract; however such damage shall be caused.

The Contractor shall at all times indemnify the Employer and keep indemnified in respect of any costs, charges for expenses arising out of any claim that may arise on account of the Contractor's operation at the site or proceedings and also in respect of any award of or compensation of damages arising there from. It shall also be the Contractor's responsibility to file and pursue with the Insurance Company for a claim if any.

The Employer with the concurrence of the Architect shall be at liberty and is hereby empowered to deduct the amount of any damages, compensations, costs, charges and expenses arising or acquiring from or in respect of any such claim or damages from any sums due or to become due to the Contractor.

Before commencing the work, the Contractor shall without limiting his obligations and responsibilities under the condition, obtain the necessary insurances. If he shall fail to effect and keep in force the insurances referred to in this clause hereof or any other insurances which he may be required to effect under the terms of contract then the contractor shall be fully responsible for the consequences of such a default. In any such case the Employer may effect and keep in force any such insurance and pay such premium or premiums as may be necessary for the purpose and from time to time deduct the amount so paid by the Employer as aforesaid from any monies due or which may become due to the Contractor or recover the same as a debt due from the Contractor.

The Contractor shall provide the Employer with documentary evidence from time to time that he has taken all the insurance policies mentioned in the foregoing paragraphs and that he has paid the necessary premium for keeping the policy valid till the works are completed and handed over to the employer.

The Architect/ARCHITECT shall ensure the validity of the insurance policies on behalf of the Employer. If extension of time limit is granted by Employer, he shall have to ensure that the insurance policies are progressively extended.

23. Compliance with Statutes, Regulations etc.

The Contractor shall comply with the provision of Payment of Wages ACT 1936, Minimum Wages Act 1948, Employees Liability Act 1938, Workmen's Compensation Act 1923, Industrial Dispute Act 1947, Maternity Benefits Act 1961 and the Contractor's Labour (Regulation and Abolition) Act 1970 or any such statutes ordinance or have and the modification thereof and the regulation or Bye-Laws of any local or other duly constituted authority and rules and regulations of public bodies and companies which may be applicable to the works or to any temporary works as aforesaid and shall keep the Employer indemnified of every kind for breach of any such statute, ordinance or Law Regulation or Bye-Laws.

Contractor, as required, will pay necessary P.F. and E.S.I contribution for the contractor's workers and employer shall be absolved of all these risks.

24. Fire Insurance:

The Contractor shall at the time of signing of the contract insure until the virtual completion of the contract against loss or damage by fire in an office/company to be approved by the Architect/Employer in the joint names of the Employer and Contractor (the name of the former being placed first in the policy) for the full amount of the contract and for any further sum if called upon to do so by Architect the premium of such further sum being allowed in the contract shall be authorized extra. Such a policy shall cover the property of the Employer only and the Architect and Surveyors' fees for assessing the claim and in connection with his services generally in the reinstatement and shall not cover any property of the Contractor or any sub contractor or employee. The Contractor shall deposit the policy and receipt for the premium with the Employer within twenty-one days from the date of signing the contract unless otherwise instructed. In default of the contractor insuring as provided above the Employer or the Architect on his behalf may so insurance and may deduct the premium from any moneys 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 Office should they elect to do so, proceed with all the completion of the works in the same manner as though the fire had not occurred and in all respects under the same conditions of contract. The Contractor in case of rebuilding or reinstatement after fire shall be entitled to such extension of time for completion as the Architect may deem fit but shall however not be entitled to reimbursement by the Employer of any short fall or deficiency in the amount finally paid by the insurer in settlement of any claim arising as set out herein.

25. Giving of Notices and Payment of Fees

The Contractor shall give all notices and pay all fees required to be given or paid by any National or State Statute Ordinance or other Law or any Regulation or Bye-Law of any local or other duly constituted authority in relation to the execution of the works or of any temporary works and by the rules and regulations of all public bodies and companies whose property or rights are affected or a may be affected in any way by the works.

26. Returns of Labour etc.:

The Contractor shall furnish all such information regarding the supervisory staff, the numbers of the several classes of labour from time to time employed on the site, constructional plant etc. as the Architect may require.

27. Materials and Workmanship:

a) Quality of Material and Workmanship and Tests:

All materials and workmanship shall be of the respective kinds described in the contract and in accordance with the Architect's/ARCHITECT instructions and the contractor shall upon the request of the Architect/ARCHITECT furnish to them all invoices, accounts, receipts and other vouchers to prove the materials comply therewith and shall be subjected from time to time to such tests as the 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 at his own cost provide such assistance, instruments, machines, labour and materials as are normally required for examining, measuring and testing any work and the quality, weight or quantity of any material used and shall supply samples of materials before incorporation in the works for testing as may be selected and required by the Architect.

b) Cost of Samples and Shop Drawings:

All samples for the fittings and fixtures, wood, hardware etc. should be submitted for approval before using in the work. The Contractor at his own cost as directed by the Architect shall supply all Samples and Shop Drawings.

c) Cost of Tests

The cost of making any test shall be borne by the Contractor, if such test is clearly intended by or provided for in the contract and in the cases only for a test under load or of a test to ascertain whether the construction of any finished or partially finished work is appropriate for the purposes which it was intended to fulfil is particularized in the contract in sufficient detail to enable the Contractor to price or allow for the same in tender.

d) Cost of Test not provided for etc.

If any test is ordered by the Architect which is either:

i) Not so intended by or provided for or,

ii) (In the case above mentioned) is not so particularized or,

iii) Though so intended or provided for is ordered by the Architect to be carried out by an independent person at any place other than the site or the place of manufacture or fabrication of the materials tested, then the cost of such test shall be borne by the Contractor if the test shows the workmanship or materials not to be in accordance with the provisions of the contract or the Architect's instructions but otherwise by the Employer.

28.

a) Examination of Work Before Covering Up:

No work shall be covered up or put out of view without the approval of the Architect/ARCHITECT and the Contractor shall afford full opportunity for the Architect/ARCHITECT to examine and 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 due notice to the Architect whenever any such work or foundations is or are ready or about to be ready for examination and the Architect shall without unreasonable delay unless he considers it necessary and advises the contractor accordingly attend for the purpose of examining and measuring such work or of examining such foundations.

b) Uncovering and Making Openings:

If the Contractor puts any part of the foundations or covers up or puts out of view before he has notified the Architect/ARCHITECT and received instructions, he shall be liable to reinstate all work that may subsequently be, at any time, damaged on account of any defect in or insufficiency of the foundation. The Contractor shall at the request of the Architect, open up for inspection any work, and should the Contractor refuse or neglect to comply with such requests, the Employer through the Architect, may employ other agency to open up the same. If the said work has been covered up in contravention of the Architect's instructions, or if on being opened up, if he found not in accordance with the drawings and the specifications or the instructions of the Architect, the expenses of opening it again, whether done by the Contractor, or such other agency, 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. If the work has not been covered in contravention of such instructions and found to be in accordance with the said drawings and specifications or instructions than the expenses aforesaid shall be borne by the Employer and be added to the contract sum; provided always that in the case of foundation or any other urgent work so open up and required immediate attention, the Architect shall within 7 days after receipt of written notice from the Contractor that the work has been opened make or cause the inspection thereof to be made at the expiration of such time, if such inspection shall not have been made. The contractor may cover up the same and shall not be required to open it up again except at the expenses of the Employer.

29.

a) Removal of Improper Work and Materials:

The Architect shall during the progress of the works have power to order in writing from time to time.

- i) The substitution of proper and suitable material and,
- ii) The removal and proper re-execution notwithstanding any previous test thereof or interim payment therefore of any work which in respect of materials or workmanship is not in accordance with the contract in the opinion of the Architect.

b) 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 employ and pay other agency 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 amount due or which may become due to the Contractor.

30. **Suspension of Work:**

The Contractor, shall on the written order of the Architect/Employer suspend the progress of the works or any part thereof for such time or times and in such manner as the Architect may consider

necessary and shall during such suspension properly protect against threats or damage and secure the work, so far as is necessary in the opinion of the Architect. The cost, if any, incurred by the Contractor in giving effect to the Architect's instructions and ARCHITECT's recommendations, if any, under this clause shall be borne and paid by the Employer unless such suspension is:

- i) Otherwise provided for in the contract or
- ii) Necessary by reason of some default on the part of the Contractor or Provided that Contractor shall not be entitled to recover any such extra cost unless he gives written notice of his intention to claim to the Architect on receipt of the Architect's order. The Architect shall settle and determine the payment and/or extension of the time under Clause 42 hereof to be made to the Contractor in respect of such claim as shall, in the opinion of the Architect, be fair and reasonable.

31. Commencement of Works:

The Contractor shall commence the works on site after the receipt by him of an order in writing to this effect from the Employer and shall proceed with the same with due expedition and without delay except as may be expressly sanctioned or ordered by the Architect/Employer or be wholly beyond the Contractor's control.

32. Possession of Site:

- a) Save in so far as the contract may prescribe and with the Architect's/ARCHITECT/Employer written order to commence the works, the Contractor shall be given possession of the whole of the site or part by part progressively enabling him to commence and proceed with the execution of the works in accordance with the programme referred to in Clause 16 hereof. If the Contractor suffers delay on account of the Employer's failure to give possession of site in accordance with the terms of this clause, necessary extension of time (without any financial implications) shall be granted by the Employer for the completion of the entire works, on recommendations of Architect/ARCHITECT.
- b) The Contractor shall bear all costs and charges for special or temporary way leaves required by him in 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 purposes of the works.

33. Time for Completion

Subject to any requirement in the contract as to completion of any section of the works before completion of the whole, the whole of the works shall be completed within the time stated in the contract calculated from the date of the Employer's written order to commence the works or such extended time as may be allowed under Clause 35 hereof.

33.1. Certification of Virtual Completion of Works

The contractor shall report in writing to the ARCHITECT when the works are completed in all respects. The ARCHITECT shall after the verification of works and in consultation with Architects issue to the contractor a certificate to be called "Virtual Completion Certificate" a copy whereof shall be submitted to the employer to enable it to take possession of the completed works. The Defects liability period shall commence only from the date of issue of such Virtual Completion certificate.

34. Delays and Extension of Time for Completion

In the opinion of the Architect, the works be delayed (a) by force majeure (b) by reason of any exceptionally inclemental weather or (c) by reasons of proceedings taken or threatened by or dispute with adjoining or neighbours of adjoining properties or public authorities arising otherwise than through the Contractor's own default or (d) by the works or delays of the other Contractors or Tradesman engaged or nominated by the Employer or the Architect and not referred to in the Schedule of Quantities and/or specifications or (e) be reason of the Architect's instruction or (f) by reason of civil commotion, local commotion of workmen or strike or lockout affecting any of the

building trades or (g) due to extra or additional work or other circumstances provided the Contractor has intimated to the Architect full and detailed particulars soon after such work has been commenced or (h) in consequence of the Contractor, not having in due time necessary instructions from the Architect for which he shall have specifically applied in writing ahead of time, giving the Architect reasonable time to prepare such instructions, the Employer shall make a fair and reasonable extension of time for completion of work. In case of such strike or lockout, the Contractor shall, as soon as may be, give written notice thereof to the Architect/ARCHITECT but the Contractor shall nevertheless constantly use his endeavours to prevent delay and do all that may reasonably be required to the satisfaction of the Architect/ARCHITECT to proceed with the work.

35. Rate of Progress:

The whole of the material plant and labour to be provided by the Contractor under Clause 13 hereof and the mode, manner and speed of execution and maintenance of the works are to be of a kind and constructed in a manner approved of by the Project Management Consultant. Should the rate or progress of the works or any part thereof, be at any time in the opinion of the Project Management Consultant too slow to ensure the completion of the works by the prescribed time or extended time for completion, the Project Management Consultant shall so notify the Contractor in writing and the Contractor shall there upon take such steps as the Contractor may think necessary and the Project Management Consultant may approve to expedite progress so as to complete the works by the prescribed time or extended time for completion. If the work is not being carried on by day and night the Contractor shall request permission to work by night as well as by day then if the Architect/Employer shall grant such permission the Contractor shall not be entitled to any additional payment for so doing but if such permission shall be refused and there shall be no equivalent practicable method of expediting the progress of works, the time of completion of the works shall be extended by the Employer by such period as is solely attributable to such refusal. All work at night shall be carried out without unreasonable noise and disturbance. The Contractor shall indemnify the Employer from and against any liability for damage on account of noise or other disturbance created while or in carrying out the work and from and against all claims, demands, proceedings, damages, costs, charges and expenses whatsoever in regard or in relation to such liability.

36. Liquidated Damages for Delay

If the Contractor shall fail to complete the works within the time prescribed by Clause 34 hereof or extended time then the Contractor shall pay to the Employer the sum stated in the Tender as Liquidated Damages for such default and not as a penalty for every day or part of a day which shall elapse between the time prescribed by Clause 41 hereof or extended time as the case may be and the default certified completion of the works. The Employer may deduct without prejudice to any other method of recovery deductible amount of such extent from the money that stands due or which may become due to the Contractor. The payments or deduction of such damages shall not relieve the Contractor from his obligations and liabilities under the contract.

37. Certificate of Completion of Works:

- a) When the whole of the works have been substantially completed and have satisfactorily passed any final test that may be prescribed by the contract, the Contractor may give a notice to the effect to the Project Management Consultant accompanied by an undertaking to finalize any outstanding work during the period of maintenance. Such notice and undertaking shall be in writing and shall be deemed to be a request by the Contractor for the Project Management Consultant to issue a Certificate of Completion in respect of the works. The Architect, shall within twenty eight days of the date of delivery of such notice either issue to the Contractor, with a copy to the Employer, a Certificate of Completion stating the date on which, in his opinion, the works were substantially/virtually completed in accordance with the contract or give instructions in writing to the Contractor specifying all the work which, in the Project Management Consultant's opinion, requires to be done by the Contractor before the issue of such Certificate. The Architect/ARCHITECT shall also notify the Contractor of any defects in the works affecting substantial completion that may appear after instructions and before completion of the Works specified therein. The Contractor shall be entitled to receive such certificate of completion within twenty-eight days of completion to the satisfaction of the Architect/ARCHITECT of the Works so specified and making good any defects so notified.

b) Certification of Completion by Stages

Similarly, in accordance with the procedure set out in sub clause (a) of this Clause, the Contractor may request and the Project Management Consultant shall issue a Certificate in respect of:

- i) Any section of the Permanent Works in respect of which a separate time for completion is provided in the contract, and
- ii) Any substantial part of the Permanent Works, which has been completed to the satisfaction of the Architect/ARCHITECT and occupied or used by the Employer.

If any part of the Permanent Works shall have been substantially completed and shall have satisfactorily passed any final test that may be prescribed by the contract, the Architect, on recommendations of ARCHITECT, may issue a Certificate of Completion in respect of that part of Permanent Works before completion of the whole of the works and upon the issue of such Certificate, the Contractor shall be deemed to have undertaken to complete any outstanding work in that part of the Work during the period of maintenance. Provided always that Certificate of Completion given in respect of any section or part of the Permanent Works before Completion of the whole shall not be deemed to certify completion of any ground or surfaces regarding reinstatement, unless such Certificate shall expressly so state.

38. Defects:

a) Definition of "Defects Liability Period:

In these conditions, the expression "Period of Defects Liability" shall mean the period of Defects Liability named in the Tender, calculated from the date of completion of the Works, certified by the Architect/ARCHITECT in accordance with item no.13 of Annexure-1 (appendix to form of offer) and mentioned elsewhere in the tender, or in the event of more than one certificate having been issued by the Project Management Consultant under the said Clause from the respective dates so-certified. In general, the Defects Liability Period shall be one year after the virtual completion of the works (except for all Water Proofing Works for which the period shall be 10 years).

b) Defects:

The Contractor shall make good at his own cost and to the satisfaction of the ARCHITECT/Architect, all defects, shrinkage, settlement, or other faults and all damages, loss and expenses consequent thereon or incidental thereto, and such damage, loss and expenses shall be recoverable from him by the Employer or may be deducted by the Employer upon the ARCHITECT/ Architect's Certificate in writing from any money due or that become due to the Contractor.

c) Entry to the Premises for Attending Defects:

The premises shall have/remain in exclusive physical possession of the Employer and the Contractor is given only a temporary permission to enter the said premises with his workman, agents for attending the defects, during the defects liability period. If the Contractor or his workman whether negligently or otherwise causes any damage or loss to the property, fixtures of the Employer lying in the premises, the Contractor shall be bound to reimburse such loss to the Employer. The Employer always is entitled to deduct any amount of sum loss from the amounts payable to the Contractor.

d) Execution of Work of Repair etc.:

To the intent that the Works shall at or as soon as practicable after the expiration of the Defects Liability Period be delivered to the Employer in the condition required by the Contractor, fair wear and tear excepted, to the satisfaction of the Architect/ARCHITECT, as that in which they were at the commencement of the DLP, the Contractor shall finish the Work, if any, outstanding at the date of completion, as certified under Clause 39 hereof, as soon as practicable after such

date and shall execute all such work of repair, amendment, reconstruction, rectification and making good defects, imperfections, shrinkages or other faults as may be required of the Contractor in writing by the Architect/ARCHITECT during the DLP within fourteen days after its expiration, as a result of an inspection made by Architect/Employer/ARCHITECT prior to its expiration.

e) Cost of Execution of Work etc.:

All such work shall be carried out by the Contractor at his own expenses if the necessity thereof shall, in the opinion of the Architect/ARCHITECT, be due to the use of materials or workmanship not in accordance with the contract or to neglect or failure on the part of the Contractor to comply with any obligation, expressed or implied, on the Contractor's part under the Contract. If, in the opinion of the Architect/ARCHITECT/Employer, such necessity shall be due to any other cause, the value of such work shall be ascertained and paid for as if it were additional work.

f) Remedy on Contractor's Failure to Carry Out Work Required:

If the Contractor shall fail to do any such work as aforesaid required by the Architect/ARCHITECT, the Employer shall be entitled to employ and pay other persons to carry out the same and if such works which is in the opinion of the Architect/ARCHITECT, the Contractor was liable to do at his own expense under the Contract, then all expenses consequent thereon or incidental thereto shall be recoverable from the Contractor by the Employer or may be deducted by the Employer from any money due or which may become due to the Contractor.

39. 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 Architect/Employer 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 Architect/Employer. 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.

40. Contractor to Search:

The Contractor shall, if required by the Architect/ARCHITECT in writing, search under the directions of the Architect/ARCHITECT for the cause of any defect, imperfection or fault appearing

during the progress of the works or in the Period of DLP. Unless such defects, imperfection or fault shall be one for which the Contractor is liable under the contract, the cost of the work carried out by the Contractor in searching as aforesaid shall be borne by the Employer. If such defect, imperfection or fault shall be one for which the Contractor is liable as aforesaid, the cost of work carried out in searching as aforesaid shall be borne by the Contractor and he shall in such case repair, rectify and make good such defect, imperfection or fault at his own expense in accordance with the provisions of Clause 39 and 40 hereof.

41. Extra Item of Work:

a) Work or material of nature not included under the Schedule of items which has to be executed or supported, insurance of any of the Provisions of this contract shall be considered as an extra item. When alterations/additions or omissions made to any work or material shall be such that the cost of the resulting work cannot be estimated according to the tendered items the same shall also be considered extra item. The Contractor shall carry out the extra items as may be directed by the Architect/Employer. However, extra charges or claims in respect of any work will not be allowed unless the works they relate are clearly outside the spirit and meaning of the tender item/specifications and such works are ordered by the Architect/Employer and claimed for specified manner before the particular work is actually commenced.

b) Prices for Extras, Ascertainment of:

The extra item rates shall generally be derived from the quoted rates of the Contractor for comparable items of similar nature/scope/description under Schedule of Quantities of the Tender, making allowance for variations only. However if no comparable items are available in the unit rates and the quantity of work is to be executed can conveniently be derived / measured; the same shall be arrived at based on the prevailing rates in the original tender. However, where the work is so disjointing the unit rates or the quantity of work done cannot be conveniently be derived/measured then it will be within the purview of the Architect/Employer to derive the rates either from Tender item or other extra items or by rate analysis showing clearly the fair market cost of material, cost of labour, plus 10% to cover overheads, profit etc. The actual cost shall be determined for the above purpose, as the cost of: -

- i) Materials supplied or used at site on items forming part of completed item of work as determined by the Architect/ARCHITECT by inquiry of the prevailing market rate at the time of procurement.
- ii) Materials (non-consumable) which are used temporarily and not forming a part of the completed item of main work, provided the same are solely meant for the particular and this cost would be determined by the Architect/ARCHITECT by inquiry of prevailing market rate.
- iii) The actual cost of transport if solely transported for the execution of the particular extra work and running charge of equipment if any used for the execution of the particular extra item of work.
- iv) Skilled and unskilled labour charges for the actual strength of labour employed and petty supervision charges as certified by the Architect/ARCHITECT.
- v) Contractor shall inform school in writing seven days before the occurrence of any extra item during execution of the work.
- vi) If any work executed it will be paid as per DSR 2018 rate with 0% premium and for non-scheduled items, on the rate analysis basis with 10% contractor profit.

Other relevant applicable costs viz. water, electricity, sundries etc as per CPWD guidelines may be considered on satisfactory production of documentary evidence to the ARCHITECT/Architect/Employer.

No escalation shall be entertained on such extra items.

c) **Claims:** -

The Contractor shall send to the employer's representative/ ARCHITECT prior to submission of Interim Bill/Running Bill giving particulars of all claims for any additional payment to which the Contractor may consider himself entitled and of all extra or additional work ordered by the Architect/Employer, which he has executed. No final or interim claim for payment for any such work or expense will be considered which has not been included in such particulars. Provided always that the Architect shall be entitled to authorize payment to be made for any such work or expense, notwithstanding the Contractor's failure to comply with this condition, if the Contractor, has at the earliest practicable opportunity, notified the Architect/ARCHITECT/Employer in writing such claims along with required particulars.

42. **Plant Temporary Works and Materials:** -

a) **Plant etc. Exclusive use for the Works:** -

All Constructional Plant, Temporary Works and materials provided by the Contractor shall when brought on to the site immediately be deemed to be exclusively intended for the construction and completion of the Works and be deemed to become the property of the Employer and the Contractor shall not remove the same or any part thereof (Save for the purpose of moving it from one part of the site to another without the consent in writing of the Employer which shall not be unreasonably withheld. But the Employer will permit the Contractor the exclusive use of all such Constructional plant, Temporary works and materials 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.

b) **Revesting of Plant Etc.:** -

Upon the removal of any such Constructional Plant, Temporary works of materials with consent as aforesaid the same shall be deemed to revert in and become the property of the Contractor and upon completion of the Works the remainder of the said Constructional Plant and Temporary Works and any unused materials provided by the Contractor shall be deemed to revert in and become the property of the Contractor who shall remove the same. If the Contractor fails to remove any of the said Constructional Plant, Temporary Works of unused materials within such reasonable times after the completion of Works as may be allowed by the Architect/ARCHITECT then the Employer may sell the same and shall after deducting from the proceeds the charges and expenses and in connection with such sale pay the balance (if any) to the Contractor.

c) **Employer not Liable for Damage to Plant etc.:** -

The employer shall not at any time be liable for the loss of or injury to any or the said Constructional Plant, Temporary Works or materials save as mentioned in Clause 22 hereof.

43. **Approval of Materials, Etc.:**

The Architect/ARCHITECT/Employer is at a liberty to reject any materials, if in his opinion they are of sub standard quality or not as per the tender specifications.

44. **Works to be measured:** -

The Project Management Consultant shall, except as otherwise stated, ascertain and determine by measurement the value in terms of the contract of work done in accordance with the contract. It shall, when it required 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 ARCHITECT/Architect in making such measurement, 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 ARCHITECT or approved by him shall be taken to be the correct measurement of the work. For the purpose of measuring such Permanent Work as is to be measured

by records and drawings, the ARCHITECT shall prepare records and drawings month by month of such work and the Contractor as and when called upon to do so writing, shall, within fourteen days, attend to examine and agree such records and drawings with the employer's representative/ARCHITECT and shall sign the same when so agreed. If the Contractor does not so attend to examine and agree such records and drawings, they shall be taken to be correct. If, after examination of such records and drawings, the Contractor does not agree with the same or does not sign the same as agreed, they shall nevertheless be taken to be correct, unless the Contractor shall, within fourteen days of such examination, lodge with the employer's representative/ARCHITECT for decision by the Architect/Employer, notice in writing of the respects in which such records and drawings are claimed by him to be incorrect.

45. 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 of building works (I S 1200 - 1958).
- ii) The measurement for certificate of payment shall be as described in mode of payment.

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 as far as it is practicable. The billing procedure and formats shall be as approved by the Architect/ARCHITECT.

46. Assignment or Sub-Letting: -

The Contractor shall not assign or sub-let any portion of the work, except as expressly provided elsewhere in these documents.

47. Certificates and Payments:

a) Certificates and Payments: -

- i) The Contractor shall submit to the Project Management Consultant after the end of each month statements and voucher and documents etc. as directed and signed by the Contractor showing the quantities and value of the materials, equipments etc. ordered, work done on the site and of the stock of equipments and unused materials on the site intended to form part of the permanent work or such other items as directed.
- ii) The rates of prices in such monthly statements shall be in accordance with stipulations in the contract.
- iii) If any rates or prices in the said contract are in the opinion of the Project Management Consultant not applicable to some or any part of the work executed or materials supplied and the ARCHITECT has not fixed a rate or price at the time when the monthly statement is prepared then temporary/provisional rates or prices shall be assigned by the Project Management Consultant's Representative.
- iv) Neither the temporary rates or prices assigned under sub- clause (iii) of this clause nor the quantities mentioned in the statements submitted under sub-clause (i) of this clause shall be binding on the Employer or on the Contractor.

- v) The Contractor shall when required by the Architect/ARCHITECT furnish all proper documents vouchers, returns etc. as to values to assist the Architect/ARCHITECT in the preparation of certificate.

b) Interim Payment:

The Contractor will be paid interim payment on the certificate of the Project Management Consultant's contract value of the Permanent Works executed up to date together with such amount (if any) that the Project Management Consultant may consider proper on account of materials delivered by the Contractor on the site and in addition such amount that the Project Management Consultant may consider fair and reasonable for any Temporary Works subject to a retention of the percentage named in the Contract until the amount retained shall reach the "Limit of Retention Money" named in the Contract (hereinafter called "the retention money") after which time no further deduction of retention will be made. The issue of interim payment certificate by the Project Management Consultant/Architect for the value of work done and period of honouring such certificates by the Employer shall be as indicated in special condition of Contract hereto.

c) Final Bill:

When the Architect has granted a certificate or certificates of completion for the whole of the works under clause 38 hereof and when the Architect/ARCHITECT has ascertained (excluding in so doing unsettled or disputed claims of the Contract) the final sum (that is to say the gross payment for the completion of the whole of the works) due to the Contractor, the Project Management Consultant shall after allowing for the amount of all previous certificate and after determining and allowing for any sum due to the Employer from the Contractor for delay and after allowing for all other payments due from the Contractor to such a sum out of the balance so calculated as remaining due to the Contractor as will leave to be retained by the Employer a sum equal to retention money for defects liability period. The issue of Final payment certificate by the Project Management Consultant/Architect for the value of work done and period of honouring such certificates by the Employer shall be as indicated in special condition of Contract hereto.

As soon as possible after the Certificate or Certificates of completion for the whole of the works have been issued, the Contractor shall furnish a final account for the works in the form and manner prescribed by the Architect/ARCHITECT.

d) Payment after Defects Liability Period:

The said retention money retained under sub-clause (c) of this clause and the amount if and by which the final sum exceeds the final sum ascertained under the said sub-clause (c) will not be paid by the Employer until after the expiration of defects liability period and then (subject to the deduction of such sums if any as the Project Management Consultant shall determine to be due from the Contractor to the Employer) only upon the Architect/ARCHITECT/Employer being satisfied that all the Contractor's obligations under the Contract have been satisfactorily performed.

e) Time of Payment: -

Payment upon each of the Project Management Consultant's Certificates shall be made by the "Employer within the specified time as mentioned in Appendix to Form of Offer Page-16 of the Contract".

f) Correction/ Withholding of Certificates: -

The Project Management Consultant 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.

48. Remedies and Powers:

a) Default of Contractor: -

If the Contractor shall become bankrupt, or have a receiving order made against him, or shall present his petition in bankruptcy, or shall agree to carry out the Contract under a committee of inspection of his creditors or, being a corporation, shall go into liquidation (other than a voluntary liquidation for the purposes of amalgamation or reconstruction), if the contractor shall assign the Contract, without the consent in writing of the Employer first obtained, or shall have an execution levied on his goods, or if the Architect/ARCHITECT shall certify in writing to the Employer that in his opinion the Contractor :-

- i) Has abandoned the Contract, or
- ii) Without reasonable excuse has failed to commence the works or has suspended the progress of the works for twenty eight days after receiving from the Architect/Employer written notice to proceed, or Has failed to remove materials from the site or to pull down and replace work for twenty eight days after receiving from the ARCHITECT's written notice that the said materials or work had been condemned and rejected by the Architect's under these conditions, or
- iii) Despite previous warnings by the Architect/ARCHITECT in writing, is not executing the works in accordance with the Contract, or is persistently or flagrantly neglecting to carry out his obligations under the Contract, or has, to the detriment of good workmanship, or in defiance of the Architect's instructions to the contrary, sub-let any part of the contract then the Employer may, after giving fourteen days notice in writing to the Contractor, enter upon the site and the works and expel the Contractor there from without thereby voiding the contract, or releasing the Contractor from any of his obligations or liabilities under the Contract, or affecting the rights and powers conferred on the Employer or the Architect by the Contract, and may himself complete the works or may employ any other Contractor to complete the works. The Employer or such contractor may use for such completion so much of the Constructional plant, temporary works and materials, which have been deemed to be reserved exclusively for the execution of the works, under the provisions of the contract, as he or they may think proper, and the Employer may, at any time, sell any of the said constructional plant, temporary works and unused materials and apply the proceeds of sale in or towards the satisfaction of any sums due or which may become due to him from the Contractor under the Contract.

b) Valuation at Date of Forfeiture: -

The Architect shall, as soon as may be practicable after any such entry and expulsion by the Employer, fix and determine expiate, or after reference to the parties, or after such investigation or enquiries as he may think fit to make or institute, and shall certify that amount, if any, had at the time of such entry and expulsion been reasonably earned by or would reasonably accrue to the Contractor in respect of work then actually done by him under the Contract and the value of any of the said unused or partially used materials, any Constructional Plant and any temporary works.

c) Payment after Forfeiture: -

If the Employer shall enter and expel the Contractor under this Clause, he shall not be liable to pay to the Contractor any money on account of the Contract until the expiration of the Defects Liability Period and thereafter until the costs of execution and maintenance, damages for delay in completion, if any, and all other expenses incurred by the Employer have been ascertained and the amount thereof certified by the ARCHITECT/Architect. The Contractor shall then be entitled to receive only such sum or sums, if any, as the Architect may certify would have been payable to him upon due completion by him after deducting the said amount, if such amount shall exceed the sum which would have been payable to the Contractor on due completion by him, then the Contractor shall, upon demand, pay to the Employer the amount of such excess and it shall be deemed a debt due by the Contractor to the Employer and shall be recoverable accordingly.

49. 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 Architect/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 ARCHITECT/Architect may consider necessary.

If the work of repair so done by the Employer is the work which in the opinion of the 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 Architect/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.

50. Matters to be finally Determined by the Architect: -

The decision, opinion, direction certificate (except for payment) with respect to all or any of the matters under Clauses hereof (which matters are hereinafter referred to as excepted matter) shall be only on ARCHITECT's scrutiny and recommendations to the Bank and shall be final and conclusive and binding on the parties hereto and shall be without appeal: -

Clause 5 -Architect's interpretation of drawings and further drawings and instructions.

Clause 15 - Work to the satisfaction of the Architect.

Clause 28 -Quality of material and workmanship and tests.

Clause 30(a) -Removal of improper work and materials.

Clause 35 – except 35(e)

Clause 40 - Variations

Any other decision, opinion, direction, certificate or valuation of the Architect to give any of the same shall be subject to the right of arbitration.

51. Settlement of Disputes and Arbitration Act 1996: -

Except where otherwise provided in the contract all questions and disputes relating to the meaning of the specifications, design, drawings and instructions herein before mentioned and as to the quality of workmanship or materials used on the work or as to any other question, claim, right, manner or thing whatsoever in any way arising out of or relating to the contract, designs, drawings, specifications, estimates, instructions, orders or these conditions or otherwise concerning the work or the execution or failure to execute the same whether arising during the progress of the work or after the cancellation, termination, completion or abandonment thereof shall be dealt with as mentioned herein after.

- i) If the contractor considers that he is entitled to any extra payment or compensation in respect of the works over and above the amounts admitted as payable by the Architect or in case the contractor wants to dispute the validity of any deductions or recoveries made or proposed to be made from the contract or raise any dispute, the contractor shall forthwith give notice in writing of his claim, or dispute to the **The ARO, DAV Institutions UP Zone-A, C/O DAV Public School, Sector-18 Indira Nagar, Lucknow (U.P.)-226016** and endorse a copy of the same to the Architect, within 30 days from the date Of disallowance thereof or the date of deduction or recovery. The said notice shall give full particulars of the claim, grounds on which it is based and detailed calculations of the amount claimed and the contractor shall not be entitled to raise any claim nor shall the Bank be in any way liable in respect of any claim by the contractor unless notice of such claim shall have been given by the contractor to the **ARO, DAV Institutions UP Zone-A, C/O DAV Public School, Sector-18 Indira Nagar, Lucknow (U.P.)-226016** in the manner and within the time as aforesaid. The contractor shall be deemed to have waived and extinguished all his rights in respect of any claim not notified to the **ARO, DAV Institutions UP Zone-A, C/O DAV Public School, Sector-18 Indira Nagar, Lucknow (U.P.)** in writing in the manner and within the time as aforesaid.

- ii) **The Assistant Regional Officer, D.A.V School** shall give his decision in writing on the claims notified by the contractor. The contractor may within 30 days of the receipt of the decision of **The Assistant Regional Officer, D.A.V School** submit his claims to the conciliating authority namely the **Dy. Regional Officer, D.A.V School**, for conciliation along with all details and copies of correspondence exchanged between him and the **Regional Officer, D.A.V School**.
- iii) If the conciliation proceedings are terminated without settlement of the disputes, the contractor shall, within a period of 30 days of termination thereof shall give a notice to the concerned **Dy. Regional Officer** of the D.A.V Public School for appointment of an Arbitrator to adjudicate the notified claims failing which the claims of the contractor shall be deemed to have been coconsidered absolutely barred and waived.
- iv) Except where the decision has become final, binding and conclusive in terms of the contract, all disputes or differences arising out of the notified claims of the contractor as aforesaid and all claims of the Bank shall be referred for adjudication through arbitration by the sole Arbitrator appointed by the **Assistant Regional Officer, D.A.V School** . It will also be no objection to any such appointment that the Arbitrator so appointed is a Bank officer and that he had to deal with matter to which the contract relates in the course of his duties as Bank officer. If the Arbitrator so appointed is unable or unwilling to act or resigns his appointment or vacates his office due to any reason whatsoever another sole Arbitrator shall be appointed in the manner aforesaid by the said **Assistant Regional Officer, D.A.V School**. Such person shall be entitled to proceed with the reference from the stage be entitled to proceed with the reference from the stage at which it was left by his Predecessor.

It is a term of this contract that the party invoking arbitration shall give a list of disputes with amounts claimed in respect of each dispute along with the notice for appointment of arbitrator. It is also a term of this contract that no person other than a person appointed by such **Assistant Regional Officer, D.A.V School** as aforesaid should act as Arbitrator.

The conciliation and arbitration shall be conducted in accordance with the provisions of the Arbitration & Conciliation Act 1996 or any statutory modification or re-enactment thereof and the rules made there under.

It is also a term of the contract that fees, Travelling, lodging, etc, or any such expenses on account of Arbitration, payable to the arbitrator, shall be paid equally by both the parties. However, no fees will be payable to the arbitrator if he is a Bank officer.

It is also a term of the contract that the arbitrator shall be deemed to have entered on the reference on the date he issues notice to both the parties calling them to submit their statement of claims and counter statement of claims. The venue of the arbitration shall be such place as may be fixed by the arbitrator in his sole discretion. The fees, if any, of the arbitrator shall, if required to be paid before the award is made and published, be paid half and half by each of the parties. The cost of the reference and of the award (including the fees, if any of the arbitrator) shall be in the discretion of the arbitrator who may direct to any by whom and in what manner, such costs or any part thereof, shall be paid and fix or settle the amount of costs to be so paid.

7. SPECIAL CONDITIONS OF CONTRACT (ANNEXURE 4)

7.1. Location of Site

The site is located at Sector-18, Indira nagar, Lucknow (U.P)

7.2. Dimensions and Levels

All dimensions and levels shown on the Drawings shall be verified by the Contractor on the site and he will be held responsible for the accuracy and maintenance of all dimensions and levels.

7.3. Notice of Operation:

- a) The Contractor shall not carry out important operation without the consent in writing of the Employer/ Project Management Consultant.
- b) If it is found that the two or more persons who are connected with one another either financially or as principal and agent or master and servant have tendered separately under different names, for the same worked without disclosing their relation, the tender will be cancelled. Any contract if entered into, under such conditions, will also be cancelled at any time during its currency and earnest money will be forfeited.

7.4. Programme of Works and Method of Construction:

In pursuance of General Condition of Contract, the contractor on starting the work shall furnish to the Architect/ARCHITECT a program for carrying out the work stage by stage in the stipulated time. Bar chart etc. on individual work shall be maintained showing the progress week by week. The contractor shall submit to the Project Management Consultant a weekly progress report stating the number of skilled and unskilled labours employed on the works, working hours done, quality of cement used, place, type and quality/quantity of work done during the period.

7.5. Assistance for Employer/Architect/ Project Management Consultant:

The Contractor shall provide for the Employer/Architect at all times during the Contract including Defects Liability Period a ARCHITECT and/or all such other men as he 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 Architect.

7.6. Construction Records

The Contractor shall keep and supply to the Employer/ Project Management Consultant full and accurate records of the dimensions and positions of all new work and any other information necessary for the Project Management Consultant to be able to prepare complete drawings recording details of the works as constructed.

7.7. Safety of adjacent Structures of Works:

- a) The Contractor shall provide and erect to the approval of the Employer/Architect/ Project Management Consultant such supports as may be required to protect efficiently all structures or works which may be endangered by the execution of the works or otherwise take such permanent measures as may be required by the Project Management Consultant to protect the structures or Works. The Contractor will be allocated an area for his plant, stores, compound workshop and site offices and within the site.
- b) **Work at Night:** If the contractor is required to work at night and/or on Sundays and holidays in order to complete the work within the time schedule the contractor shall provide and maintain at his own cost sufficient lights to enable the work to proceed satisfactorily without danger. Approaches to the site also shall be sufficiently lighted by the contractor. No extra

payments will be made for night work. Prior intimation and approval should be taken from Employer through Architects/ ARCHITECT in this regard.

c) Reporting of accidents to labour

The contractor shall be responsible for the safety of persons employed by him on the works and shall report accidents to any of them whenever and wherever occurring on the works, to the employer who shall make every arrangement to render all possible assistance. This shall be without prejudice to the responsibility of the contractor under the insurance clause of the general conditions of contract.

7.8. Requisition of Materials:

The Bills of Quantities shall not be used as a basis for quantities of materials and the Contractor is entirely responsible for assessing the quantities of materials to be ordered. The employer is not bound to supply of any materials and EMPLOYER may reset the requisition of materials.

7.9. Power, Water & Other facilities:

The Contractor shall be responsible to provide within the scope of work all facilities necessary for performance of the work including (but not limited to) water, power, transportation, labour, tools, construction and testing equipment and machinery and land at or about the job site (s) for the Contractor's field offices, godowns, workshops and residential accommodation for Contractor's staff, quarry rights for raw material, borrow areas, access roads, and right (S) of way to or about the job site (s) and Contractor's office, godown, workshop accommodation, quarries and/or borrow area.

The EMPLOYER does not warranty or undertake the provision of any facility aforesaid or otherwise whatever to the Contractor, or assistance in 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 obligations 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.

Any assistance which the EMPLOYER renders to the Contractor in terms hereof or otherwise relative to the work by provision of any facility, water, power etc. as above shall not for any cause afford a basis or defence to the Contractor for any of his obligations under the contract, nor ground for extension of time for completion.

7.10. Procurement of materials:

a) The Contractor shall procure all materials by his efforts and at his own cost.

The Contractor shall not remove any cement from the site without a written authority of the Project Management Consultant on completion of the works. The contractor shall obtain the instructions of the controlling Authorities as to how the surplus materials if any, is to be disposed off.

b) Cement storage:

The Contractor shall at his own cost erect and maintain a cement storage shed on the site having water tight walls and roof. The shed should be capable of storing twenty tones (400 bags) of cement.

7.11. Temporary Services:

The Contractor shall provide and maintain all temporary services on or about the site including providing Tower cranes; hoists for material movements required for the execution of the works and shall remove them on completion as decided by Architect/ Project Management Consultant.

7.12. 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.

7.13. Keeping Site Clean and clearer:

During the progress of the works and when directed by the Architect/ Project Management Consultant the Contractor shall keep the site clear of all rubbish and debris including that which may be deposited on the site by any sub-contractors 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 expense 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 a workman like condition. In case of failure by the contractor, the employer under the advice of Architect/ Project Management Consultant will have the right to get the site cleared at the risk and cost of the contractor to the satisfaction of the Architect/ ARCHITECT/Employer.

7.14. Office Accommodation store for Contractor, Employer and Project Management Consultant on the site.

- a) The Contractor shall erect and maintain entirely at his own expense offices for the Project Management Consultant, the Architect's representatives and for his own staff respectively at such places as the Architect shall indicate. These offices shall be provided by the contractor with furniture and light, toilet facilities etc.
- b) The Contractor shall provide for all necessary storage on the site in a specified area for all materials such as timber, cement, lime and such other material, which are likely to deteriorate by exposure to sun or rain. All such stores shall be cleared away and the ground left in good and proper order on completion of this contract; unless otherwise expressly mentioned herein.
- c) All materials which are stored on the site such as bricks, metal, sand etc. shall be stacked in such a manner as to facilitate rapid and easy checking of quantities of such materials.

7.15. Lighting for Works

The Contractor shall at all times provide approved lighting as required for the proper execution and supervision of the works at his own cost.

7.16. Labour Hutments

The contractor shall not be allowed to put up any hutments/temporary structures for accommodating his labour/staff. He shall be required to make his own arrangement elsewhere at his own cost. However, if local authorities so permit and subject to the Contractor arranging for such permission, some space at site which will not come in the way of the permanent construction, temporary construction facilities and offices may be provided to the Contractor at the discretion of the Employer for purely temporary bachelor accommodation or essential/core staff engaged on Emergency or essential services round the clock like security, fire fighting, concrete laying and curing with proper sanitary facilities.

7.17. Works Diary

The Employer shall keep a diary/Register on the site in which all his remarks, instructions, decisions and the essential details, of the work shall be recorded. The Contractor shall assist in keeping the diary by supplying daily information on the works as required by Employer/Architect/ Project Management Consultant.

7.18. Progress Report:

The Contractor shall submit regular weekly progress reports to the Employer/Architect / Project Management Consultant in a form as required by him which shall also include progress photographs of the works.

In addition, the contractors shall maintain site records/registers etc. as required and directed by the Architect/ARCHITECT/Employer.

7.19. Site Meetings:

Progress and quality evaluation meetings will be held at the site every week. The Contractors' senior representative-in-charge of the project along with his site-in-charge and other staff as required participating in these meetings and ensuring all follow up actions.

7.20. Return of Plant:

The Contractor shall supply to the Employer a monthly return showing full particulars on a form, to be approved by him of the items of plant including location and state of each and the sections of the works on which they are employed. This return is to be presented on the 10th day of each month.

7.21. 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 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 the works. A copy of all such information passed on shall be given to the Project Management Consultant.
- b) Measurement to be recorded before work is covered up:

The contractor shall take joint measurements with the ARCHITECT's representative 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.

c) Typographic or clerical errors

The Architect's clarifications regarding partially omitted particulars or typographical or clerical errors shall be final and binding on the Contractor.

7.22. Items not covered

- a) If any item of work is ordered to execute which is not covered in the contract it will be paid for through deriving from analogous item of the contract and if such item is not available then as per valuation that would be derived on the basis of the actual cost of the materials and labour incurred in carrying out the said work, as specified and directed by Employer/Architect/ARCHITECT and as determined by the Employer, plus **15%** (Fifteen percent) to allow for Contractor's profit and overhead and other related costs.
- b) Any work not carried out as per drawings issued for Execution and Specification and/or instructions or is defective in the opinion of the Architect/ARCHITECT shall be demolished and replaced by new work by the contractor to the satisfaction of the architect and/or consulting Engineer. If the Architect may allow such work to remain the contractor shall accept a reduction in the rate quoted by him and/or reduction in the total cost of such works as will be assessed and decided upon by the architect. The architect's decision in this matter shall be final and binding to parties, contractor and employer.

7.23. Contract Rates:

The Contract prices and variation rates shall remain firm till final completion of the work and shall be deemed to include all labour, materials, use of plant tools, temporary works and buildings, etc. insurance, sales tax, works contract tax, VAT, local taxes and duties establishment charges, overhead, profit, supervision, transport, sampling, testing, shop drawing and other charges and

every expense incurred in the proper and due execution, completion and maintenance of the works (**No escalation will be paid**), and shall be in full satisfaction and discharge of every obligation and imposed upon him by the contract and nothing extra shall be payable unless so specifically stated in this contract.

7.24. Time of Completion & Progress of Works:

The whole of the work as stipulated shall be completed within the stipulated time period starting from the date of the written order by the Employer to commence the work. The work shall generally be preceded in accordance to agreed program of works. Time is the essence of the contract and the works must be completed within the time schedule as indicated in the appendix to the Tender. Any tender which disagrees with time schedule of construction and stipulates a longer period is liable to be rejected.

The Contractor shall take all special steps he thinks might be necessary to complete the work in the stipulated time including any special plant, equipment, additional quantity of shuttering and other materials, labour etc. and give detailed and specific indication of the same in his tender submission and include the cost thereof in his quoted rates.

7.25. Statutory Obligations, Notice, Fees and Charges:

- i)
- a) The Contractor shall comply with and give all notices required by any act, any instrument rule or order made under any Act, or of any regulation or bylaw of Municipal Corporation and other any local body or authority or of any agency which has any jurisdiction with regard to the works or with whose systems the same we are or will be connected (all requirements to be complied with being referred to in these Conditions as the statutory requirements)
- b) If the Contractor shall find any divergence between the statutory requirements and all or any of the contract documents or any variation instruction issued in accordance with these Conditions, he shall immediately give to the Employer/Architect a written notice specifying the divergence.
- c) If the Contractor gives notice under paragraph (b) of this sub-clause or of Employer /Architect shall otherwise discover or receive notice of a Divergence between the statutory requirements and all or any of the contract documents or any variation instructions issued in accordance with these conditions, the Employer shall within 7 days of discovery or on receipt of a notice issue instructions in relation to the divergence.
- d) If in any emergency compliance with paragraph (a) of this sub-clause requires the Contractor to supply materials or execute work before receiving instruction under paragraph (c) of this sub-clause the Contractor shall supply such limited materials and execute such limited work as are reasonably necessary to secure the statutory requirements.
- e) The Contractor shall forthwith inform the Employer/ Architect/ Project Management Consultant of the emergency and of the steps that he is taking under this paragraph of these conditions.
- f) Work executed and materials supplied by the Contractor under sub-paragraph (i) of this paragraph shall be deemed to have been executed and supplied pursuant to Employer instruction in accordance with these Conditions provided that the emergency arose because of a divergence between the statutory requirements and all or any of the documents referred to in these Conditions or any variations, instructions issued in accordance with these Conditions.
- g) Provided that the contractor complies with paragraph (b) of this sub-clause, the Contractor shall not be liable to the Employer under this Contract if the works do not comply with the statutory requirements from the Contractor having carried out work in accordance with the documents referred to these Conditions.

- (II) The Contractor shall pay and indemnify the Employer against liability in respect of any fees or charges (including any rates or taxes) legally demandable under any Act, any instrument rule or order made under any Act, law or any regulation or below of any local authority or of any statutory or agency in respect of works.
- (III) It will be the contractor's sole responsibility and obligation to arrange for blasting license from the relevant authorities, if the excavation requires blasting. The contractor will have to store the blasting powder in a suitably constructed store as per regulation of the explosive department and local bodies.

7.26. Materials and Workmanship to be best of the respective kind

- i) All materials, goods and workmanship shall as far as procurable be the best of the respective kinds and standards described in the Contract.
- ii) The Contractor shall upon the request of the Employer/ Architect/ Project Management Consultant furnish him with documentation to prove that the materials and goods comply with sub clause (1) of this condition.
- iii) The Employer may issue instructions in regard to the removal from the site of any work, materials or goods which are not in accordance with this Contract. In case the Contractor fails to do so in accordance with the time schedule laid down by the Employer, then the Employer will be at liberty to have these material moved out at the expense of Contractor. Ruling of Employer in this regard will be final and binding under the advice of the Architect.

7.27. Samples:

- a) 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 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 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/ Project Management Consultant shall check the samples and give his comments and/or approval to the same. Only when the samples are approved in writing by Employer he shall proceed with the procurement and installation of the same. The approved samples shall be signed by the 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 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 to the account of the Contractor.

b) Testing of concrete:

The Contractor shall make his own arrangement for testing of the concrete cubes from time to time as required by the ARCHITECT/Architect and all the cost of testing and conveyance shall be borne by the Contractor. At least 6 cubes of 6" x 6" x 6" per 1000 C.ft. of R.C.C. work must be taken as directed and tested. The ARCHITECT/Architect/Employer reserves the right to test the concrete at the cost of the contractor in the event of the contractor failing to do so.

c) Testing of work and materials:

The Contractor shall if required by the Project Management Consultant, arrange to test materials/proportions of the works at his own cost in order to prove their soundness and quality.

If after any such test the work is found, in the opinion of the Architect, to be defective or unsound, the contractor shall pull down and re-erect the same at his own cost.

d) Treasure trove:

Should any treasure, fossils, minerals, or works of art of antiquarian interest be found during excavation or while carrying out works, the same shall be the property of the employer. The contractor shall give immediate notice to the Architect of any such discovery and shall hand over any such treasure to the employer on demand.

7.28. Approved Makes:

The specifications provide a list of approved makes of some materials specified. 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 and the Contractor shall propose alternative materials and if found suitable these shall be approved by the Employer for construction.

7.29. Dismissal of Undesirable Persons:

The Employer may issue instructions requiring the dismissal from the works of any person employed thereon without assigning any reason. The decision of Employer in this regard will be final and binding.

7.30.

a) Access to the Works

The Employer/Employer's representative, Architect /Architect's Representative, Project Management Consultant/representatives and their nominees shall at all reasonable times have access to the works and to the workshops or other places of the Contractor or his sub-contractors/suppliers where work is being carried out for the Contract. When work is to be so carried out in workshops or other places of a sub-contractor the Contractor shall by a term in the sub-contract incorporate a similar right of access to those workshops or places for the Employer and their nominees and shall do all things reasonably necessary to make such right effective.

b) Facilities to other contractors:

The Contractor shall give full facilities and cooperation to all other contractors working on site such as, plumbing, electrical, lift erection etc. as directed by the Architect/ Project Management Consultant and shall arrange his program of work so as not to hinder the progress of other works. The decision of the architect/ Project Management Consultant on any point of dispute between the various contractors shall be final and binding on all parties concerned.

7.31. Employer/Architect's Instruction:

- i) The Contractor shall forthwith comply with all instructions issued to him by the Employer/Architect/ Project Management Consultant in regard to any matter in respect of which the Employer/Engineer expressly empowered by these Conditions to issue instructions. If within seven days after receipt of a written notice from the Employer/Architect/ Project Management Consultant 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.
- ii) All instructions issued by the Employer/Architect/ Project Management Consultant shall be issued in writing. However any instruction issued orally shall be given immediate effect and shall be confirmed in writing by the Architect within three days.

7.32. Liquidated Damages:

If the Contractor shall fail to complete the works within the stipulated period of completion mentioned herein above, the Contractor shall be liable and shall pay to the Employer as pre-estimated damages at the rate indicated in the APPENDIX TO FORM OF TENDER. In case the non-completion is limited to certain items disciplines/sections which is not preventing the Employers to occupy and use the building effectively s decided by the Employer then the damages shall be limited to 200% of the cost of the particular item/discipline/section subject to the ceiling as indicated before.

7.33. Termination:

In the event of the Contractor failing to complete the works within the stipulated period of completion as mentioned hereof, the Employer may, notwithstanding anything contained to the contrary in the contract, terminate at any time the contract without being liable in any manner whatsoever to the Contractor, by giving 30 days notice in writing to the Contractor and proceed to complete or get completed the works which have remained incomplete/not done at the time of such termination at the risk and cost of the Contractor.

7.34. Contract Price

The contract prices as indicated in accepted tender value and as detailed in priced bill of quantities shall govern this aspect of the contract.

7.35. Preparation of building works for occupation and use on completion:

On completion of the work, the contractor shall inform the ARCHITECT/Architect in writing that he has finished the work and it is ready for the inspection. He will leave the entire possession of site neat and clean and ready and to the satisfaction of the Architect.

7.36. All the work shall be carried out as per the detailed drawings and architect's instruction and in stages as desired by the architect.

8. CONTRACTORS LABOUR RULES – REGULATION (ANNEXURE 5)

8.1. 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 Government and other local authorities and any other enactments, notifications and acts that may be passed in future either by the State or the Central Government 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 mentioned in Annexure A-I. 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.

8.2. Fair Wages:

- 8.2.1. The Contractor shall pay the labourers engaged by him on the work not less than fair wage which expression shall mean, whether for time or piecework, the respective rates of wages fixed by the local authorities as fair wages for the area payable to the different categories of labourers or those notified under the Minimum Wages Act for corresponding employees of the Employer, whichever may be higher.
- 8.2.2. 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.

8.3. Notices:

- 8.3.1. 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.

8.4. 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 Government of India, or such other authorized person appointed by the central or State Government and the same shall include the following particulars of each worker :

- 8.4.1. Name, worker's number and grade;
- 8.4.2. Rate of daily or monthly wage;
- 8.4.3. Nature of work on which employed;
- 8.4.4. Total number of days worked during each wage period;

- 8.4.5. Total, amount payable for the work during each wage period; All deductions made from the wage with details in each case of the ground for which the deduction is made;
- 8.4.6. Wage actually paid for each wage period.
- 8.4.7. The Contractor shall provide a Wage Slip for each worker, employed on the Works.
- 8.4.8. The Wage records and Wage Slips shall be preserved for at least 12 months after the last entry for Inspection of Wage Records.
- 8.4.9. The Contractor shall allow inspection of the aforesaid Wage Records and Wage Slips to the Architect/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.
- 8.4.10. 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 sub-contractor in regard to such provision.
- 8.4.11. No party shall be represented by a legal practitioner in any investigation or inquiry under this Clause, unless Architect/Employer agree otherwise.

8.5. 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 ladder shall be given an inclination not steeper than $\frac{1}{4}$ to 1 ($\frac{1}{4}$ horizontal and 1 vertical)
- 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 the 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 off 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.

OTHER SAFETY MEASURES

- vii) 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.
- viii) 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.

EXCAVATION & TRENCHING

- ix) 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.
- x) 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 defence 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.

DEMOLITION

- xi) 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 flood, roof or other part of the building shall be so overloaded with debris or materials as to render it unsafe.

PERSONAL SAFETY EQUIPMENTS

- xii) All necessary personal safety equipment as considered adequate by the 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.
 - a) Workers employed on mixing asphaltic materials, cement and lime mortars shall be provided with protective footwear and protective goggles.
 - b) Those engaged in white washing and mixing or stacking of cement bags or any material which is injurious to the eyes shall be provided with protective goggles.
 - c) Those engaged in welding works shall be provided with welder's protective eyesight lids.

- d) Stone breakers shall be provided with protective goggles and protective clothing and seated at sufficiently safe intervals.
- e) 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.
- f) 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:
 - g) No paint containing lead or lead products shall be used except in the form of paste or readymade paint. Paints like vinyl and epoxies having toxic fumes should be applied after following all precautions laid down by manufacturers.
 - i) 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.
 - ii) 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.
- xiii) 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 prompt 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.

HOISTING MACHINES

- xiv) Use of hoisting machines and tackle including their attachments anchorage and supports shall conform to the following standards or conditions:
 1.
 - a) These shall be of good mechanical constructions sound material and adequate strength and free from patent defect and shall be kept 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.
 2. 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.
 3. 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.
 4. In case of departmental machines, the safe working load shall be notified by the Engineer. As regards contractor's machines, the contractor shall notify the safe working load of the machine to the Engineer whenever he brings any machinery to site of work and get it verified by the Engineer concerned.
- xv) 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.

- xvi) 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.

- xvii) 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.
- xviii) 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.
- xix) Notwithstanding 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.

8.6. **First Aid:**

At every workplace, there shall be maintained in a readily accessible place first aid appliances including an adequate supply of sterilized dressings and sterilized cotton wool as prescribed in the Factory Rules of the State in which the work is carried on. The appliances shall be kept in good order and, in large workplaces; they shall be placed under the charge of a responsible person who shall be readily available during working hours.

At large workplace, 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. Where large workplaces are remotely situated and far away from regular hospitals, an indoor ward shall be provided with one bed for every 250 employees.

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

At large workplace, there shall be provided and maintained an ambulance room containing the prescribed equipment and in the charge of such medical and nursing staff as may be prescribed. For this purpose, the relevant provisions of the Factory Rules of the State Government of the area, where the work is carried on, may be taken as the prescribed standard.

8.7. **Accommodation for Labour:**

The Contractor shall during the progress of the Work provide, erect and maintain necessary temporary living accommodation and ancillary for labour at his own expenses to the standards and scales as approved by the Engineer.

8.8. **Drinking Water:**

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

Where drinking water is obtained from an intermittent public water supply, each workplace shall be provided with storage where drinking water shall be stored. Every water supply storage shall be at a distance of not less than 15 meters from any latrine, drain or other source of pollution. Where water has to be drawn from an existing well, which is within such proximity of latrine, drain or any other source of pollution, 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-proof 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.

8.9. Washing and Bathing Places:

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

8.10. Latrines and Urinals:

Except in workplaces provided with water/flushed latrines connected with a water borne sewage system, all latrines shall be provided with receptacles on dry-earth system which shall be cleaned at least four times daily and at least twice during working hours and kept in a strictly sanitary condition. Receptacles shall be tarred inside and outside at least once a year.

Regulation 6 - Payment of Wages

- i) Wages due to every worker shall be paid to him direct. All wages should be paid in current coins or currency or in both.
- ii) Wages of every worker employed on the Contract shall be paid where the wage period is one week, within THREE days from the end of the Wage period, and in any other case before the expiry of the 7th day or 10th day from the end of the wage period according as the number of workers does not exceed 1,000 or exceeds 1,000.

NOTE: The term "Working Day" means a day on which the work on which the labour is employed is in progress.

Regulation 7 - Register of Workmen:

A register of workmen shall be maintained in the Form appended to the regulations and kept at the work site or as near to it as possible, and relevant particulars of every workman shall be entered therein within THREE days of his employment.

Regulation 8 - Employment Card:

The Contractor shall issue an employment card in the Form appended to these regulations to each worker on the day of work or entry into his employment. If a worker already has any such card with him issued by the previous employer, the Contractor shall merely endorse that Employment Card with relevant entries. On termination of employment, the Employment Card shall again be endorsed by the Contractor and returned to the worker.

Regulations 9 - Register of Wages, etc.:

- i) A Register of Wages cum Muster Roll in the Form appended to these regulations shall be maintained and kept at the Work Site or as near to it as possible.
- ii) A wage slip in the form appended to these regulations shall be issued to every worker employed by the Contractor at least a day prior to disbursement of wages.

11. TECHNICAL SPECIFICATIONS

I. CIVIL WORKS

SECTION – III

BRICK MASONRY WORK

1.0 INDIAN STANDARDS

Work shall be carried out to Indian Standards and Code of Practices. In absence International Standards shall be followed. These shall be latest issue. List given hereunder is not to be considered as conclusive and is for reference and guidance only. Any discrepancies/conflict noticed shall be directed to the PM for his direction/approval. However as a general rule more stringent specification shall take precedence.

- | | | |
|-----|---------|--|
| (1) | IS 226 | Specification for Structural steel standard quality |
| (2) | IS 269 | Specification for 33 grade OPC |
| (3) | IS 1077 | Specification for common burnt clay building bricks |
| (4) | IS 2116 | Specification for sand for masonry mortars |
| (5) | IS 2212 | Code of practice for brick work |
| (6) | IS 2250 | Code of practice for preparation and use of masonry mortars. |
| (7) | IS 8112 | Specification for 43 grade OPC |
| (8) | SP 27 | Handbook of method of measurement for building works. |

2.0 MATERIALS

2.1 Bricks (CLASS 150 AS PER U P, L N V)

2.1.1 Bricks shall be sound, hard, well-burnt, uniform in size, shape and colour, homogeneous in texture, giving a metallic ringing sound, free from flaws, cracks, holes, lumps or grit and arises should be square, straight and sharply defined. They shall not break when struck against each other and dropped flat from a height of 1 m to the ground. They shall conform to IS 1077 giving classes of common burnt clay bricks. One sample brick shall be tested as per IS 3495 prior to approval by the Incharge/Architect.

2.1.2 Bricks shall be as specified and detailed in the BOQ. It shall to be approved prior to procurement. Bricks shall be obtained from an approved source and shall be of uniform colour, size, shape. Bricks shall have smooth rectangular faces with sharp straight right angle edges. Maximum absorption shall not be more than 20% of its dry weight on immersion in water for 24 hours. Minimum crushing strength shall be 75 kg/sq.cm (EQUIVALENT TO CLASS 150 BRICK WORK AS PER U P, L N V) if not specified in the BOQ.

2.1.3 Bricks of approved quality and quantity shall have to be procured by the contractor at the desired time. No delay or extra cost due to non-availability shall be accepted. The contractor is obliged to carry out the work as specified. It shall be the responsibility of the contractor to procure sufficient quantities of bricks and stack them at site or elsewhere to avoid delays.

2.2 Mortars

2.2.1 Mortars for masonry shall be prepared in accordance with ARE 2250 code of practice for preparation and use of masonry mortars.

2.2.2 Cement

Cement used shall be ordinary Portland cement conforming to IS and shall be of grade 43.

2.2.3 Water

Water used for masonry shall be clean and free from injurious amounts of deleterious materials.

2.2.4 Fine aggregate (sand)

2.2.4.1.1 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 coarse sand (coarse sand FM above 2.25 & Fine sand F M more than 1.25) shall conform 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.

2.2.4.2.1 Sea sand should not be used unless approved by the In charge/Architect. If approved, the required treatment shall be done at the contractor's cost.

2.2.4.2 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 or durability of concrete or mortar. Also it should not contain any material liable to attack the steel reinforcement.

2.2.4.2.1 When tested as per IS 2386 Part I and Part II, fine aggregate shall not exceed permissible quantities of deleterious materials as given in IS 383 "Limits of Deleterious materials (aggregates)".

2.2.4.2.2 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.

2.3 Metal reinforcement

Metal reinforcement used in brick masonry shall conform to the following Indian Standard Specifications.

- a) IS 226 Specification for steel standard quality
- b) IS 412 Specification for Expanded metal steel sheet for general purpose.
- c) IS 432 Specification for Mild steel and Medium tensile steel bars
- d) IS 1566 Specification for Steel fabric or hard drawn steel wire.

3.0 MORTAR

3.1 Mortar 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 mortar shall be done by mechanical mixers only. Hand mixing may be permitted in specified cases on the written permission of the Incharge/Architect.

3.2 Mortars shall be specified by proportion. Volumetric mixing shall be based on dry volumes of each ingredient. For convenience, measurement shall correspond to volume of one cement bag i.e. 0.035 cum. Boxes shall be of size 40x35x25 cm. These shall be marked as mortar mixing or mechanical mixing proportions shall be done with the use of these boxes.

- 3.3 Cement mortar shall be prepared by mixing cement and sand in specified proportions. Proportioning shall be carried out as detailed above. Sand shall be added suitably to allow for bulkage if required. Bulkage 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.

4.0 WORKMANSHIP

- 4.1 IS code 2212 Code of practices recommendation shall be followed.
- 4.2 Bricks used for masonry in cement mortar shall be soaked by immersing in water or by hosing of water (so as to prevent bubbling.) at least one hour prior to start of actual laying.
- 4.3 Bricks shall be laid in English bond unless otherwise specified. Half or cut bricks shall be used only for the purpose of bond and at no other place.
- 4.4 Work shall be true to horizontal lines and perfect plumb. Vertical joints shall be truly vertical and those in alternate courses shall be in the same vertical line. Joints of each course shall be within the limit of 6 mm to 10 mm depending upon the size of bricks. Total height of 9 cm brick with 5 courses and 5 mortar joints shall be 50 cm. In no case shall joint thickness of horizontal and vertical be more than stated above. Joints should be filled to full depth and checked each time. Prior to start of work it must be noted and checked that bricks on top are full-size bricks (flat or brick on edge). To achieve this, precautions should be taken from the start of the first layer. Thickness of joints shall be so adjusted so as to have full bricks on top. Also it must be noted and checked that all horizontal joints on every floor are at the same level, so as to allow proper bonding at junctions.

Required datum levels must be established throughout the floor and only then should work start.

It is equally important to take into account levels of window sills, lintels, etc. while finalizing courses and joint thickness.

In normal practice architects do take care of these while finalizing levels, but it is difficult to expect the ideal situation at all places. In such situations, the decision of the Incharge/Architect shall be taken such as providing brick on edge, concrete sills, etc.

In addition, for convenience and speed, gauge boards of exact width shall be fixed at the edges of masonry to correct line and plumb. These boards shall be marked with course levels to achieve exact height of each course and full bricks at the top.

- 4.5 One or half brick thick wall have minimum one face in true plumb.
- 4.6 It is imperative to raise the brick work uniformly over complete Work joined together. If this is not possible, raked brick work shall be done at 45 degrees to the vertical. Tooting shall not be accepted.
- 4.7 All iron fixtures, pipe outlets, holdfasts for doors and window shall be fixed when the brick work is in progress. It must be embedded in cement mortar or concrete as specified or as directed by the In charge/Architect. Required treatment to fixtures shall be carried out prior to embedding.
- 4.8 To achieve better results and proper working, the following tools should be available with masons working at site:
1. Spirit level
 2. Wooden/Aluminium straight edge 3 m long

3. 3 metre steel tape
 4. Right angle 1/2 metre long
 5. Line and pin strings
 6. Plumb
 7. Storey rods
- 4.9 Joint thicknesses shall be provided as discussed above. Joints shall be filled to full depth before second course is laid. Frogs shall be upward at all times. Joints shall be raked back to a minimum 10 to 15 mm while the mortar is green. Surface of brick work shall be cleaned with coir string, wire brushes, etc. to keep the surface free for the next operation. All dropped and spoiled mortar, brickbats, etc. shall be cleared from the floor before work is closed for the day.
- 4.10 Protection and curing
Green work shall be protected from rains by suitable covering. Masonry in cement mortar shall be kept constantly moist on all the faces for a minimum period of ten days. The top of masonry shall be left flooded with water at close of the day.
- 4.11 Scaffolding
Scaffolding independent of brick work i.e. double scaffolding shall be provided. It should be tied to brick work or structure at suitable intervals in both directions. Two rows of planks shall be provided all around. Planks shall be at least 50 mm thick and well tied to scaffolding. Railing to the outside face shall be provided. While erecting scaffolding, the following points must be noted and closely followed:
1. Minimum number of holes in the horizontal direction. Holes shall be formed by omitting header brick.
 2. No holes in pillars under 1 metre in width.
 3. No holes near the skew backs of arches.
 4. Scaffolding must be sound and strong and easy to maintain.
 5. Holes lift must be closed while finishing the plaster.

5.0 TYPES OF BRICK WORK

- 5.1 Walls 230 mm thick or more
- 5.1.1 Walls of 230 mm thickness or more shall be constructed with approved and selected bricks. Mortar shall be as specified in the BOQ. Points discussed above shall be followed for workmanship.
Brick wall of 230 mm thickness shall be constructed from one side and one face shall be true and plumb. Thicker wall shall be constructed with masons on both faces and both the faces shall be true and plumb.
- 5.1.2 Measurements shall be in cubic meters for actual executed work. All opening and concrete work for lintels, transom/mullions shall be deducted.
- 5.2 Half brick work – plain or reinforced
- 5.2.1 115 mm thick brick work shall be called as half brick work. It shall be built by laying bricks in stretcher bond. Mortar shall be as specified in the BOQ.
These walls may be used for forming cavities or partition walls inside buildings. Brick work shall be reinforced with either of following methods:
- 1) With 8 mm dia bars, 2 bars at every third layer.

- 2) GI metal lath/ GI hoop iron 25 mm x 1.6 mm shall be used at every third layer as detailed by layer as detailed by the manufacturer.
- 3) Thin Beams of 100x150 mm high in M20 grade concrete shall be cast. Beam shall be reinforced with 2 nos. of 8 mm dia Tor bars and 6 mm dia M.s. links at 300 mm c/c. Thin beams shall be at every 1000 mm interval in height.

Embedding of reinforcement shall be done very carefully. All precautions shall be taken so that edges are not exposed. Lapping of bars and lath shall be proper and staggered.

5.2.2 Measurement shall be in square meters. Reinforcement and shuttering shall not be measured separately.

6.0 RATE

6.1 The rate shall include the cost of all the materials and labour as described in their respective items of work and for all the operations as detailed in the respective specifications for the various items of work. Brick on edge courses, cut brick corners, splays, reveals, cavity walls, shall be included in brick work for the purpose of payment.

6.2 The following operations shall be included in the rate for Brick Work:-

- a) Raking out joints for plastering or for pointing done as a separate process or for finishing joints flush as work proceeds;
- b) Preparing tops and sides of existing walls and the like for raising;
- c) Rough cutting and waste for forming gables, cores of arches, splays at caves and the likes and all rough cutting in the body of brick work, unless otherwise stated;
- d) Plumbing to angles and battered surfaces;
- e) Forming reveals to jambs where fair cutting on exposed faces is not involved;
- f) Leaving holes for pipes, etc;
- g) Building-in holdfasts, air bricks, fixing bricks, etc;
- h) Building-in ends of beams, joists, slabs, lintels, sills, trusses, etc;
- i) Forming openings and flues for which no deduction is made;
- j) Bedding wall plates, lintels, sills, roof tiles, corrugated sheets, etc., in or on walls, if not covered in their respective trade.
- k) Leaving chases of section not exceeding 50 cm in girth.
- l) Scaffolding as per clause 4.10.

SECTION – IV

PLASTERING WORK

1.0 INDIAN STANDARDS

Work shall be carried out to Indian Standards and Code of Practices. In absence International Standards shall be followed. These shall be latest issue. List given hereunder is not to be considered as conclusive and is for reference and guidance only. Any discrepancies/ conflict noticed shall be directed to the In charge /Architect for his direction/approval. However as a general rule more stringent specification shall take precedence.

- | | | |
|----|---------|--|
| 1. | IS 383 | Specification for coarse and fine aggregates for natural sources for concrete. |
| 2. | IS 412 | Specifications for expanded metal steel sheets for general purposes. |
| 3. | IS 1542 | Specifications for sand for plaster |
| 4. | IS 1661 | Code of practice for application of cement and cement lime plaster finishes. |
| 5. | IS 2402 | Code of practice for external rendered finishes |
| 6. | IS 2645 | Specifications for integral cement water proofing compound |
| 7. | SP 27 | Handbook of method of measurement of building works. |

2.0 MATERIALS

2.1 Cement

2.1.1 Cement shall be PPC conforming to IS .

2.2 Water

2.2.1 Water used for mixing and curing shall be clean, reasonably clear and free from objectionable quantities of silt, oils, alkalis, acids, salts so as not to weaken mortar.

2.2.2 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 1 of IS 456.

2.3 Sand (coarse sand FM above 2.25 & Fine sand F M more than 1.25) shall conform to IS 1542 specification for sand for plaster. For white or coloured renderings, only quartz or silica sand shall be used. For textured finishes produced by treatment of freshly applied final or finishing coat with a tool coarser, particles used shall be screened through 3.35 mm IS sieve or 2.36 mm IS sieve. For torn texture a slightly larger portion of material coarser than 4.75 mm IS sieve shall be used.

2.4 Aggregate shall conform to IS 383.

2.5.1 Integral water proofing compound shall conform to IS 2645 (specification for integral water proofing compound).

2.6 GI Chicken Mesh

GI Chicken mesh of 20 gauge as approved shall be used over junctions of concrete and masonry or two dissimilar materials about 150mm wide fixed with GI wire nails etc. as directed by the In-charge/Architect.

3. MORTARS

3.0.1 Mortars shall be prepared by mixing fine graded aggregate with cement, the lime or a combination of these in the proportion specified for respective items of work as detailed in the BOQ. Mixing or mortars shall be done by mechanical mixers only. Hand mixing may be permitted in specified cases on the written permission of the Incharge/Architect.

3.0.2 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 m. Boxes shall be of size 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.

3.1 Cement mortar

3.1.1 Cement mortar shall be prepared by mixing cement and sand in specified proportions. Proportioning shall be carried out as detailed above and shall be added suitably to allow for bulkage if required. Bulkage 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.

4.0 WORKMANSHIP

Work shall be carried out as per recommendations of code of practices IS 1661 and IS 2402.

4.1 Preparation of mortar mix

4.1.1 The material used in preparation of plastering mixes shall be measured by volume using gauge – boxes or by weight.

4.1.2 When cement is measured by weight, 1440 kg of material shall be taken equivalent to one cubic meter.

4.2 Mixing

4.2.1 Mixing shall be done mechanically. Each mortar batch shall be used within half an hour. Hand mixing if permitted as special case shall be carried out on a clean, watertight platform. The mixing operation shall be continued with addition of necessary quantity of water until a uniform appearance and consistency of mortar is obtained.

4.2.2 Cement and sand shall be mixed dry in required proportion to obtain a uniform colour and water shall then be added to get the required consistency for the plaster.

4.3 Method of plastering:

4.3.1 Surface to be plastered must be clean and free from dust, loose material, oil, grease, mortar droppings, sticking of foreign matter, traces of algae, etc. It is very important to ensure that there should not be any chance of the plaster getting debonded due to presence of materials harmful for bonding.

4.3.2 Raking out of joints is expected to be carried out along with masonry but it should be checked thoroughly so as to receive good key.

4.3.3 Walls should be sufficiently damp prior to plastering. Water from plastering mortar must not be absorbed by masonry under any condition.

4.3.4 Any unavoidable projections in masonry and concrete surfaces shall be chiseled back. Care shall be taken that surrounding surfaces are not damaged and reinforcement is not exposed.

4.3.5 Thickness of one coat should not be more than 15 mm and less than 8 mm for single coat finished plaster.

4.3.6 In case of multi coat plaster, sufficient time shall be allowed for the undercoat to harden (cured, dried and shrunk properly) before subsequent coats are applied.

4.3.7 Undercoats shall be scratched or roughened before they are fully hardened to form a mechanical key.

4.3.8 The method of application is also important and hence it is recommended that the mix be thrown on the surface rather than stuck with trowel. This increases the adhesion.

- 4.3.9 Independent double legged scaffolding free of masonry shall be provided. Scaffolding should be rigid, allowing free and safe movement on the platform and it should be at sufficient distance or height from the working areas. Scaffolding with railing gives more confidence to workers and improves the quality of work.
- 4.3.10 Actual plastering shall be undertaken only on the approval of the In charge/Architect. Plaster work should only follow the steps mentioned below:
- a. Surface must be thoroughly cleaned.
 - b. Plaster area must be provided with level dabs or sports allowing working and checking with 2-3 m straight edge. Depth of plaster must not be less than 8 mm at any point.
 - c. Required concealing services must be completed and tested.
 - d. No further cutting of masonry must be required.
 - e. masonry or concealing work must be cured and dry.
 - f. Surface must be sufficiently damp.
 - g. Plaster dabs are checked for plumb and level by the Incharge/Architect or his representative.
 - h. Joints, concealing and repairing areas must be covered with 20 gauge GI chicken mesh as per the In charge/Architect's instruction.
- 4.3.11 Corners, external or internal, shall be finished along with final coat. It is advisable to have rounded corners.
- 4.3.12 Plaster shall be cured for 14 days by wet curing except in neeru finish plaster. During this period plaster shall be protected from exposure to extremes of temperature and weather.
- 4.3.13 Plaster shall be leveled and lined by aluminum hollow section, 2-3 m long. (This will give even and leveled surface). There shall not be more than 2 mm difference in level when checked with 3 m straight edge. It is important that enough pressing and beating is done to achieve compact filling of joints and that the area is fully compacted.
- 4.3.14 Finishing of plaster may be carried out with wooden float (rand has) or trowel led smooth with sheet metal trowels as specified. Care shall be taken to avoid excessive trowelling and overworking of the wooden float.
- 4.3.15 All corners, internal or external, shall be truly vertical or horizontal. These shall be finished with a proper template to achieve best workmanship for rounding and chamfering as specified or directed.
- 4.3.16 Plaster shall be cut to correct horizontal or vertical line at the end of the day or if work requires to be suspended for any reason.
- 4.3.17 It is advisable to limit the area of plaster to 15 sq. m. to avoid cracks due to thermal movements of dissimilar material in contact, it is advisable to provide joints treated with groove or any other detail as suggested by the Architect. These joints if not specified shall be treated with 150 mm wide reinforcing chicken mesh (approved by the In charge/Architect) fixed over joints by GI nails and the area plastered.

5.0 TYPE OF PLASTER

5.1 12 mm thick ordinary cement sand plaster

Single coat cement-sand plaster with cement-sand mix in proportion of 1:4 shall be carried out over the entire area as detailed above. This shall be finished just with wooden float to give the best smooth surface possible. This may be for internal or external areas. Thickness may be from 10 to 15 mm maximum or as specified in the item or drawing.

5.2 18 to 25 mm ordinary cement sand plaster

This is the same as for the 12 mm thick single coat plaster except that this shall be carried out in two coats. Maximum thickness of the undercoat shall be 12 mm and balance in the second finishing coat. All operations remain the same and are as detailed in Clause 3.0 of this section.

5.3 Cement finished plaster

This shall be carried out in the same manner as in Clause 5.1 and 5.2 of this section for specified thickness in single or double coat. Then it shall be finished uniformly over the entire area with a paste of neat cement when the plaster has just hardened and finished smooth with a steel trowel. It shall be worked over again to achieve a smooth leveled surface. Quantity of cement applied shall be about 1 kg/sqm.

5.4 Sand face plaster

5.4.1 This shall generally be carried out on the outside face and exposed area of masonry work and concrete work. It shall be of minimum 22 mm thickness and shall be in two coats (1st coat 16 mm and 2nd coat 6 mm). The coat shall be CM 1:4 (1 cement : 4 sand). mixed with water-proofing compound 2% by weight of cement and applied as usual and surface shall be keyed.

5.4.2 The second coat shall be applied after 7 to 10 days and shall be of CM 1:4 (1 cement : 4 sand). Mortar shall be mixed with slightly coarse sand. Mix shall be worked over with 3 m gauge or wooden float to achieve an uniform surface.

5.4.3 The surface shall be allowed to harden sufficiently for sponging operation. Sponging shall be done by dipping sponge in cement water and removing fine particles and exposing large sand particles. The movement of sponge shall be such that no parches develop nor excessive material is removed from the surface. There shall not be a difference of more than 7 mm when checked with a 2 m long straight edge.

5.5 Water proof plaster

The water proofing compound shall be mixed with dry cement in the proportion by weight as specified or recommended by the approved manufacturer of water proofing compound. Mixing should be thoroughly well integrated with cement. Addition of water must not allow any slips of mixed cement.

The mix used, in general, shall be CM 1:4 (1 cement : 4 sand) and the balance application, curing, etc. remains the same as detailed above.

6.0 MEASUREMENT

6.1 Plaster work shall be measured in square meter to the second decimal place.

6.2 Thickness of plaster shall be the average depth of plaster as specified. But if extra thickness occurs due to bad quality of bricks, stones or blocks or due to bad workmanship, the repairs or extra thickness required to be carried out shall be at the cost of contractor.

6.3 a) Grooves, pattas in continuation of large areas or plaster areas shall be considered as part of the plaster and not measured separately.

b) Ceiling plaster, including ribbed beam slab shall be measured in square meters.

c) Beams and columns in continuation of masonry shall be measured in square meter.

6.4 Jambs, sills, coves, cornices, etc. shall be a part of plaster and no separate payment shall be made towards these items.

6.5 Deduction

- a) Deduction for an opening in plaster shall not be for area less than 0.5 sq. m.
- b) In case the opening area is 0.5 sq m. only 50% area shall be deducted from each face.
- c) In case the widths of door or window frames are equal to masonry, full area of opening shall be deducted.
- d) In case of openings of area above 3 sqm each deduction shall be made for opening on each face and jambs, sills, sills shall be measured.

6.6 Plaster to ceiling and walls shall be measured separately if specified in the BOQ.

7.0 RATE

- 7.1 Description of item in the BOQ. unless otherwise stated, includes, wherever necessary, conveyance and delivery handling, unloading, storing, fabrication, hoisting, all labour for finishing to required shape and size, setting, fitting and fixing in position, straight cutting and waste, return of packings and other incidental charges.
- 7.2 Levels and heights shall be as approved by the In charge/Architect.
- 7.3 Preparation of surface shall be as approved by the In charge/Architect.
- 7.4 Trimming off the projections on masonry shall be included in the price.
- 7.5 Scaffolding and working platform shall be included in the price.
- 7.6 Materials as detailed and as required to complete item as specified shall be included in the price.
- 7.7 Curing of plaster shall be included in the price.
- 7.8 Cleaning of adjacent areas, windows, door frames, etc. including masonry surface in exposed masonry work, shall be included in the price.
- 7.9 Forming grooves for joints between beams/columns and masonry etc. shall be included in the price. Any special treatment if detailed shall be measured separately as billed in BOQ.
- 7.10 Providing and fixing chicken mesh at junction of R.C.C., brick work, edges, corners, chiseled and repaired brick work prior to plaster over concealed conduit, etc. shall be as directed by the Incharge/Architect. It shall be considered as part of item and no separate charge will be payable.

SECTION – V A

DOORS - WINDOWS AND HANDRAILS TIMBER SUB FRAMES

1.0 INDIAN STANDARDS

1.1 Standard

Work shall be carried out to Indian Standards and Code of Practices. In absence International Standards shall be followed. These shall be latest issue. List given hereunder is not to be considered as conclusive and is for reference and guidance only. Any discrepancies / conflict noticed shall be directed to the In charge/Architect for his direction/approval. However as a general rule more stringent specification shall take precedence.

- | | | |
|-----|---------|--|
| (1) | IS 287 | Recommendation for maximum permissible moisture content for timber used for different purposes in different zones. |
| (2) | IS 401 | Code of practice for preservation of timber. |
| (3) | IS 733 | Specification for wrought aluminium, aluminium alloys, bars, rods, sections (for general engineering purpose) |
| (4) | IS 851 | Specification for synthetic resin adhesive for construction (non-structural) in wood. |
| (5) | IS 852 | Specification for animal glue for general wood working purposes. |
| (6) | IS 1141 | Code of practice for seasoning of timber |

2.0 MATERIAL

2.1 Timber

- 2.1.1 Timber shall be of quality as specified in BOQ and well seasoned. It shall have uniform colour, be free from defects such as cracks, dead knots, soft spongy spots and waves of injurious open shakes. Grains shall be reasonably straight. The individual hard and sound knot shall not be larger than 6 sq. cm. The aggregate area of all knots shall not exceed 0.5% area of a piece.
- 2.1.2 All timber shall be treated with chemical wood preservatives and be kiln seasoned to IS 1141 and conform to IS 287 for moisture content. Maximum permissible limit shall be +3% for average moisture content of all samples from a given lot and +5% for individual sample of the given lot. This is applicable when thickness of timber is more than 50 mm. Small size tolerance shall be + 2% and +3% respectively.
- 2.1.3 Timber used shall be treated with a 10 years guaranteed and approved anti-termite treatment. Wood work in contact with masonry of concrete shall be painted with hot bitumen coaltar before being placed in position.
- 2.1.4 Timber received at site shall be marked and stamped for approval prior to being used at site.
- 2.1.5 Sizes specified are not indicative and shall be correct finished sizes within allowable tolerances.
- 2.1.6 All timber shall be finished to required dimension and texture prior to being treated for chemical preservation.
- 2.2 All nails, screws etc. Shall be hot dip galvanized or of brass or non ferrous material.
- 2.3 Adhesives and glue shall be as per IS for exterior quality and water repellent.

3.0 WORKMANSHIP

- 3.1 Timber door windows & hand rail sub frames etc.
- 3.1.1 Timber brought at site shall be as approved by the In charge/Architect.
- 3.1.2 No timber shall be painted, tarred, oiled etc. before its inspection by the In charge/Architect. Any effort to hide the defects by plugging, painting, etc. shall render the piece to be rejected by the Incharge/Architect.
- 3.1.3 All rejected timber shall be removed at once from the site of work.
- 3.1.4 All sawing of timber shall be done in straight lines and planes of uniform thickness.
- 3.1.5 All joints shall be tongued and grooved or of the type shown in the drawings specified in the item or as directed by the Incharge/Architect. All joints shall be glued with approved adhesive.
Joints shall be strong, neat and shall fit without wedging or filling. They shall be pinned with hard wood or bamboo pins of 10-15 mm dia after the members of the frame are glued and pressed together in a suitable vice-mechanism.
- 3.1.6 Prior to joining, wood members of frame shall be planed smooth and accurate to the full depth. Rebates, roundings, mouldings, etc. as shown in the drawing shall be done before the members are joined.
- 3.1.7 All timber items shall be subjected to inspection by the In charge/Architect prior to any treatment to be carried out. No. item shall be installed unless it is approved by the Incharge/Architect.

4.0 MEASUREMENTS / RATE

- 4.1 Door sub frames shall be measured in running metres as detailed in the BOQ.
- 4.2 The price for an item shall include supply of specified quantity and type of timber, sawn, cut, joined, framed and fixed in positron including supply and fixing of approved anti-corrosive treated fixtures, straps, bolts, hold-fasts, spikes, nails, screws, etc. supplying glue, coaltar, paint and anti termite treatment. The items shall also include all materials, labour, scaffolding, use of equipment, etc.

SECTION – VI

WATER PROOFING WORK

1.0 GENERAL

Work shall be carried out to Indian Standards and Code of Practices. In absence International Standards shall be followed. These shall be latest issue. List given hereunder is not to be considered as conclusive and is for reference and guidance only. Any discrepancies/conflict noticed shall be directed to the In charge/Architect for his direction/approval. However as a general rule more stringent specification shall take precedence.

- | | | |
|----|----------|--|
| 1. | IS 269 | Specification for 33 grade ordinary and low heat Portland cement. |
| 2. | IS 383 | Specification for coarse and fine aggregates from natural sources. |
| 3. | IS 2645 | Specification for integral cement water proofing compound. |
| 4. | IS 6494 | Code of practice for water proofing of underground reservoirs and swimming pool. |
| 5. | IS 8112 | Specification for 43 grade ordinary Portland cement. |
| 6. | IS 12118 | Specification for two part polysulphide based cement: |
| | Part – I | General requirements. |
| 7. | IS 13826 | Method of Test. |
| 8. | IS 3495 | Method of Test for Burnt clay building bricks. |

1.2 Quality Assurance

1.2.1 Manufacturer's Qualification

- a) Not less than five years experience in manufacturing of membrane roofing.
 1. Obtain primary materials from single manufacturer. Manufacturer's name shall appear on containers and accessories.
 2. Provide secondary materials as required by manufacturer of primary materials.

1.2.2 Applicators Qualification

- a) Approved by manufacturer prior to execution of this Contract, with experience on at least five projects.
- b) Foreman of Field Crew: Minimum five years experience with system of waterproofing being installed.

1.2.3 Certifications

Manufacturer's certification on manufacturer's letterhead:

1. Certify system design; penetration, transition; and perimeter details; and system specification are appropriate and satisfactory for this particular project.
2. Certify products proposed for use comply with standards.
3. Certify materials ordered and supplied are compatible with each other, suited for local and purpose intended and shipped in sufficient quantity to ensure proper timely installation.

4. Certify materials have express warranty of merchantability and fitness for particular purposes of this Project.
5. Certify manufacturer has reviewed Project and will issue warranty upon successful completion of installation.
6. Certify materials shipped to site meet membrane manufacturer's published performance standards and requirements of this Specification.
7. Membrane manufacturer's approval of insulation type and method of installation.
8. Manufacturer's approval of installer.

1.3 Submittals

1.3.1 Product Data

Contractor to submit along with his proposal product data for material he proposes to use.

1.3.2 Informational Submittals

- a) Certifications specified in quality assurances
- b) Manufacturer's instructions

1.4 Waterproofing compounds

1.4.1 Waterproofing compounds shall be compendious (cement based) non-shrinking, self curing mixtures.

These shall be

- ❖ Free from sodium and chlorides
- ❖ Free from material detrimental to concrete and reinforcement.
- ❖ Able to create a membrane in one or multiple coats as per manufacturer's instruction.
- ❖ Membrane capable to prevent infiltration when applied to interior faces and ponded.
- ❖ Permeability, shear bond strength, compressive strength, volume changes meets minimum requirements of codes.

1.4.2 Accessories

All other accessories materials such as primers, bonding agents, polymers etc. shall be as recommended by waterproofing manufacturer.

1.5 Warranty

A. Special Warranty:

1. Warranty with attachments for full replacement value of completed installation signed by manufacturer, applicator and Contractor warranting against water infiltration and defects of materials and workmanship for period of ten years.
2. Provide warranty that covers labour and workmanship, including labour for access to waterproofing, for watertight warranty.
 - a) Warrant penetrations, terminations, changes of direction, and membrane.
 - b) Warranty shall include removing and reinstalling superimposed work covering waterproofing.

2.0 MATERIALS

2.1 Cement

2.1.1 Cement shall be PPC conforming to IS .

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 be tested before use to ascertain its strength, setting time, etc. In case cement has

- been stored for over 4 months or for any reasons the stored cement shows signs of deterioration or contamination, it shall be tested as per the direction of the In charge/Architect prior to use in the works.
- 2.1.2 Cement shall be stored in such locations so as to prevent deterioration due to moisture dampness. A dry and water proof shed shall be provided. Bags shall be stacked on rigid water-proof platforms about 15 to 20 cm clear above the floors and 25 to 35 cm clear 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 (FIFO), and that they permit easy access for inspection and handling.
- 2.2 Sand (coarse sand FM above 2.25 & Fine sand F M more than 1.25)
- 2.2.1 Natural sand deposited by stream or glacial agencies as a result of disintegration of rock is the best form of sand and shall be used.
- 2.2.2 Sometimes it is obtained from crushed stone screenings 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.
- 2.2.3 Sea sand shall not be used.
- 2.2.4 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 or durability of concrete or mortar.
- 2.2.5 When tested as per IS 2386 Part I and Part II, sand shall not exceed permissible quantities of deleterious materials as given in table 1 of IS 383.
- 2.2.6 Grading of sand shall conform to IS and shall fall within limits.
- 2.2.7 Sand 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 Incharge/Architect.
- 2.3 Brick bats (CLASS 150 AS PER U P, L N V)
- 2.3.1 It shall be prepared from well-burnt bricks. In no case shall under-burnt bricks be used. Flaky and elongated pieces shall be avoided. It should also be free from adherent coatings of soil or silt. Brick bats should be free from alkalies, soft fragments, organic impurities, etc. in such quantities as not to affect strength and durability of concrete.
- 2.3.2 Water absorption for the bricks after 24 hours immersion in cold water shall not exceed 15%.
- 2.4 Water
- 2.4.1 Water used for mixing and curing shall be clean, reasonably clear and free from objectionable quantities of silt, oils, alkalies, acids, salts so as not to weaken mortar, or concrete or cause efflorescence or attack the steel in RCC while curing. It shall be free of elements, which significantly affects the hydration reaction. Potable water is generally satisfactory but it shall be tested prior to use in the works.
- 2.4.2 Water tested shall be such as to prevent any deleterious materials getting mixed with it.
- 2.4.3 Water shall be tested and approved in writing by the Incharge/Architect prior to use in the works.
- 2.5 Stone tiles such as kota / shahbad shall be of best quality and free from any defects and of uniform thickness.
- 2.6 MEMBRANCE
- 2.6.1 Synthetic elastomeric polymerized semisolid liquid and forming a film on curing.
- 2.6.2 Properties shall confirm to requirement as under:

1. Material : Free from sodium and chlorines
2. Chemicals : Not detrimental to concrete or reinforcing steel.
3. Colour : Manufacturer's standard
4. Testing Standards
 - a) Water : IS 3085
 - b) High temperature stability : ASTM D-794
 - c) Abrasion : ASTM D-968/57
 - d) Salt spray test : IS 2074
 - e) Acid / Alkali resistance : Unaffected over a period of 30 days by sulphuric acid solution pH 1 and sodium carbonate solution pH 13.5
 - f) U.V. resistance : ASTM D-322
 - g) Sword hardness after one week : 50
 - h) Elongation : 20%
 - i) Impact : 25 Lb. test
 - j) Abrasion Index : 10-13

2.6.3 Accessories

Primers, bonding agents, water stops or plugs etc. as per recommendations of the manufacturer.

2.6.4 Mixes

- a) Mix materials in accordance with manufacturer's instructions
- b) Mix in clear containers
- c) Do not re-temper mix after initial set.

2.7 Delivery / Storage

All materials shall be delivered and stored at site conforming to following minimum requirements.

- ❖ Material received is approved by In charge/Architect.
- ❖ Material is in unopened container and labeled with manufacturer's name, brand name and instruction for use.
- ❖ Material received shall be along with manufacturer's certificate for quality and period of manufacture.
- ❖ Material shall be stored in dry, well ventilated and covered storage if so desired by manufacturer.
- ❖ Primers, adhesives etc. shall be as recommended by the membrane manufacturer.

3.0 SCOPE OF WORK

3.1 Work shall include supply, installation and test proprietary waterproofing systems to underground structure, terraces, toilet sunk slabs, water tanks etc. This shall be guaranteed for 10 years on Rs. 100/- stamp paper in proforma to be approved by the Incharge/Architect.

- a) Water proofing of basement including sealing of services junctions, drain points, sumps shall be as per approved box type proprietary treatment.

- b) Water proofing of terrace inclusive of grouting, sealing rainwater down takes outlets, other services outlets, junctions of walls, slab, beam, columns, parapet wall etc., where required expansion joints all as per approved terrace proprietary treatment.
- 3.2 Waterproofing of toilet sunk portions and water tanks inclusive of grouting, sealing, outlet pipes of services, junctions of slab, beams, walls and covering with protective cement sand plaster coat / screed.
- 3.3 Work shall include supply, installation and test proprietary box type system for basement and terrace system for sloped/flat roofs as approved by the In charge/Architect. This shall be guaranteed for 10 years on Rs. 100/- Stamp paper in proforma to be approved by the Incharge/Architect. Work shall conform to minimum standards specified. Systems detailed hereunder are to clarify type of water proofing system expected. Contractor is at liberty to suggest and submit equivalent system with products meeting / exceeding standards.
- 3.4 Sub Contractor / specialist shall be from the approved list and shall be approved by the In charge/Architect in writing before being employed by the Contractor.
- 3.5 The Contractor shall submit
1. Statement giving detailed brief of work he proposes to carry out.
 - a) Name of agency with his experience certificate and quantum of work carried out.
 - b) Technical Specifications
 - c) Product data sheets of material to be used
 - d) Shop drawing detailing
 - Sections coordinated with typical installation details
 - Vertical termination and sealing
 - Laps needed if any
 - Typical expansion, construction and control jointing details with minimum requirement.
 - Horizontal fixing and laying details.
 - Typical finishing arrangement.
 - Flashings if required.
 - e) Protective measures to be taken.
 - f) Installation guidance
 - g) Samples of each product in duplicate fixed over plywood boards or similar to enable proper cross sections.
 - h) Manufacturer's certificate that product and material to be used is correct and shall give intended results when applied through authorized agency.

4.0 WORKMANSHIP

4.1 Preparation of Surfaces

- a) The surfaces to receive the treatment shall be thoroughly cleaned of
 - Laitances, scales, loose material on surface.
 - Grease, oil or other contaminants by etching with 10-15% of solution of muriatic acid using commercial grade alkaline cleaner, flushing with clean water drying and vacuuming.
- b) Surfaces shall be examined and well defined cracks grouted by making 'V' groove / notches with cement slurry, shall be cured and dried well before treatment.

- c) Any honeycombs shall be carefully cut and plugged, and cured well before treatment.
- d) Examination of surface shall account for the fact that,
 - Surfaces are cured for 14 days and no condensation has taken place.
 - Horizontal and vertical surfaces have smooth finish, free from defects.
 - Surfaces are dry, clean, free of grease, oil, dirt, rust, corrosion, other coatings and contaminants which could affect bond of water proofing system.

4.2 Box Type Water proofing installation

A. Stone method

It is a proprietary method. However basic steps (given below just for guide lines) are

FLOOR

- 1) Preparation of surface by cleaning, leveling etc.
- 2) 20 mm thick cement-sand-bedding mortar 1:3 (1 cement : 3 coarse sand) mixed with water proofing powder 4% by weight of cement shall be laid on surface and 20 mm graded aggregate free from impurities shall be spread on the floor. It shall be cured for 3 days.
- 3) Provide insert socket and pipes to release the sub soil water pressure.
- 4) Then 20 mm thick rough kota or similar stones of approximate 600x600 mm in size shall be laid flat over 20mm th. 1st layer mortar and joints sealed & grouted with cement slurry mixed with WPC. This shall project 300 mm all around RCC raft.
- 5) Then the surface shall be screened with 25mm th. cement- coarse sand-1:3 mortar and finished smooth.
- 6) RCC raft, walls or masonry shall be constructed as per design and standard specification.
- 7) The sockets / pipes are grouted with pressure.
- 8) Columns or any support etc. coming out of raft shall be sealed properly with aforesaid treatment / polysulphide sealant at all levels including and at top of raft / design foundation.

WALL

When walls are fully examined and prepared as detailed above, the treatment shall be

- 1) About 20 mm thick stone slabs shall be fixed with cement slurry grout. Grout mixed with water proofing compound 4% by weight of cement and joint 20mm thick (min) are well grouted and cured properly with 1:3 (cement : 3 coarse sand) mortar mixed with WPC.
- 2) External surface shall be plastered 20 mm thick with cement sand mortar 1:4 (1 cement: 4 coarse sand) mixed with 4% by weight of water proof compound with heat cement punning mixed with WPC complete at all levels as directed by E/I Architect.
- 3) Vertical joint shall be well cleaned and grouted to make sure it forms a continuous treatment. If required joint may be treated with sealant.
- 4) Treatment shall be taken about 300 mm above finished level.
- 5) All pipes etc. coming out of walls shall be sealed by grouting with sealant.

4.3 Terrace waterproofing (Block bat coba - CLASS 150 AS PER UP, L N V)

4.3.1 Experienced water proofing specialists shall carry out the following or similar types of water proofing treatments. Terraces and roof slabs shall be treated with integral cement based waterproofing consisting of block coba concrete laid to slope. The treatment shall be taken over vertical surfaces as required / specified. Final finished surfaces may be laid with paving tiles, stones or finished smooth in cement and marked with false chequered marking. Points given below are just for guidelines. The actual steps and details shall be as per standard specifications and accordingly submitted by the contractor for approval of the Incharge/Architect. Work shall be carried out as per Indian standards approved method by the Incharge/Architect.

4.3.2 Surface preparation

The surface to be treated shall be cleaned and inspected thoroughly

- a) All minor, medium cracks shall be marked.
- b) All cracks shall be well defined and 'V' groove made. These shall be cleaned with compressed air, grouted with cement sand mortar 1:4 (1 cement: 4 sand) slurry mixed with non shrinking and waterproofing compound. Areas well cured.
- c) Then again surfaces shall be well cleaned of all loose particles, laitance, moss, oil / greasy material, cement etc.
- d) Roof areas shall be well marked with spot datums to create ridge, lines, slopes and drain points for easy draining of water (Nominal slopes shall be about 1:100).
- e) Cement sand mortar mixed in ration 1:4 along with water proofing and non-shrinking compound as specified by manufacturer shall be mixed with clean water and layer of about 20 to 30 mm laid over the entire area to be treated; then well soaked saturated block bats shall be arranged by proper placing to create required slope as per datum established. Minimum thickness at draining point shall be 75 mm.
Rain water inlet, pipes etc. shall be well grouted; edge, corners shall be well rounded (watta) by taking up treatment about 300 mm above proposed finished level.
- f) These mortar laid and bat fixed area shall be kept dipped in water for atleast 3 days.
- g) Slab and roof soffits shall be examined for dampness from under. Any leakage / dampness noticed shall be treated with pressure grouting and again checked by dipping the area for 3 days.
- h) When no dampness noticed, area shall be drained out and cement sand mortar mixed in ratio 1:4 (1 cement: 4 sand) shall be spread over the entire area and bats well grouted.
The top surfaces shall be finished to a neat horizontal datum level to achieve well defined ridges, gutters, watta etc. Edges shall be tucked in grooves in wall / parapet about 300 mm above proposed finished level.
- i) Surfaces shall be finished / prepared to receive about 40 mm thick IPS (Indian patent stone) or China mosaic etc.
- j) All expansion joints shall be cleaned, primed and finished with sealant as specified by manufacturer of sealant and approved by Incharge/Architect.

4.3.3 Products and Manufacturers

Acceptable Products:

1. Distilment DS+ MC-Bauchemie (India) Pvt. Ltd.

Nafufill – VV2

- | | | |
|----|------------------|-----------------------------|
| 2. | Formak 629 | Aqua Alliance Agencies |
| 3. | Tapecrete | CICO |
| 4. | Hydro-tight | Xypex |
| 5. | Polyakk-WP | Sunanda Speciality Coatings |
| 6. | Mastercrete M-81 | Choksey Chemicals Pvt. Ltd. |

4.4 Basement Top terrace waterproofing

4.5 Experienced water proofing specialist shall carry out the above or similar types of waterproofing treatments. Terraces and roof slabs shall be treated with integral cement based waterproofing consisting of light weight Perlite brick bat coba concrete laid to slope. The treatment shall be taken over vertical surfaces as required / specified. Final finished surfaces may be laid with flooring / paving tiles, stones or finished smooth with cement.

4.5 Points given below are just for guide lines. The actual steps and details shall be as per standard specification submitted by the contractor for approval of the Architect. Work shall be carried out as per Indian standards approved method by the Architect.

4.4.3 Surface preparation

The surface to be treated shall be cleaned and inspected thoroughly

- a) All minor, medium cracks shall be marked.
- b) All cracks shall be well defined and 'V' groove made. These shall be cleaned with compressed air, grouted with cement sand mortar 1:4 (1 cement: 4sand) slurry mixed with non shrinking and waterproofing compound. Areas well cured.
- c) Then again surfaces shall be well cleaned of all loose particles, laitance, moss, oil / greasy material, cement etc.
- d) Roof areas shall be well marked with spot datum to create ridge, lines, slopes and drain points for easy draining of water (Norminal slopes shall be about 1:100).
- e) Light weight Perlite concrete having density 450kg/Cum shall be mixed as specified by the manufacturer, with clean water and layer of about minimum 75 mm laid over the entire area to be treated; creating required slopes as per datum established. Rain water inlet, pipes etc. shall be well grouted; edge, corners shall be well rounded (watta) by taking up treatment about 300 mm above proposed finished level.
- f) 4 mm thick APP Polymer modified polyester reinforced torch on membrane (Garden Moply FP 4) of STP Texsa Ltd., 16, NGN, Vaidya Marg, Bank Street, Fort, Mumbai- 400 023 (Tel: 022 22664643, Fax: 022 22661730) or equivalent approved; is laid over light weight concrete, Control and construction joint shall be reinforced with memberane strip as specified by manufacturer. All corner joints between vertical and horizontal surfaces shall be reinforced with strip as specified by the manufacturer. Expansion joints are formed as detailed and approved by structural consultant. Drains shall be sealed with proper flashings and laps as per details approved in shop drawing.
- g) Slab and roof shall be examined for dampness from under. Any leakage / dampness noticed shall be treated with pressure grouting and again checked by dipping the area for 3 days.

- h) When no dampness noticed, area shall be drained out and cement sand mortar mixed in ratio 1:4 (1 cement: 4 sand) shall be spread over the entire area and well grouted.
The top surfaces shall be finished to a neat horizontal datum level to achieve well defined ridges, gutters, watta etc. Edges shall be tucked in grooves in wall / parapet about 300 mm above proposed finished level.
- i) Surfaces shall be finished / prepared to receive about 30 mm thick cement sand mortar screed about 30 mm thick over laid membrane and cured.
- j) All expansion joints shall be cleaned, primed and finished as per specification and grouted with sealant as specified by manufacturer of sealant and approved by Architect.

4.5 Waterproofing to water retaining structures

4.5.1 Crystalline waterproofing of Xypex or equivalent approved; waterproofing compound one / two coat shall be applied to water retaining structures.

4.5.2 Steps followed shall be as per the directions of the manufacturers and approval of the In charge /Architect. For guideline following steps may be followed.

1. Surface preparation

Clean the surface to remove dust, loose particles and laitance.

2. Apply Crystalline waterproofing compound one / two coats at specified intervals as recommended by the manufacturer on concrete / plastered surface.

3. Protect horizontal surfaces with 30 mm thick IPS 1:2:4 (1 cement : 2 sand : 4 aggregates) laid to gradient; with adding waterproofing compound 2% by weight of cement and vertical surfaces shall be plastered with cement sand mortar in a ratio of 1:4 (1 cement : 4 sand) with using 2% waterproofing compound by weight of cement.

4. Wattas and rounding of corners, junctions with walls and floors and finished smooth and cured.

5. Curing shall be done for 7 days.

4.5.3 Treatment shall be tested by ponding water about 250 mm high for 72 hours. Surfaces shall be examined for leakage seepage, dampness, sweating etc.

4.5.4 Measurements shall be in square metre for finished surface area. Rates shall include all items right from cleaning of surface to completion and testing required against defects such as leakage, seepage, dampness, sweating etc. and providing guarantee of employer's.

5.0 TESTING

5.5.1 On completion of installation and prior to next operation or as directed by Incharge/Architect work shall be tested by the Contractor. Required water shall be arranged and disposed of by the contractor at his cost.

a) All openings, drains etc. shall be plugged.

b) Water shall be flooded about 200 mm over the Sunk portion. Water shall be kept for 72 hours.

c) Surfaces shall be observed critically and incase any leakage is observed areas shall be treated again and tests to be carried out again to the satisfaction of the Incharge/Architect.

- 5.5.2 Approval of water test does not relieve the contractor of his obligation of providing installed water proofing guaranteed for 10 years as per contract.
- 5.5.3 All arrangement of material, labour etc. required including preserving and maintaining areas flooded shall be carried out by the Contractor at his cost.

6.0 GUARANTEE

- 6.1 All waterproofing systems described above are to be referred as guide-lines only. The contractor may propose the system along with his tender, giving full descriptions.
- 6.2 The system shall be guaranteed for 10 years against all defects and liabilities thereof from the date of completion of project. The guarantee shall be on Stamp Paper of Rs. 100/- in Performa to be approved by Employer / Incharge/Architect. (The contractor shall submit Performa to PM/ RE for approval of Employer before being written on Stamp Paper). The cost of Stamp Paper shall be to the contractor's account.
- 6.3 Work shall be carried through approved specialist agency as per method of working approved in writing by the In charge/Architect.

Proforma

FORM OF GUARANTEE FOR WATER PROOFING- (ON Rs 100/- NJ Stamp)- Contractor to submit **Rs 1.0 Lacs Performance Guarantee separately other than 5 % BG/FDR for 10 years for water proofing)**

Name of the Project

Free Maintenance Guarantee- Waterproofing work

By -----

We hereby guarantee that the surfaces treated by us for waterproofing in the above work for M/s.-----the general building Contractor for the above work, shall remain water tight , should however due to any unforeseen defect left out in the work carried out by us at the time of execution of the work , there be any leakage from any surface treated by us during the period of ten years from the date of virtual

Completion of the work i.e. from ----- to ----- the same shall be rectified by us without any extra cost to the -----(Name of the Bank).

Signature

II- PLUMBING WORKS – SANITARY, WATER SUPPLY, DRAINAGE & SEWERAGE

TECHNICAL SPECIFICATIONS FOR PLUMBING WORKS

GENERAL

- a) All sanitary and plumbing work shall be carried out by skilled and licensed plumbers. It shall comply by local Bye-laws, where applicable.
- b) The pipe shall be carefully cleared of all foreign matter before being laid. They shall be thoroughly brushed out internally with a well-fitted hard brush, and after laying, the open end shall be temporarily plugged to prevent ingress of water, soil etc. Precautions shall be taken to prevent flotation of the plugged pipe.

Any coating, sheathing or wrapping of the pipes shall be examined for damage and repaired, where necessary, and shall also be made continuous over the joints.
- (c) All joints shall be made properly so as to be mechanically sound and leak-proof.
- (d) Excavation and refilling shall be carried out as per specification.

The bottoms of trench excavations shall be carefully prepared so that the barrels of the pipes when laid are well bedded for their whole length on a firm surface and are true to level and gradient

In the refilling of trenches the pipes shall be surrounded with the fine selected material, well rammed so as to resist subsequent movement of the pipes. No stones shall be in contact with the pipes and when the excavation is in rock, the excavation shall be continued to 15 cm below the level required for laying pipes and subsequently brought to the required levels by filling with a layer of the fine selected materials or (especially where there is a steep gradient) on a layer of concrete.

Refilling of trenches shall not be carried out until the laying and jointing have been approved and passed by the Engineer-in-charge.

When roads have to be crossed, half the width shall be dug at a time and proper warning notices, signs and lights shall be displayed and watchmen posted to prevent the accidents.

All types of pipes, water mains, cables etc. met within the course of excavation shall be carefully protected and supported. Care shall be taken, not to disturb the electrical and communication cable, removal of which, if necessary, shall be arranged.

WATER SUPPLY

1. GENERAL REQUIREMENTS:

- (a) Any damage caused to the building, or to electric, sanitary water supply or other installations etc. therein either due to negligence on the part of the contractor, or due to actual requirements of the work, shall be made good and the building or the installations shall be restored to its original condition by the contractor.

Nothing extra shall be paid for it, except where otherwise specified.

- (b) All water supply installation work shall be carried out through licensed plumbers.
- (c) It is most important to ensure that wholesome water supply provided for drinking and culinary purposes, is in no way liable to contamination from any less satisfactory water. There shall, therefore, be no cross connection whatsoever between a pipe or fitting for conveying or containing wholesome water and a pipe or fitting for conveying or containing impure water or water liable to contamination or of uncertain quality of water which has been used for any purpose. The provision of reflux or non return valves or closed and sealed valves shall not be construed a permissible substitute for complete absence of cross-connection.
- (d) No piping shall be laid or fixed so as to pass into, through or adjoining any sewer, scour outlet or drain or any manhole connected therewith nor through any ashpit or manure-pit or any material of such nature that would be likely to cause undue deterioration of the pipe.
- (e) Where the laying of any pipe through fouled soil or pervious material is unavoidable, the piping shall be properly protected from contact with such soil or material by being carried through an exterior cast iron tube or by some other suitable means. Any piping or fitting laid or fixed, which does not comply with the above requirements, shall be removed and re-laid in conformity with the above requirements.

2. MATERIALS:

The standard size of brass or gunmetal fittings shall be designated by the nominal bore of the pipe outlet to which the fittings are attached. A sample of each kind of fittings shall be got approved from the Engineer-in-charge and all supplies made according to the approved samples.

All cast fittings shall be sound and free from laps, blow holes and pittings. Both internal and external surfaces shall be clean, smooth and free from sand etc. Burning, plugging stopping or patching of the casting shall not be permissible. The bodies, bonnets, spindles and other parts shall be truly machined so that when assembled the parts shall be axial, parallel and cylindrical with surfaces smoothly finished. The area of the water way of the fittings shall not be less than area of the nominal bore, chromium plating wherever specified shall be of 0.3 micron conforming to IS : 4827. The chromium shall never be deposited on brass unless a heavy coating of nickel is interposed. In the case of iron a thick coat of copper shall first be applied, then one of nickel and finally the chromium. In finish and appearance the plated articles when inspected shall be free from plating defects such as blisters, pits roughness and unplated areas and shall not be stained or discolored. Before fitting is plated the washer plate shall be removed from the fittings, the gland packing shall be protected from the plating solution.

(a) Galvanized Iron pipes (G. I. Pipes) :

- (i) The pipes (tubes) shall be galvanized mild steel hot finished seamless (HFS) or welded (ERW) screwed and socketed conforming to the requirements of IS : 1239 Part – I for medium grade. They shall be of the diameter (nominal bore) specified in the description of the item, the socket shall be designated by the respective nominal bores of the pipes for which they are intended.

- (ii) **Galvanizing shall conform to IS : 4736 :** The zinc coating shall be uniform adherent, reasonably smooth and free from such imperfections as flux, ash and dross inclusions, bare patches, black spots, pimples, lumpings runs, rust stains, bulky white deposits and blisters. The pipes and sockets shall be cleanly finished, well galvanized in and out and free from cracks, surface flaws laminations and other defects. All screw threads shall be clean and well cut. The ends shall be cut cleanly and square with the axis of the tube.
- (iii) **Fittings:** The fittings shall be galvanized mild steel tubular or wrought steel fittings conforming to IS: 1239 (Part – II) or as specified. The fittings shall be designated by the respective nominal bores of the pipes for which they are intended.

(b) **Full Way Valve with Wheel – Gun Metal:**

These shall be of the gun metal fitted with wheel and shall be of gate valve type opening full way and of the size as specified. These shall generally conform to IS: 778.

LAYING AND JOINTING OF WATER SUPPLY PIPES AND FITTINGS

1. UNLOADING :

- (a) The pipes shall be unloaded where they are required.
- (b) Unloading (except where mechanical handling facilities are available) – pipes weighing upto 60 kg shall be handled by two persons by hand passing. Heavier pipes shall be unloaded from the lorry or wagon by holding them in loops, formed with ropes and sliding over planks set not steeper than 45 degree. The planks shall be sufficiently rigid and two ropes shall always be used to roll the pipes down the planks. The ropes should be tied on the side opposite the unloading. Only one pipe shall be unloaded at a time.
- (c) Under no circumstances shall be the pipes be thrown down from the carriers or be dragged or rolled along hard surfaces.
- (d) The pipes shall be checked for any visible damage (such as broken edges, cracking or sapling of pipe) while unloading and shall be sorted out for reclamation. Any pipe which shows sufficient damage to preclude it from being used shall be discarded.

2. STORING :

- (a) The pipes and specials shall be handled with sufficient care to avoid damage to them. These shall be lined up on one side of the alignment of the trench socket facing upgrade when line runs uphill and upstream when lines run on level ground.
- (b) Each stack shall contain pipes of same class and size, consignment or batch number and particulars of the suppliers, wherever possible, shall be marked on the stack.
- (c) Storage shall be done on firm, level and clean ground. Wedges shall be provided at the bottom layer to keep the stack stable.

3. CUTTING :

- (a) Cutting of pipes may be necessary when pipes are to be laid in lengths shorter than the lengths supplied, such as while replacing accessories like tees, bends, etc. at fixed position in the pipe lines.
- (b) A line shall be marked around the pipe with a chalk piece at the point where it is to be cut. The line shall be so marked that the cut is truly at right angle to the longitudinal axis of the pipe.

4. TRENCHES :

- (a) The trenches shall be so dug that the pipes may be laid to the required alignment and at required depth.
- (b) Cover shall be measured from top of pipe to the surface of the ground.
- (c) The bed of the trench, if in soft or made up earth, shall be well watered and rammed before laying the pipes and the depressions, if any, shall be properly filled with earth and consolidated in 20 cm layer.
- (d) If the trench bottom is extremely hard or rocky or loose stony soil, the trench shall be excavated at least 150 mm below the trench grade. Rocks, stone or other hard substances from the bottom of the trench shall be removed and the trench brought back to the required grade by filling with selected fine earth or sand (or fine moorum if fine soil or sand is not available locally) and compacted so as to provide a smooth bedding for the pipe.

- (e) After the excavation of the trench is completed, hollows shall be cut at the required position to receive the socket of the pipes and these hollows shall be of sufficient depth to ensure that the barrels of the pipes shall rest throughout their entire length on the solid ground and that sufficient spaces left for jointing the underside of the pipe joint. These socket holes shall be refilled with sand after jointing the pipe.
- (f) Roots of trees within a distance of about 0.5 meter from the side of the pipe line shall be removed or killed.
- (g) The excavated materials shall not be placed within 1 meter or half of the depth of the trench, whichever is greater, from the edge of the trench. The materials excavated shall be separated and stacked so that in refilling that may be re-laid and compacted in the same order to the satisfaction of the Engineer-in-charge.
- (h) The trench shall be kept free from water. Shoring and timbering shall be provided wherever required. Excavation below water table shall be done after dewatering the trenches.
- (i) Where the pipe line or drain crosses an existing road, the road crossing shall be excavated half at a time, the 2nd half being commenced after the pipes have been laid in the first half and the trench refilled. Necessary safety measures for traffic as directed shall be adopted. All types, water main cables, etc. met within the course of excavation shall be carefully protected and supported. Care shall be taken not to disturb the electrical and communication cable met with during course of excavation, removal of which, if necessary, shall be arranged by the Engineer-in-charge.

5. **LAYING :**

- (a) The pipes shall be lowered into the trench by means of suitably pulley blocks, sheer legs chains ropes etc. In no case the pipes shall be rolled and dropped into the trench. One end of each rope may be tied to a wooden or steel peg driven into the ground and the other end held by men which when slowly released will lower the pipe into the trench. After lowering, the pipes shall be arranged so that the spigot of one pipe is carefully centered into the socket of the next pipe, and pushed to the full distance that it can go. The pipe line shall be laid to the levels required. Specials shall also be laid in their proper position as stated above.
- (b) Where so directed, the pipes and specials may be laid on masonry or concrete pillars. The pipe laid on the level ground, shall be laid with socket facing the direction of flow of water.
- (c) In unstable soils, such as soft soils and dry lumpy soils it shall be checked whether the soils can support the pipe lines and if required suitable special foundation shall be provided.

6. **THRUST BLOCKS :**

- (a) Thrust blocks are required to transfer the resulting hydraulic thrust from the fitting of pipe on to a larger load bearing soil section.
- (b) Thrust blocks shall be installed wherever there is a change in the direction / size of the pipe line or the pressure line diagram, or when the pipe line ends at a dead end. If necessary, thrust blocks may be constructed at valves also.
- (c) Thrust blocks shall be constructed taking into account the pipe size, water pressure, type of fitting, gravity component shell when laid on slopes and the type of soil.

7. **BACK FILLING AND TAMPING :**

- (a) Back filling shall follow pipe installation as closely as possible to protect pipe from falling boulders, eliminating possibility of lifting of the pipe due to flooding of open trench and shifting pipe out of line by caved in soil.
- (b) The initial back fill material used shall be free of large stones and dry lumps.

- (c) The initial back fill shall be placed evenly in a layer of about 100 mm thick. This shall be properly consolidated and this shall be continued till there is a cushion of at least 300 mm of cover over the pipe.
- (d) If it is desired to observe the joint or coupling during the testing of mains they shall be left exposed. Sufficient back fill shall be placed on the pipe to resist the movement due to pressure while testing.

8. HYDROSTATIC TESTS :

- (a) After a new pipe has been laid, jointed and back filled (or any valve section thereof), it shall be subjected to the following two tests :
 - (j) **Pressure test:** At a pressure of at least double the maximum working pressure-pipe and joints shall be absolutely water tight under the test.
 - (ii) **Leakage test:** (To be conducted after the satisfactory completion of the pressure test) at a pressure to be specified by the authority for a duration of two hours.
- (b) **Hydrostatic Tests:** The portions of the line shall be tested by subjecting to pressure test as the laying progresses before the entire line is completed. In this way any error of workmanship will be found immediately and can be corrected at a minimum cost. Usually the length of the section to be tested shall not exceed 500m.
- (c) Where any section of a main is provided with concrete thrust blocks or anchorages, the pressure test shall not be made until at least five days have elapsed after the concrete is cast. If rapid hardening cement has been used in these blocks or anchorages, test shall not be made until atleast two days have elapsed.
- (d) Prior to testing, enough back fill shall be placed over the pipe line to resist upward thrust. All thrust blocks forming part of the finished line shall have been sufficiently cured and no temporary bracing shall be used.
- (e) The open end of the section shall be sealed temporarily with an end cap having an outlet which can serve as an air relief vent or for filling the line, as may be required. The blind face of the end cap shall be properly braced during testing by screw jacks and wooden planks or steel plate.
- (f) The section of the line to be tested shall be filled with water manually or by a low pressure pump. Air shall be vented from all high spots in the pipe line before making the pressure strength test because entrapped air gets compressed and caused difficulty in raising the required pressure for the pressure strength test.

PROCEDURE FOR PRESSURE TEST:

1. Each valved section of the pipe shall be slowly filled with water and all air shall be expelled from the pipe through hydrants and blow offs. If these are not available at high places, necessary tapping may be made at points of highest elevation before the test is made and plugs inserted after the tests have been completed.
2. If the trench has been partially back-filled the specified pressure based on the elevation of the lowest point of the line or section under test and corrected to the elevation of the test gauge, shall be applied by means of a pump connected to the pipe in a manner satisfactory to the Engineer-in-charge. The duration of the test shall not be less than 5 minutes.
3. **Examination under Pressure:** All exposed pipes, fittings, valves, hydrants and joints should be carefully examined during the open-trench test. When the joints are made with lead, all

such joints showing visible leaks shall be recaulked until tight. When the joints are made with cement and show seepage or slight leakage, such joints shall be cut out and replaced as directed by the authority. Any cracked or defective pipes, fittings, valves or hydrants discovered in consequence of this pressure test shall be removed and replaced by sound material and the test shall be repeated until satisfactory to the Engineer-in-charge.

4. If the trench has been back-filled to the top, the section shall be first subjected to water pressure normal to the area and the exposed parts shall be carefully examined. If any defects are found, they shall be repaired and the pressure test repeated until no defects are found. The duration of the final pressure tests shall be at least one hour.

PROCEDURE FOR LEAKAGE TEST:

5. Leakage is defined as the quantity of water to be supplied into the newly laid pipe, or any valved section thereof, necessary to maintain the specified leakage test pressure after the pipe has been filled the water and the air expelled.

No pipe installation shall be accepted until the leakage is less than the number of cm³/h determined by the formula:

$$ql = ND\sqrt{P} / 3.3$$

Where ql = the allowable leakage in cm³/h.
 N = number of joints in the length of the pipe line.
 D = diameter in mm, and
 P = the average test pressure during the leakage testing kg/cm².

6. **Variation from Permissible Leakage:** Should any test of pipe laid in position discloses leakage greater than the specified in para 5 the defective joints shall be repaired until the leakage is within the specified allowance.

LAYING AND JOINTING OF CAST IRON PIPES AND FITTINGS (EXTERNAL WORK)

1. TRENCHES :

- (a) The gradient is to be set out by means of bonning rods and the required depth to be excavated at any point of the trench shall be regarded as directed by the Engineer-in-charge. The depth of the trench shall not be less than 1 meter measured from the top of the pipe to the surface of the ground under roads and not less than 0.75 meter elsewhere.
- (b) The width of the trench shall be the nominal diameter of the pipe plus 40 cm but it shall not be less than 55 cm in case of all kinds of soils excluding rock and not less than 1 meter in case of rock.

2. LAYING :

Any deviation either in plan or elevation less than 11.25 degrees shall be effected by laying the straight pipes around a flat curve of such radius that minimum thickness of lead at the face of the socket shall not be reduced below 6 mm or the opening between spigot and socket increased beyond 12 mm at any joint. A deviation of about 2.25 degree can be effected at each joint in this way. At the end of each day's work the last pipe laid shall have its open ends securely closed with a wooden plug to prevent entry of water, soil, rats and any other foreign matter into the pipe.

3. LEAD CAULKED JOINTS WITH PIG LEAD :

- (a) This type of lead caulking is generally done in providing joints in water lines wherever it is practicable to use cast lead caulking, but not in case of wet conditions.
- (b) The approximate depth and weights (min.) of pig lead for various diameters of C. I. Pipes and specials shall be as given in table below :-

LEAD FOR DIFFERENT SIZES OF PIPES

Nominal size of pipe mm.	Lead per joint Kg.	Depth of lead joint mm.
(1)	(2)	(3)
80	1.8	15
100	2.2	45
125	2.6	45
150	3.4	50
200	5.0	50
250	6.1	50
300	7.2	55
350	8.4	55

Note :

1. The quantity of lead given in the table is on average basis and a variation of 10 percent is permissible.
2. Before pipe are jointed on large scale, three a four sample joints shall be made and the average consumption of lead per joint shall be got approved by the Engineer-in-charge. Only required quantity of spun yarn shall be put so as to give the specified depth of lead in the joint.

4. LEAD CAULKED JOINT WITH LEAD WOOL YARN :

- (a) This type of lead caulking is generally done when it is inconvenient or dangerous to use molten lead for joints, for example in cases such as inverted joints or in wet trenches or in

exceptional cases. In such cases the joints shall be made with lead wool or yarn. Caulking with lead wool or yarn shall however be not carried out without the prior permission of Engineer-in-charge.

- (b) **Jointing :** The spun yarn shall first be inserted and caulked into the socket as described under jointing with pig lead. Lead wool or yarn shall then be introduced in the joint in strings not less than 6 mm thick and the caulking shall be repeated with each turn or lead wool or yarn. The whole of lead wool or yarn shall be compressed into a dense mass. The joint shall then be finally finished flush with face of the socket.

5. FLANGED JOINTS :

- (a) Cast iron pipes may be jointed by means of flanges cast on. The jointing material used between flanges of pipes shall be compressed fiber board or rubber of thickness between 1.5 mm to 3 mm. The fiber board shall be impregnated with chemically neutral mineral oil and shall have a smooth and hard surface. Its weight per m² shall be not less than 112 gm/mm thickness.
- (b) Each bolt should be tightened a little at a time taking care to tighten diametrically opposite bolts alternatively. The practice of fully tightening the bolts one after another shall not be allowed.
- (c) Several proprietary flexible joints are available for jointing cast iron pipes and these may be used with the specific approval of the authority, however, they shall be used strictly in accordance with the manufacturer's instructions.

6. MEASUREMENTS:

- (a) The net length of pipes as laid or fixed, shall be measured in the running meters correct to cm specials shall be excluded and enumerated and paid for separately. The portion of the pipe within the collar at the joint shall not be included in the length of pipe work.
- (b) Excavation, refilling, shoring and timbering in trenches masonry or concrete pillars and thrust blocks, wherever required, shall be measured and paid for separately, under relevant items of work.
- (c) Lead caulked joints shall be measured and paid for separately.

7. RATE :

The rate shall include the cost of materials and labour involved in all the operations described above except for the items measured/enumerated separately under above para which shall be paid for separately.

LAYING AND JOINTING OF G. I. PIPES (EXTERNAL WORK)

1. TRENCHES :

The galvanized iron pipes and fittings shall be laid in trenches. The widths and depths of the trenches for different diameters of the pipes shall be as in Table below:

TABLE

Dia of pipe (mm)	Width of trench (cm)	Depth of trench (cm)
15 to 50	30	60
65 to 100	45	75

At joints the trench width shall be widened where necessary. The work of excavation and refilling shall be done true to line and gradient in accordance with general specifications for earth work in trenches.

When excavation is done in rock, it shall be cut deep enough to permit the pipes to be laid on a cushion of sand minimum 7.5 cm deep.

2. CUTTING AND THREADING :

Where the pipes have to be cut or rethreaded, the ends shall be carefully filed out so that no obstruction to bore is offered. The end of the pipes shall then be carefully threaded conforming to the requirements of IS: 554 with pipe dies and tapes in such a manner as will not result in slackness of joints when the two pieces are screwed together. The taps and dies shall be used only for straightening screw threads which have become bent or damaged and shall not be used for turning of the threads so as to make them slack, as the later procedure may not result in a water tight joint. The screw threads of pipes and fitting shall be protected from damage until they are fitted.

3. JOINTING :

The pipes shall be cleaned and cleared of all foreign matter before being laid. In jointing the pipes, the inside of the socket and the screwed end of the pipes shall be oiled and rubbed over with white lead and a few turns of spun yarn wrapped round the screwed end of the pipe. The end shall then be screwed in the socket, Tee etc. with the pipe wrench. Care shall be taken that all pipes and fittings are properly jointed so as to make the joints completely water tight and pipes are kept at all times free from dust and dirt during fixing. Burr from the joint shall be removed after screwing. After laying, the open ends of the pipes shall be temporarily plugged to prevent access of water, soil or any other foreign matter.

4. THRUST BLOCKS :

In case of bigger diameter pipes where the pressure is very high, thrust blocks of cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate of 20 mm nominal size) of adequate size and shape shall be provided on all bends to transmit the hydraulic thrust to the ground, spreading it over a sufficient areas, depending upon the type of soil met with.

5. PAINTING :

The pipes shall be painted with two coats of anticorrosive bit mastic paint of approved quality.

6. TESTING OF JOINTS :

The pipes and fittings after they are laid and jointed shall be tested to hydraulic pressure of 6 Kg/sq.cm (60 meter). The pipes shall be slowly and carefully charged with water allowing all air to escape and avoiding all shock or water hammer. The draw off taps and stop cocks shall than be closed and specified hydraulic pressure shall be applied gradually. Pressure gauge must be accurate and preferably should have been recalibrated before the test. The test pump having been stopped, the test pressure

should be maintained without loss for at least half an hour. The pipes and fittings shall be tested in sections as the work of laying proceeds, having the joints exposed for inspection during the testing. Pipes or fittings which are found leaking shall be replaced and joints found leaking shall be redone, without extra payment.

7. **TRENCH FILLING :**

The pipes shall be laid on a layer of 7.5 cm sand and filled upto 15 cm above the pipes. The remaining portion of the trench shall then be filled with excavated earth. The surplus earth shall be disposed off as directed.

8. **MEASUREMENTS :**

The lengths shall be measured in running meter correct to a cm for the finished work, which shall include G. I. Pipe and G. I. Fittings such as bends, tees, elbows reducers, crosses, plugs, sockets, nipples and nuts, but exclude brass or gun metal taps (cocks), valves, lead connection pipes and shower rose. All pipes and fittings shall be classified according to their diameters, method of jointing and fixing substance, quality and finish. In case of fittings of an equal bore, the pipe shall be described as including all cuttings and wastage. In case of fittings of unequal bore, the largest bore shall be measured.

9. **RATE :**

The rate shall included the cost of labour and materials involved in all the operations described above including excavation in trenches & back filling. The rate shall not include painting of pipes and sand filling all round the pipes, unless otherwise specified.

LAYING AND JOINTING UNPLASTICISED P.V.C. PIPES (EXTERNAL WORK)

1. HANDLING AND STORAGE :

Unplasticized P.V.C. pipes are light in weight material. Reasonable care shall be taken in handling and storage of these to prevent damages. On no account the pipes shall be dragged along the ground. Pipes shall be given adequate support at all times. They shall not be stacked in large piles, especially under warm temperature conditions as the bottom pipes may distort, thus giving rise to difficulty in pipe alignment and jointing.

For temporary storage in the field, where racks are not provided care shall be taken that the ground is level and free from loose stones. Pipes stored thus shall not exceed three layers and shall be so stacked as to prevent movement; the pipes shall preferably be stored under shade.

For satisfactory service performance of plastic pipes under conditions of use, the following points must be kept in view while undertaking installation of plastic piping system :

- a) The plastic materials are 'thermoplastic' in nature, and must not be used in contact with hot surfaces (or hot water) ;
- b) They must be supported at regular intervals for above ground installation ;
- c) Allowance must be made, during installation for their expansion, particularly by using loose clips / clamps ;
- d) A range of specials, and matching fittings must be identified and their manufactures / suppliers listed.

2. TRENCHES :

The trench bottom shall be carefully examined for the presence of hard objects such as flints, rock projections or tree roots etc. pipes shall be bedded in sand or soft soil free from rock and gravel. Back fill 15 cm above the pipe shall also be of fine sand or soft soil. Pipes shall not be painted. The width of trench shall be not less than outside dia meter of pipe plus 30 cm in case of gravel soils. Pipes shall be laid at least 90 cms below the ground level (measured from surface of the ground to the top of the pipe).

3. JOINTING :

- (a) **Solvent welded joints** : Non heat application Method :

In this method, instead of forming a socket on one pipe and an injection moulded socket fitting or coupler is used, with a provision to take in the pipes at both ends, the solvent cements are applied on the surfaces to be jointed and the joint is made at ambient temperature. Injection moulded fittings only shall be used in preference to fabricated fittings, only solvent recommended by the manufacturers of the pipes shall be used and full load on the joints applied only after 24 hours. The pipe shall be cut perpendicular to the axis of the pipe length with a metal cutting saw or an ordinary hand saw with small teeth. Pipe ends have to be beveled slightly with a beveling tool (Reamer) at an angle of about 30 degree. The total length of insertion socket (injection moulded socket or coupler) shall be marked on the pipe and checked how far the pipe end could be inserted into the fitting socket. Attempt shall be made to push the pipe to the marked distance if not possible it shall at least be pushed for 2/3 of this distance.

Dust, oil, water grease etc. shall be wiped cut with a drycloth from the surface. Further the grease should be thoroughly removed with a suitable solvent, such as methylene chloride or as an alternative the outside surface of the pipe and the inside of the fitting may be roughened with emery paper.

Generous coating of solvent cement shall be evenly applied on the inside of the fitting around the circumference for the full length of insertion and on the outside of the pipe end upto the marked line with non synthetic brush of suitable dimension. The pipe shall be pushed into the fitting socket and held for 1 or 2 minutes as otherwise the pipe may come out of the fitting due to the slippery quality of cement and the tapering inside bore of the fitting. The surplus cement on the pipe surfaces shall be wiped out. If the solvent cement has dried up too much or the tapering of the socket is too steep, jointing will not be proper and pipe will come out of the fitting.

In summer months joints shall be made preferable early in the morning or in the evening when it is cooler. This will prevent joint from pulling apart when the pipe cools off at night. Heat application method for jointing shall not be allowed.

(b) Flanged Joints :

For jointing P.V.C. pipes particularly of larger sizes to valves and vessels and larger size metal pipes where the tensile strength is required the joint is made by the compression of a gasket or ring seal set in the face of C. I. flange. Flanges solvent welded to the P.V.C. pipes shall be supplied by the manufacturers.

4. CROSSING ROAD OR DRAIN :

Where the pipe line crosses a road or a drain, it shall be through C.I. or R.C.C. pipe.

5. SUPPORTS FOR VALVE AND HYDRANT :

Valve and hydrant tees shall be supported, so that the torque applied in operating a valve is not transmitted to the pipe line.

6. INSPECTION AND TESTING :

Solvent welded pipe shall not be pressure tested until at least 24 hours after the last solvent cemented joint has been done.

All control valves shall be positioned open for the duration of the test and open end closed with water tight fittings. The testing pressure on completion of the work shall not be less than one and a half time the working pressure of the pipes.

Pressure shall be applied either by hand pump or power driven pump. Pressure gauges shall be correctly positioned and closely observed to ensure that at no time are the test pressure exceeded. The systems shall be slowly and carefully filled with water to avoid surge pressure or water hammer. Air vents shall be open at all high points so that air may be expelled from the system during filling.

When the system has been fully charged with water and air displaced from the line air vent shall be closed and the line initially inspected for seepage at joints and firmness of supports under load. Pressure may then be applied until the required test pressure is reached.

Without any additional requirement of make-up-water the test pressure should not fall more than 0.2 kg/sq.cm. at the end of one hour test duration.

7. MEASUREMENTS :

The length shall be measured in running meter correct to a cm for the finished work which shall include P.V.C. fittings such as bends, tees, elbows, reducer, crosses, plugs, sockets, nipples and nuts, but exclude taps, valves, etc. All pipes and fittings shall be classified according to their outside diameters and pressure ratings. Fitting of unequal outside diameter shall be measured alongwith the larger diameter pipe.

8. RATE :

The rate shall include the cost of labour and material in all the operation described above except excavation in trenches, sand filling around the pipes, metal pipe used for encasing P.V.C. pipe and anchor blocks, unless otherwise specified.

PVC & CPVC PIPES & FITTINGS

a) MATERIAL :

(i) PVC & CPVC PIPES AND FITTINGS :

All pipes with spigot and socket ends and fittings shall conform to IS : 651. These shall be sound, free from visible defects such as fire cracks or hair cracks. The glaze of the pipes shall be free from crazing. The pipes shall give a sharp clear tone when struck with a light hammer. There shall be no broken blisters. The thickness of pipes shall be as given in the Table below :

TABLE

Internal diameter Mm	Thickness of the barrel and socket mm
100	12
150	16
200	17

The length of pipes shall be 60,75,90 cm exclusive of the internal depth of socket. The pipes shall be handled with sufficient care to avoid damage to them.

b) TRENCHES :

- (i) The trenches shall be so dug that the pipes may be laid to the required alignment and at required depth.
- (ii) Cover shall be measured from top of pipe to the surface of the ground.
- (iii) The bed of the trench, if in soft or made up earth, shall be well watered and rammed before laying the pipes and the depressions, if any, shall be properly filled with earth and consolidated in 20 cm layer.
- (iv) If the trench bottom is extremely hard or rocky or loose stony soil, the trench shall be excavated at least 150 mm below the trench grade. Rocks, stone or other hard substances from the bottom of the trench shall be removed and the trench brought back to the required grade by filling with selected fine earth or sand (or fine moorum if fine soil or sand is not available locally) and compacted so as to provide a smooth bedding for the pipe.
- (v) After the excavation of the trench is completed, hollows shall be cut at the required position to receive the socket of the pipes and these hollows shall be of sufficient depth to ensure that the barrels of the pipes shall rest throughout their entire length on the solid ground and that sufficient spaces left for jointing the underside of the pipe joint. These socket holes shall be refilled with sand after jointing the pipe.
- (vi) Roots of trees within a distance of about 0.5 meter from the side of the pipe line shall be removed or killed.
- (vii) The excavated materials shall not be placed within 1 meter or half of the depth of the trench, whichever is greater, from the edge of the trench. The materials excavated shall be separated and stacked so that in refilling that may be re-laid and compacted in the same order to the satisfaction of the Engineer-in-charge.
- (viii) The trench shall be kept free from water. Shoring and timbering shall be provided wherever required. Excavation below water table shall be done after rewatering the trenches.

- (ix) Where the pipe line or drain crosses an existing road, the road crossing shall be excavated half at a time, the 2nd half being commenced after the pipes have been laid in the first half and the trench refilled. Necessary safety measures for traffic as directed shall be adopted. All types, water main cables, etc. met within the course of excavation shall be carefully protected and supported. Care shall be taken not to disturb the electrical and communication cable met with during course of excavation, removal of which, if necessary, shall be arranged by the Engineer-in-charge.

c) CONCRETE SUPPORT :

i) BEDDING :

Bedding shall be rectangular in section and shall extend laterally at least 15cm beyond and on both sides of the projection of the barrel of the pipe. The thickness of the concrete below the barrel of the pipe shall be 10cm for pipes under 150mm diameter and 15cm for pipes 150mm and over in diameter. Where bedding is used alone the concrete shall be brought up at least to the invert level of the pipe to form a cradle and to avoid lime contact between the pipe and the bed.

The width of the bedding shall be external diameter of the pipe plus

- (a) 30cm upto trench depth of 1.2 meter.
- (b) 40cm for trench depth more than 1.2 meter.

ii) HAUNCHING

Concrete haunching shall consist of :

- a) Concrete bed as described for bedding in (i) above.
- b) The full width of the bed carried upto the level of the horizontal level of the pipe; and
- c) Splays from this level carried up on both sides of the pipe; from the full width of the bed to meet the pipe barrel tangentially.

iii) SURROUND OR ENCASING

Surround or encasing shall be similar to haunching upto the horizontal diameter of the pipe and top portion over this shall be finished in a semi circular form to give a uniform encasing for the top half of the pipe.

d) LAYING :

The pipe shall be laid accurately and perfectly true to line, levels and gradients. Great care shall be taken to prevent sand etc. from entering the pipes. The pipes between two manholes shall be laid truly in a straight line without vertical or horizontal undulation. All junction and changes in direction and diameter shall be made inside manholes by means of curves tapered channels formed in cement concrete finished smooth and benched on both sides. The body of the pipe shall, for its entire length, rest on an even level of concrete, grips being made or left in the bed to receive the sockets of the pipes. Normally the sockets ends should face the upstream. When the line runs up hill the socket ends should face the upgrade.

All pipes shall be laid on a bed of cement or lime concrete with thickness and mix as specified, projecting on each side of the pipe to the specified width of the trench. The pipes with their crown level at 1.20 m depth and less from ground shall be covered with 15 cm thick. Concrete above the crown of the pipe and sloped off to meet the outer edges of the concrete, to give a minimum thickness of 15 cm all – around the pipe. Pipes laid at a depth greater than 1.20 m at crown shall be concreted at the sides upto the level of the center of the pipe and sloped off from the edges to meet the pipe tangentially.

e) **JOINTING GLAZED STONE WARE PIPES :**

Tarred gasket or yarn soaked in neat cement slurry shall first be placed round the spigot of each pipe and spigot shall then be placed well home into the socket of pipe previously laid. The pipe shall then be adjusted and fixed in the correct position and the gasket caulked tightly home so as to fill not more than one fourth of the total depth of the socket.

The remainder of the socket shall be filled with a stiff mixture of cement mortar proportion of 1 part of cement and 1 part of fine sand. When the socket is filled, a fillet shall be formed round the joint with a trowel, forming an angle of 45 degree with the barrel of the pipe.

Mortar shall be mixed as necessary for immediate use and no set mortar shall be beaten up and used before it has begun to set.

After the joint is made, any extraneous material shall be removed from the inside of the joints with a suitable scrapper or '. The newly made joints shall be protected, until set, from the sun, dry winds, rain or frost. Sacking or other suitable materials, which shall be kept damp, may be used for the purpose.

The approximate quantity of cement required for each joint for following sizes of pipes are given below for guidance.

Nominal dia of pipe (mm)	Cement (Kg)
100	1.00
150	1.50
200	2.00
250	2.50

f) **CURING :**

The mortar joints shall be cured at least for 7 days before testing.

g) **TESTING OF JOINTS :**

HYDRAULIC TEST :

The pipes shall be subjected to a pressure of at least 2.5meter head of water at the highest point of the section under test. Before commencing the hydraulic test, the pipeline shall be filled with water and maintained full for 24 hours by adding water if necessary under a head of 0.6 meter of water. The test shall be carried out by suitably plugging the low end of the drain and the ends of the connection, if any and filling the system with water. A knuckle bend shall be temporarily jointed in at the top end and a sufficient length of vertical pipe jointed to it so as to provide the required test head; or the top end may be plugged with a connection to a hose ending in a funnel which could be raised or lowered till the required head is obtained and fix suitably for observation. Subsidence of the test water may be done to one or the more of the following causes :-

- i) Absorption by pipes and joints;
- ii) Sweating of pipes or joints;
- iii) Leakage at joints or from defective pipes and
- iv) Trapped air.

Allowance shall be made for (i) above by adding water until absorption has ceased after which the proper test should commence if any leakage is visible the defective part of the work should be made good. A slight amount of sweating which is uniform may be over looked but excessive sweating from a particular pipe or joint shall be watched for as taken as indicating a defect to be made good.

RECTIFICATION OF FAULTY JOINTS :

Any joint leaking or sweating shall be rectified or embedded into into 150mm layer of cement concrete (1:2:4) 300mm in length and the section retested.

h) REFILLING :

In cases where pipes are not bedded on concrete special care shall be taken in refilling trenches to prevent the displacement and subsequent settlement at the surface resulting in uneven street surfaces and dangers to foundations etc. The backfilling materials shall be packed by hand under and around the pipe, and rammed with a shovel and light tamper. This method of filling will be continued upto the top of pipe. The refilling shall rise evenly on both sides of the pipe continued upto 60 cm above the top of pipe so as not to disturb the pipe. No tamping should be done within 15 cm of the top of pipe.

i) MEASUREMENTS :

The lengths of pipes shall be measured in running meters nearest to a cm as laid or fixed, from inside of one manhole to the inside of the other manhole. The length shall be taken along the center line of the pipes over all fittings such as bends, junctions, etc. which shall not be measured separately.

Excavation, refilling, shoring and timbering in trenches, and cement concreting wherever required shall be measured separately under relevant items of work.

j) RATE :

The rate shall include the cost of materials and labour involved in all operations described above excluding the cost of concrete which shall be paid for separately.

MANHOLES

i) GENERAL :

Manholes of different types and sizes specified shall be constructed in the sewer line at such places and to such levels and dimensions as shown in the drawing or as directed by the Engineer-in-charge. The size specified shall indicate the inside dimensions (between wall faces) of the manholes. Sewers of unequal section area shall not be jointed at the same invert in a main shall be at least two third the diameter of the main above the invert of the main. The branch sewer should deliver sewage in the manhole in direction of main flow and the junction must be made with care so that flow in the main is not impeded.

No drain from house fitting i.e. gully taps or soil pipes etc. to manholes shall normally exceed a length of 6 meter unless it is unavoidable.

At every change of alignment, gradient or diameter of a drain, there shall be a manhole or inspection chamber. Bends and junctions in the drains shall be grouped together in manhole as far as possible. The maximum distance between manholes shall be 30 m.

Where the diameter of the drain is increased, the crown of the pipe shall be fixed at the same level and necessary slope given in the invert of the manhole chamber.

Manholes shall be built to the following specifications:-

a) Bed concrete:

The manhole shall be built on a bed of cement concrete 1:4:8 (1 cement : 4 coarse sand: 8 graded stone aggregate 40 mm nominal size) The thickness of Bed Concrete shall be 150 mm upto 1 meter depth, 20 cm for manholes from 1 meter to 4.25 meter depth and 30 cm for manholes of above 4.5 meter depth.

b) Walls:

The walls of the manholes shall be of brick masonry. The brick masonry shall be with bricks of class 75 in cement mortar 1:4 (1 cement : 4 coarse sand) of brick work shall be carefully built in English bond. The jointing face of each brick being well buttered with cement mortar before laying so as to ensure a full joint. The thickness of wall shall not be less than 230mm upto 1.5 meter in depth and one and a half brick for depth greater than 1.5 meter. The exact thickness of wall shall be governed by the structural design & site conditions.

c) Plaster :

The inside of wall shall be plastered 12 mm thick with cement mortar 1:3 (1 cement : 3 coarse sand) and finished with a floating coat of neat cement. All angle shall be rounded to 7.5 cm. radius and all rendered internal surfaces shall have impervious finish obtained by using a steel trowel.

Where the saturated soil is met with, also the external surface of the walls of the manhole shall be plastered with 12 mm thick cement plaster 1:3 (1 cement : 3 coarse sand) finished smooth upto 30 cm above the highest sub-soil water level with the approval of the Engineer-in-charge. The plaster shall further be water proofed with addition of approved water proofing compound in a quantity as per manufacturer's specifications.

d) Channels and benching:

Channels shall be semi circular in the bottom half and of diameter equal to the sewer. Above the horizontal diameter, the sides shall be extended vertically to the same level as the crown of the out going 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 on appropriate shall suitably rounded off in the direction of flow in the main channel shall be given.

The channels and benching shall be done in cement concrete 1:2:4 (1 cement: 2 coarse sand: 4 graded stone aggregate 20 mm nominal size) rising at a slope of 1 in 6 from the edges of channel. The channels of the bottom of the chamber shall be finished with the floating coat of neat cement.

e) **Foot Rests :**

All manholes deeper than 0.8 m shall be provided with M. S. foot rests. These shall be embedded 20 cm deep in 20 x 20 x 10 cm blocks of cement concrete 1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size). The concrete block with M. S. foot rest placed in its center shall be cast in situ along with the masonry and surface finished with 12 mm thick cement plaster 1:3 (1 cement : 3 coarse sand) finished smooth.

Foot rests which shall be of 20 x 20 sq. M. S. bars shall be fixed 30 cm apart vertically and staggered laterally and shall project 10 cm beyond the surface of the wall. The top foot rest shall be 45 cm below the manhole cover.

Foot rests shall be painted with coal tar, the portion embedded in the cement concrete block being painted with thick cement slurry before fixing.

f) **Cover slabs:**

These shall be of R.C.C. 1:2:4 (1 cement :2 coarse sand : 4 graded stone aggregate 20 mm nominal size) 15 cm thick surface and edge finished fair. Full bearing equal to the width of the wall shall be given to the slab on all sides. The frame of the man hole cover shall be embedded firmly in the R.C.C. slab so that the top of the frame remains flush with the top of the R.C.C. slab.

g) **Measurements :**

Manholes shall be enumerated under relevant items. The depth of the manhole shall be reckoned from the top level of C. I. cover to the invert level of channel. The depth shall be measured correct to a cm. The extra depth shall be measured and paid as extra over the specified depth.

h) **Rates :**

The rate shall include the cost of materials and labour involved in all the operations described above including excavation but excluding the cost of (i) M.S. foot rests and (ii) 12 mm thick cement plaster with water proofing material applied at the external surface of the manhole if required. These items shall be paid for separately under relevant items of work.

Payments for extra depths of manholes shall be made separately under relevant items of work.

ii) **TESTING:**

Manholes shall be tested by filling with water to a depth not exceeding 1.2 meter as directed by the Engineer-in-charge.

After completion of the work manhole covers shall be sealed by means of thick grease.

iii) **CONNECTION TO A EXISTING SEWER :**

The connection to an existing sewer shall, as far as possible, be done at the manholes. Where it is unavoidable to make connection in between two manholes, the work of breaking into the existing sewer and forming the connection shall be carried out under the supervision Administrative Authority.

Breaking of sewer shall be effected by the cautious enlargement of sewer hole and every precaution shall be taken to prevent any material from entering the sewer. No connection shall be formed in such a way so as to constitute a projection into the sewer or to cause any diminutions in its effective size.

iv) **DROP CONNECTIONS:**

Where it is uneconomic or impracticable to arrange the connection within 600 mm height above the invert of the manhole, the connection shall be made by constructing a vertical shaft outside the manholes chamber. If the difference in the levels between the incoming drain and the sewer does not exceed 600 mm and there is sufficient room in the manhole, the connection pipe may be directly brought through the manhole wall and the fall accommodated by constructing a ramp in the benching of the manhole.

PRECAST CONCRETE MANHOLE COVERS & FRAMES

Precast reinforced cement concrete manhole covers intended for use in sewerage and water works shall generally conform to IS : 12592 (Part 1 & 2) 1991. Detailed specifications are as under:

1. GRADES : TYPES & USES

Manhole covers and frames shall be of the following four grades and types:

Grades	Grade Designation	Type / shape of cover
Light Duty	LD – 2.5	Rectangular, Square, Circular
Medium Duty	MD - 10	Rectangular, Circular
Heavy Duty	HD – 20	Circular-Square, Rectangular, (Scrapper Manhole)
Extra Heavy Duty	EHD – 35	Circular, Square, Rectangular, (Scrapper Manhole)

2. The different grades and types of manhole covers may be used as follows :

a) LD – 2.5 Rectangular, Square or Circular types :

These are suitable for use within residential and institutional complexes / areas with pedestrian but occasional LMV traffic. These covers may also be used for inspection chambers.

b) MD – 10 :

These are suitable for use in service lanes / roads, car parking areas etc.

c) HD – 20 :

Suitable for use in institutional/commercial areas / carriage ways with heavy duty vehicular traffic like buses, trucks, etc.

d) EHD – 35 : Circular, square, or rectangular (scrapper manhole) types -

These are suitable for use on carriage way in commercial industrial / port areas / near warehouses / godowns where frequent loading and unloading of trucks / trailers are common, with slow to fast moving vehicular traffic of the types having wheel loads upto 11.5 tones, irrespective of the location of the manhole chambers.

3. MATERIALS :

(i) Cement :

cement used for the manufacture of precast concrete manhole covers shall be 33 grade Portland cement conforming to IS : 269 – 1989 or 1489 (Part1&2) – 1991 or IS : 8041 – 1990 or IS : 8043 – 1990 or IS : 8112 – 1989 or IS : 155 – 1989.

(ii) Aggregates :

The aggregates used shall be clean and free from deleterious matter and shall conform to the requirements of IS: 383–1970. The aggregates shall be well graded and the nominal maximum size of coarse aggregate shall not exceed 20 mm.

(iii) Concrete :

The mix proportions of concrete shall be determined by the manufacturer and shall be such as will produce a dense concrete without voids, honey combing etc. The minimum cement content in the concrete shall be 360 kg/m³ with a maximum water cement ratio of 0.45. Concrete weaker than grade M-30 (design mix) shall not be used. Compaction of concrete shall be done by machine vibration.

(iv) Reinforcement :

- a) The reinforcement steel shall conform to IS : 226 – 1975 or IS 432 (Part I)- 1982 or IS : 832 (Part 2) – 1982 or IS : 1556 – 1982 or IS : 1786 – 1985 as specified.

Reinforcement shall be clean and free from loose mills scale, loose rust, and mud, oil, grease or any other coating which may reduce or destroy the bond between the concrete and steel. A light film of rust may not be regarded as harmful but steel shall not be visibly pitted by rust.

- b) **Fibers steel:** In association with in the main steel bars reinforcement steel fibers of appropriate types and forms may also be used as secondary reinforcement (upto 0.5% by volume).

(v) Plastics :

Plastics fiber of polypropylene fibrillated film of suitable type and form (0.55 by weight) may also be used as reinforcement in line of steel reinforcement.

4. SHAPES AND DIMENSIONS :**(i) Shapes:**

The shapes of precast concrete manhole covers shall be square, rectangular or circular as specified.

(ii) Dimensions :

Dimensions of precast concrete manhole covers shall be as given in Table below, the minimum clearance at top between the frame and cover shall be 5 mm.

TABLE

S. No.	Description	Heavy / Extra Heavy duty HD / EHD	Medium duty M.D.	Light duty L.D.
1.	Clear opening matching the top opening of manhole	560 mm dia or 600 mm dia or square or 560 mm	450 mm dia. 480 mm dia. 500 mm dia. or square	600 x 450 mm (rectangular) 450 mm dia or 350 mm dia or square
2.	Precast slab with integral frame (D/T)	900 mm dia x 180 mm or square corners cut 1000 mm dia x 200 mm or square corner cut	800 mm. dia x 130 mm 800 mm dia x 150 mm	850mmx700mmx100mm 625mm dia x 100 mm or 575 mm dia x 100 mm or square
3.	Thickness of cover depth of frame (T1)	100 mm or 110 / 120 mm	70 / 80 mm	50 mm
4.	Matching Manhole Cover (B)	685 / 660 mm or 735 / 710 mm dia or square	585 mm dia or 645 mm dia or square	685 x 535 mm 515 mm dia or square 435 mm dia or square
5.	Edge protection of covers/lifting facility	Precast manhole covers are designed and provided with MS rims of 2.5 mm thickness welded around with provision of two lifting hooks welded at appropriate locations.		
6.	Chequered pattern on operative surface	The MS rims along with the edges of precast manhole covers and their operative surface are suitably coated/finished using corrosion resistant paint.		

7.	Marking on the covers	Precast manhole covers/precast slabs are suitably marked on the operative surface with the following letters, unless specified otherwise Name of the Department/Sewer or SWD/Grade/Date of MFR/Trade Name etc.
8.	Performance requirements Test load	When tested for ULTIMATE breaking load using 300 mm dia block as per the method described in IS : 12592 (Part I) manhole covers shall be within the following range : Light duty - 2.5 tones (L.D. – 2.5) Heavy duty – 20 tones (HD – 20) Medium duty - 10 tones (MD – 10) Extra heavy duty - 35 tones (EHD – 35).

5. **LIFTING DEVICE :**

The minimum diameter of mild steel rod used as lifting device shall be 10 mm for light and 12 mm for medium duty covers and 16 mm for heavy and extra heavy duty covers. The lifting device shall be protected from corrosion by not galvanizing or epoxy coating or any other suitable.

6. **FINISHING AND COATING :**

To prevent any possible damage from corrosion of steel the underside of the covers shall be treated with anticorrosive paint. The top surface of the covers shall be given a chequered finish.

In order to protect the edges of the covers from possible damage at the time of lifting and handling it is necessary that the manhole covers shall be cast with a protective mild steel sheet of minimum 2.5 mm thickness around the periphery of the covers. Exposed surface of mild steel sheet shall be given suitable treatment with anticorrosive paint or coating.

7. **PHYSICAL REQUIREMENTS :**

a) **General :**

All units shall be sound and free from cracks and other defects which interface with the proper placing of the unit or impair the strength or performance of the units. Minor chipping at the edge / surface resulting from the customary methods of handling during delivery shall not be deemed for rejecting.

b) **Load test :**

The breaking load of individual units when tested in accordance with the method described in IS : 12592 shall be not less than the values specified in Table below.

TABLE

Grade of cover	Type	Load in Tones	Diameter of Blocks in mm
EHD – 35	Circular, Square or Rectangular	35	300
HD – 20	Circular, Square or Rectangular	20	300
MD – 10	Circular, or Rectangular	10	300
LD – 2.5	Rectangular, Square or Circular	2.5	300

8. **FIXING :**

The frames of manhole shall be firmly embedded to correct alignment and level in RCC slab or plain concrete as the case may be on the top of masonry which shall be paid as extra unless specified otherwise.

9. **MEASUREMENTS :**

The manhole covers shall be enumerated under relevant items.

10. RATES :

The rate shall include the cost of materials and labour involved in all the operation described above except fixing of frames and covers which shall be paid as extra unless specified otherwise in the items.

III- ELECTRICAL WORKS

TECHNICAL SPECIFICATIONS FOR ELECTRICAL WORKS

GENERAL

1.0 TECHNICAL SPECIFICATIONS

1.1 MATERIALS

1.1.1 Quality

All materials used in the works shall be of their respective kinds as specified herein, obtained from sources & suppliers as approved by the architects & shall comply strictly with the tests prescribed hereafter, or where tests are not laid down in the specifications, with the requirements of the latest issue of the relevant Indian standard.

1.1.2 Sampling & testing

All materials used in the works shall be subject to inspection & test in addition to test certificate of all materials proposed to be incorporated in permanent works shall be submitted to the architect for approval before they are brought to the site.

1.1.3 Rejection

Any materials that have been not found to confirm to the specifications will be rejected forthwith & shall be removed from the site by the contractor at his own cost.

The architect shall have power to cause the contractors to purchase & use such material / s from any particular source / s as may in his opinion be necessary for the proper execution of the work.

1.2 WORKMANSHIP

All works shall be true to level, plumb & square & the corners, edges, etc. in all cases shall be unbroken & net.

Distempering, POP / Painting / Polishing shall be provided in accordance with CPWD specifications 1977 & relevant standards as applicable to this work. Painting with plastic emulsion paint (if required) shall be as per CPWD specifications 1977 & IS 5411-1969. Paint shall be of approved manufacturer & brand.

All timber shall be treated with preservatives before delivery to site. While remaining in proper wrapping, timber shall be protected from extremes of temperature & direct sunlight. Timber shall be soft wood or hardwood as suitable for the purpose for which it is intended. It shall be seasoned, free of defects which would affect strength or usability & shall be flat, non splitting & dressed on all sides. All glue, laminate, ply, board shall be as per the relevant IS codes. Where ever teak is specified it shall be 1st. Class C.P. Teak. All aluminium work prelaminate particle board work & glass work will be as per the relevant IS codes & their latest amendments.

1.3 FINISH

Finishes shall be fully in accordance with the drawings & schedules and / or as per the directions of the architect.

1.4 SAMPLES

A sample of every item to be incorporated shall be submitted for approval of the architect before placing the order. Approved samples shall be used as standards of finish & workmanship.

1.5 GENERAL TECHNICAL DETAILS

1.5.1 Checknuts shall be used for holding conduits in place in all junction boxes & switch boxes & edges of all conduits shall be filed properly to avoid damage of wires.

1.5.2 Wiring for items shall be completed & required to operate a totally functional & working system. No extra claim on this account will be allowed.

1.5.3 All PVC conduits shall be 20 / 25mm dia. (2m.m. wall thickness unless otherwise specified)

1.5.4 Maximum wires to be drawn in PVC conduits shall be as per specifications.

1.5.5 PVC bushes shall be used for PVC conduit.

1.5.6 All switch boxes, junction boxes & GI outlet boxes shall be of 18swg.

1.5.7 Wires carrying current shall be so bunched in the conduit that the outgoing & return cables are drawn in the same conduit. Cables originating from two different phases shall not be run in the same conduit.

1.5.8 All wires of 3/22, 3/20, 7/22, 7/20 shall be of copper as per specifications.

1.5.9 All light fixtures / fans to be of approved make.

- 1.5.10 Mains & sub mains where called for shall be of the rated capacity & approved make. Every main & sub main shall be drawn into an independent adequately sized conduit. Adequate size of draw boxes shall be provided at convenient locations to facilitate easy drawing of the sub mains & main cables. An independent earth wire of proper rating shall be provided for every single phase sub main. The earth wires shall be fixed to conduits by means of suitable copper clips at not more than 1000m.m. distance. Where mains & sub mains are connected to the switchgear, sufficient extra lengths of sub main & mains cable shall be provided to facilitate easy connections & maintenance.
- 1.5.11 Balancing of circuits in three phase installation shall be planned before the commencement of wiring & shall be strictly adhered to.
- 1.5.12 A circuit diagram for all wiring shall be provided for before the commencement of the works by the contractor to the architect & shall be adhered to for all execution & confirmed to the architect after the successful completion of works.

1.6 POINT WIRING

All wiring to be concealed and not on surface. Colour code shall be maintained for the entire wiring Red, Yellow, Blue for three phases and Black for neutral. The rates for all point wiring items shall include -

- a. Conduits, conduit specials, bushes & other fittings called for.
- b. MS outlet boxes & junction boxes.
- c. Painting of all inspection, junction & outlet boxes.
- d. Wiring in copper as specified.
- e. Any PVC / metallic flexible conduit where ever applicable shall be deemed to have been included in the rates mentioned by the contractor.
- f. All screws & other fixing accessories shall be deemed to have been included in the rates mentioned by the contractor.

1.7 SWITCHES & SOCKET OUTLETS

Light switches shall comply with IS 3854-1966 & IS 5987-1970 these shall be rated 5A or 15A whichever is applicable & shall be one way two way or intermediate as detailed or as per the directions of the architect. All switches shall be the type suitable for the nature of supply to which they are to be connected. The mounting height to the bottom of the outlet box shall be 3'-6" unless otherwise specified & where the structure & furnishing permits, the distance from the edge of the door to the near edge of the switch shall be 9".

1.8 MAIN DISTRIBUTION BOARDS & SUB DISTRIBUTION BOARDS

Main distribution boards, sub distribution boards shall be suitable for operation on 3 phase / single phase 415 / 230Volts, 50 cycles neutral.

Distribution boards shall comply with latest relevant Indian standards & electricity rules & regulations

2.0 DETAILED SPECIFICATIONS FOR ELECTRICAL WORKS

A. LIGHT, FAN, 6 AMPS., 6/16 AMPS.

1. Light, Fan & 6 Amps. Switch Points.

Providing, storing & installing in position, effecting proper connection, testing and commissioning of Light, fan & 6 Amps. Switch Points with an additional indicator and 6 Amps. Switch & Socket on all module plates. It shall have 2 Nos. 1.0 Sq.mm. Cu. Wire laid in PVC conduit pipe of required dia., concealed in wall/floor/panelling/partitions or above false ceiling. The work shall also include for cutting chases for conduits and moulded boxes, if required, in the wall/floor (without damaging the building) along with clamping the conduits at every 450mm interval and finally finishing the surface and matching the level with existing.

The rate shall include for all materials, labour, T&P, taxes, levies, scaffolding, shifting of furniture, carting away the debris and cleaning the floor etc.

Makes -

Wire – Finolex/Havell’s.

Indicator, Switch and Socket - Anchor - Penta, Indicator (Model – 50359), Switches (Model – 50010) and Socket (Model - 50279) with required laminated Plates fixed on metal (for concealed) or PVC (for surface mounted) Moulded boxes.

PVC Conduit – Bajaj/AKG, of required dia. and 2mm thick, with all accessories e.g. long/short bends, tees, junction boxes etc. and clamps at every 450mm interval.

The job shall be complete, to the satisfaction of the Architect.

2. Circuit Wiring (Light, Fan & 6 Amps. Switch Points).

Providing, storing & installing in position, effecting proper connection, testing and commissioning of Circuit Wiring for light, fan & 6 Amps. Switch points with 2 Nos. 1.5 Sq.mm. Cu. Wire and 1 No. 0.75 Sq.mm. Cu. earth wire laid in PVC conduit pipe of required dia., concealed in wall/floor/panelling/partitions or above false ceiling. The work shall also include for cutting chases for conduits and moulded boxes, if required, in wall floor (without damaging the building) along with clamping the conduits at every 450mm interval and finally finishing the surface and matching the level with existing.

The rate shall include for all materials, labour, T&P, taxes, levies, scaffolding, shifting of furniture, carting away the debris and cleaning the floor etc.

Makes -

Wire - Finolex/Havell’s.

PVC Conduit – Bajaj/AKG, of required dia. and 2mm thick, with all accessories e.g. long/short bends, tees, junction boxes etc. and clamps at every 450mm interval.

The job shall be complete, to the satisfaction of the Architect.

3. 6/16 Amps. Switch Socket.

Providing, storing & installing in position, effecting proper connection, testing and commissioning of 6/16 Amps. Switch Socket on module plates. The work shall also include for cutting chases for moulded boxes, if required, in wall/floor (without damaging the building) and finally finishing the surface and matching the level with existing.

The rate shall include for all materials, labour, T&P, taxes, levies, scaffolding, shifting of furniture, carting away the debris and cleaning the floor etc.

Makes -

Switch and Socket - Anchor - Penta, Switch (Model – 4147) Socket (Model – 4191) with required Laminated Plates fixed on metal (for concealed) or PVC (for surface mounted) Moulded boxes.

The job shall be complete, to the satisfaction of the Architect.

4. Circuit Wiring (6/16 Amps. Switch Points).

Providing, storing & installing in position, effecting proper connection, testing and commissioning of Circuit Wiring for 6/16 Amps. switch points with 2 Nos. 4.0 Sq.mm. Cu. wire and 1 No. 0.75 Sq.mm Cu. earth wire laid in PVC conduit pipe of required dia., concealed in wall/floor/panelling/partitions or above false ceiling. The work shall also include for cutting chases for conduits and moulded boxes, if required, in wall/floor (without damaging the building) along with clamping the conduits at every 450mm interval and finally finishing the surface and matching the level with existing.

The rate shall include for all materials, labour, T&P, taxes, levies, scaffolding, shifting of furniture, carting away the debris and cleaning the floor etc.

Makes -

Wire – Finolex/Havell’s.

PVC Conduit – Bajaj/AKG, of required dia. and 2mm thick, with all accessories e.g. long/short bends, tees, junction boxes etc.

and clamps at every 450mm interval.

The job shall be complete, to the satisfaction of the Architect.

B. U.P.S. & COMPUTERISATION.

5. Selector Switch.

Providing, storing & installing in position, effecting proper connection, testing and commissioning of 1 No. Selector Switch (three phase to single phase) with 4 pole, 63 Amps., MCB Isolator. It shall also have 3 Nos. indicating lamps (red, orange and blue).

Makes -

Selector Switch - Havells or equivalent, with all accessories.

The job shall be complete, to the satisfaction of the Architect.

6. Circuit Wiring (UPS DB to Computer Points).

Providing, storing & installing in position, effecting proper connection, testing and commissioning of Circuit wiring between UPS DB and computer points with 2 Nos. 1.5 Sq.mm. Cu. Wire and 1 No. 0.75 Sq.mm Cu. earth wire laid in PVC channel for vertical drop/PVC conduit of required dia., concealed in wall / floor /panelling / partitions or above false ceiling. The work shall also include for cutting chases for conduits and moulded boxes, if required, in the wall/floor (with out damaging the building) along with clamping the conduits at every 450mm interval and finally finishing the surface and matching the level with existing.

The rate shall include for all materials, labour, T&P, taxes, levies, scaffolding, shifting of furniture, carting away the debris and cleaning the floor etc.

Makes –

Wire – Finolex/Havell's.

PVC Conduits – Bajaj/AKG, of required dia. And 2mm thick with all accessories e.g. long/short bends, tees, junction boxes etc. and clamps at every 450mm interval.

PVC channel – Flair/Caps of required size and 2mm thick, with all accessories e.g. angles/tees bends Junction box etc. and clamps at every 450 mm interval.

The job shall be complete, to the satisfaction of the Architect.

7. 6 Amps. Switch Socket.

Providing, storing & installing in position, effecting proper connection, testing and commissioning of 6 Amps. Switch Socket on module plates. The work shall also include for cutting chases for moulded boxes, if required, in wall/floor (without damaging the building) and finally finishing the surface and matching the level with existing.

The rate shall include for all materials, labour, T&P, taxes, levies, scaffolding, shifting of furniture, carting away the debris and cleaning the floor etc.

Makes -

Indicator, Switch and Socket - Anchor - Penta, Indicator (Model – 50359), Switches (Model – 50010) and Socket (Model - 50279) with required laminated Plates fixed on metal (for concealed) or PVC (for surface mounted) Moulded boxes.

The job shall be complete, to the satisfaction of the Architect.

8. UPS Protection System (Incoming And Outgoing).

Providing, storing & installing in position, effecting proper connection, testing and commissioning of 40Amp. DP MCB for UPS Incoming and 32Amp. DP MCB for UPS Outgoing housed in a 2 module flush/surface mounted metal/plastic enclosures. The work shall also include for cutting chases for moulded boxes, if required, in wall/floor (without damaging the building) and finally finishing the surface and matching the level with existing.

The rate shall include for all materials, labour, T&P, taxes, levies, scaffolding, shifting of furniture, carting away the debris and cleaning the floor etc.

Makes –

Box – Havells or equivalent, with all accessories.

DP MCB – Havell's or equivalent.

The job shall be complete, to the satisfaction of the Architect.

C. MAINS & SUB MAINS. (Electrical connection of 15.0 KW. (Approx.)

9. Cable (Main).

Providing, storing & installing in position, effecting proper connection, testing and commissioning of **25 mm²**, 4 Core Aluminium Cable (Armoured) between electrical meter and nearest supply pole.

The cable shall be laid in PVC conduit pipe of required dia., concealed in wall/floor/panelling/partitions or above false ceiling. The work shall also include for cutting chases for conduits, if required, in wall floor (without damaging the building) along with clamping the conduits at every 450mm interval and finally finishing the surface and matching the level with existing.

The rate shall include for all materials, labour, T&P, taxes, levies, scaffolding, shifting of furniture, carting away the debris and cleaning the floor etc.

Makes –

Cable – Havell's/Rallison/Sky Tone.

PVC Conduits – Bajaj/AKG, of required dia. and 2mm thick with all accessories e.g. long/short bends, tees, junction boxes etc. and clamps at every 450mm interval.

The job shall be completed, to the satisfaction of the Architect.

10. Cable (Sub Main).

Providing, storing & installing in position, effecting proper connection, testing and commissioning of, 4 Core Aluminium Cable (Armoured) from Main DB to UPS, A/C, Power and Light & Fan DB.

The cable shall be laid in PVC conduit pipe of required dia., concealed in wall/floor/panelling/partitions or above false ceiling. The work shall also include for cutting chases for conduits, if required, in wall floor (without damaging the building) along with clamping the conduits at every 450mm interval and finally finishing the surface and matching the level with existing.

The rate shall include for all materials, labour, T&P, taxes, levies, scaffolding, shifting of furniture, carting away the debris and cleaning the floor etc.

Makes –

Cable – Havell's/Rallison/Sky Tone.

PVC Conduits – Bajaj/AKG, of required dia. and 2mm thick with all accessories e.g. long/short bends, tees, junction boxes etc. and clamps at every 450mm interval.

The job shall be completed, to the satisfaction of the Architect.

11. Panel.

Design, manufacture, providing, storing & installing in position, effecting proper connection, testing and commissioning of panel made of 14 SWG, CRCA sheet steel. It shall be dust and vermin proof. It shall have compartmentalized construction with bus bar chambers, cable alley, cable glands plate etc. as required, duly painted from inside as well outside.

The rate shall include for all materials, labour, T&P, taxes, levies, scaffolding, shifting of furniture, carting away the debris and cleaning the floor etc.

It shall have the following -

MAIN PANEL.

3 Nos. (100 Amp.) Kit Kat switches with neutral links, Makes – Havell's/Anchor.

Incoming.

1 No. 100 Amp. TPN, MCCB (10 KA breaking capacity), Makes – Havell's or equivalent.

Busbars.

100 Amp., 3 phase, 4 strips, 415 volts, 50 Hz. copper busbars with colour coded PVC heat shrinkable sleeves.

Metering.

1 No. Voltmeter (range 0-500V), 3 phase.

1 No. Ammeter (range 0-200 Amp.), 3 phase with CT operation.

3 Nos. Phase Indication Lamps (red, yellow and blue).

Outgoing.

2 Nos. (63 Amp.) TPN, MCCB, Makes – Havell's or equivalent..

1 No. (80 Amp.) TPN, MCCB, Makes – Havell's or equivalent.

1 No., 63 Amp. Three Phase Change Over for D.G. Set.

The design of panel should be got approved by the Architect before manufacturing. Also, the provision for 1/2 spare outgoing should be considered for future expansion.

The job shall be completed, to the satisfaction of the Architect.

12. TPN Distribution Boards – Horizontal Type.

Providing, storing & installing in position, effecting proper connection, testing and commissioning of TPN distribution boards manufactured out of 14 SWG, CRCA sheet, duly painted (Regal Grey / Pearl Ivory),

double door, flush mounted, complete with copper bus bars, neutral link, earth strip, cable alley etc. as required. The work shall also include for cutting chases for distribution boards, if required, in wall/floor (without damaging the building) and finally finishing the surface and matching the level with existing.

The rate shall include for all materials, labour, T& P, taxes, levies, scaffolding, shifting of furniture, carting away the debris and cleaning the floor etc.

It shall have the following -

2 Nos., 4 WAY TPN DB including 4 pole, 1 No. 40/63 Amp. MCB Isolator, for L/F, Power & U.P.S. DBs.

Makes –

DB – Havells or equivalent, with all accessories.

MCB Isolator – Havells or equivalent.

The job shall be completed, to the satisfaction of the Architect.

13. SPN Distribution Boards – Horizontal Type.

Providing, storing & installing in position, effecting proper connection, testing and commissioning of TPN distribution boards manufactured out of 14 SWG, CRCA sheet, duly painted (Regal Grey / Pearl Ivory), double door, flush mounted, complete with copper bus bars, neutral link, earth strip, cable alley etc. as required. The work shall also include for cutting chases for distribution boards, if required, in wall/floor (without damaging the building) and finally finishing the surface and matching the level with existing.

The rate shall include for all materials, labour, T& P, taxes, levies, scaffolding, shifting of furniture, carting away the debris and cleaning the floor etc.

It shall have the following -

1 No., 10 WAY SPN DB including 4 pole, 1 No. 40/63 Amp. MCB Isolator, for L/F, Power & U.P.S. DBs.

Makes –

DB – Havells or equivalent, with all accessories.

MCB Isolator – Havells or equivalent.

The job shall be completed, to the satisfaction of the Architect.

14. SP MCB.

Providing, storing & installing in position, effecting proper connection, testing and commissioning of SP MCB (10 KA breaking capacity) ranging from 6 Amps. to 32 Amp.

The rate shall include for all materials, labour, T&P, taxes, levies, scaffolding, shifting of furniture, carting away the debris and cleaning the floor etc.

Makes –

SP MCB – Havells or equivalent.

The job shall be completed, to the satisfaction of the Architect.

15. DP MCB.

S/F of DP MCB (Ranging from 6 Amps. to 32 Amp.) housed in a 2 module flush/surface mounted metal/plastic enclosures. The work shall also include for cutting chases for moulded boxes, if required, in the wall (without damaging the building) and finally finishing the surface the matching the level with existing.

The rate shall include for all materials, labour, T&P, taxes, levies, scaffolding, shifting of furniture, carting away the debris and cleaning the floor etc.

Makes –

Box – Havells or equivalent, with all accessories.

DP MCB – Havell's or equivalent.

The job shall be complete, to the satisfaction of the Architect.

16. Earthing Stations.

Providing, storing & installing in position, effecting proper connection, testing and commissioning of Earthing Stations at locations called for, including providing and burying 600mmx 600mm x 3mm thick copper electrode with its top at least 3 Mt. below ground level. It shall also have 20mm dia. G.I. pipe and C.I. funnel for watering. It shall have 2 earthing leads of 8 Sq.mm. SWG Cu. Wire in 15mm dia. G.I. pipe up to main panel. It shall include for masonry chamber of sz: 300mmx300mm made out of masonry work with C.I. frame and hinged cover. The job shall include for packing & ramming of mixture of charcoal and common salt, at least 150mm thick, all around plate electrode, complete with digging and back filling as required. All complete to the satisfaction of the Architect.

17. Earthing Wire.

Supply, storing & installing in position, effecting proper connection, testing and commissioning of the following copper Earthing Wire.

The wire shall be laid in PVC conduit pipe of required dia., concealed in wall/floor/panelling/partitions or above false ceiling. The work shall also include for cutting chases for conduits, if required, in wall floor (without damaging the building) along with clamping the conduits at every 450mm interval and finally finishing the surface and matching the level with existing.

The rate shall include for all materials, labour, T&P, taxes, levies, scaffolding, shifting of furniture, carting away the debris and cleaning the floor etc.

It shall have the following -

Wire - 8.0 Sq.mm. SWG Cu. Wire.

Makes -

PVC Conduits - Bajaj/AKG, of required dia. and 2mm thick with all accessories e.g. long/short bends, tees, junction boxes etc. and clamps at every 450mm interval.

The job shall be completed, to the satisfaction of the Architect.

D. FIXTURES.

18. Tube Light (pendent type).

Providing & fixing in position, effecting proper connection, testing and commissioning of pre wired fluorescent fixtures 2x36 watts, mirror optics (pendent type) tube light fitting with all accessories. It shall include for 600mm long M.S. conduit pipe and fixing of clamp in the ceiling.

The rate shall include for all materials, labour, T&P, taxes, levies, scaffolding, shifting of furniture, carting away the debris and cleaning the floor etc.

Makes -

Fixture - Philips, Model - TMS 021/236 HPF.

Luminaries - Philips, Model - Life Max Lamp.

Accessories - Philips (Capacitors, Ballasts & Starters).

The job shall be complete, to the satisfaction of the Architect.

19. Tube Light - Patti Type.

Providing, storing & installing in position, effecting proper connection, testing and commissioning of 1x36 watts. Tube Light fitting with all accessories.

The rate shall include for all materials, labour, T&P, taxes, levies, scaffolding, shifting of furniture, carting away the debris and cleaning the floor etc.

Makes -

Fixtures - Philips, Model - Hero TMS 303/136 HPF.

Luminaries - Philips, Model - Life Max Lamp.

Accessories - Philips (Capacitors, Ballasts & Starters).

The job shall be complete, to the satisfaction of the Architect.

20. Bracket Light.

Providing, storing & installing in position, effecting proper connection, testing and commissioning of Bracket Light fitting with all accessories.

The rate shall include for all materials, labour, T&P, taxes, levies, scaffolding, shifting of furniture, carting away the debris and cleaning the floor etc.

Makes -

Angle Holder - Penta, Model - 51114, Colour - Ivory.

Luminaries - Philips, Model - 1XPL - S 18W Lamp.

The job shall be complete, to the satisfaction of the Architect.

21. Ceiling Light.

Providing, storing & installing in position, effecting proper connection, testing and commissioning of Ceiling Light fitting with all accessories.

The rate shall include for all materials, labour, T&P, taxes, levies, scaffolding, shifting of furniture, carting away the debris and cleaning the floor etc.

Makes -

Fixtures - Philips, Model - FBS 100/118.

Luminaries - Philips, Model - 1XPL-C 18W.

Accessories - Philips (Capacitors, Ballasts, Holder etc.)

The job shall be complete, to the satisfaction of the Architect...

22. Wall Mounted Fan. (400mm dia.).

Providing, storing & installing in position, effecting proper connection, testing and commissioning of Wall Mounted Fan of 400 mm dia. impeller assembled with three blades and 100 spokes guard. It shall also include for all accessories.

The work shall also include for cutting, if required in the wall (with out damaging the building) along with grouting the rag bolts at required position and finally finishing the surface and matching the level with existing.

The rate shall include for all materials, labour, T&P, taxes, levies, scaffolding, shifting of furniture, carting away the debris and cleaning the floor etc.

Makes –

Fixture – Crompton Greaves Ltd., Model – Super Deluxe, Colour – Ivory/as suggested by the Arch.

Ceiling rose – Anchor - Penta, Model – 3257.

The job shall be complete, to the satisfaction of the Architect.

23. Ceiling Fan (1200mm dia.).

Providing & fixing in position, effecting proper connection, testing and commissioning of Ceiling Fan of 1200mm dia. sweep assembled with statically and dynamically balanced motor and three blades, capacitors type motor with internal starter and external rotor pattern and two double ball bearings which are accessible for lubrication. It shall also include for all accessories e.g. 300mm long (or as required on site) down rod, bottom cover, top canopy, rubber shackle, capacitors, compact electronic power saving regulator of 300 watts., ceiling rose etc.

It shall be suspended from the hooks/fan hook boxes. The work shall also include for cutting holes of required size, if required, in the roof (without damaging the building) along with grouting the fan hook boxes and finally finishing the surface and matching the level with existing.

The rate shall include for all materials, labour, T&P, taxes, levies, scaffolding, shifting of furniture, carting away the debris and cleaning the floor etc.

Makes –

Fixture – Crompton Greaves Ltd., Model – High Breeze.

Regulator - Anchor - (Model – 50440), with required laminated Plates fixed on metal (for concealed) or PVC (for surface mounted) Moulded boxes.

The job shall be complete, to the satisfaction of the Architect.

24. Exhaust Fan.

Providing & fixing in position, effecting proper connection, testing and commissioning of Exhaust/Fresh Air Fan of 300mm dia. impeller assembled with a visual control panel fitted with unique pull cord, louver shutter, high impact polystyrene blades. It shall also include for all accessories.

The work shall also include for cutting holes of required dia., if required, in the wall (without damaging the building) along with grouting the rag bolts at required position and finally finishing the surface and matching the level with existing.

The rate shall include for all materials, labour, T&P, taxes, levies, scaffolding, shifting of furniture, carting away the debris and cleaning the floor etc.

Makes –

Fixture – Crompton Greaves Ltd., Model – Ventilator.

The job shall be complete, to the satisfaction of the Architect.

25. Call Bell.

Providing, storing & installing in position, effecting proper connection, testing and commissioning of Call Bell with all accessories.

The rate shall include for all materials, labour, T&P, taxes, levies, scaffolding, shifting of furniture, carting away the debris and cleaning the floor etc.

Makes-

Fixtures - Anchor – City Ding Dong Door Bell.

Bell Push - Anchor – Penta, Model – 50042.

The job shall be complete, to the satisfaction of the Architect.

E. TELEPHONE POINTS.

26. Telephone Junction Box.

Supply, storing & installing in position, effecting proper connection, testing and commissioning of Telephone Junction Box, duly housed in M.S. enclosure. The work shall also include for cutting chases for moulded boxes, if required, in the wall (without damaging the building) and finally finishing the surface the matching the level with existing.

The rate shall include for all materials, labour, T&P, taxes, levies, scaffolding, shifting of furniture, carting away the debris and cleaning the floor etc. The job shall be complete, to the satisfaction of the Architect.

It shall have the following -

Box - 10 pair TJB

Makes – Krone or equivalent, with all accessories.

The job shall be complete, to the satisfaction of the Architect.

27. Telephone Cable.

Supply, storing & installing in position, effecting proper connection, testing and commissioning of Telephone Cable laid in PVC conduit pipe (2mm thick, with all accessories e.g. long/short bends, tees, junction boxes etc.) of required dia., concealed in wall/floor/panelling/partitions or above false ceiling. The work shall also include for cutting chases for conduits and moulded boxes, if required, in the wall/floor (without damaging the building) along with clamping the conduits at every 450mm interval and finally finishing the surface and matching the level with existing.

The rate shall include for all materials, labour, T&P, taxes, levies, scaffolding, shifting of furniture, carting away the debris and cleaning the floor etc.

It shall have the following -

Cable - 10 pair – 0.6mm. dia., including termination/crimping at both the ends.

Makes –

Cable – Havell's/Rallison/Sky Tone.

PVC Conduit – Bajaj/AKG, of required dia. and 2mm thick, with all accessories e.g. long/short bends, tees, junction boxes etc.

and clamps at every 450mm interval.

The job shall be complete, to the satisfaction of the Architect.

28. Telephone Points with Wiring.

Providing, storing & installing in position, effecting proper connection, testing and commissioning of Telephone Points on module plates. It shall have GI Pull Wire laid in PVC conduit pipe of required dia., concealed in wall/floor/panelling/partitions or above false ceiling. The work shall also include for cutting chases for conduits and moulded boxes, if required, in the wall/floor (without damaging the building) along with clamping the conduits at every 450mm interval and finally finishing the surface and matching the level with existing.

The rate shall include for all materials, labour, T&P, taxes, levies, scaffolding, shifting of furniture, carting away the debris and cleaning the floor etc. The job shall be complete, to the satisfaction of the Architect.

It shall have the following -

Wire - 1 pair – 0.5mm. dia. including termination/crimping at both the ends.

Makes -

Wire - Havell's/Rallison/Sky Tone.

Telephone Socket - Anchor - Penta, Socket / Telephone Jack (single) – RJ 11 with shutter (Model 50337)

with required Modular Plates fixed on metal (for concealed) or PVC (for surface mounted) Moulded boxes

– Model – Tressa, Colour – White.

PVC Conduit – Bajaj/AKG, of required dia. and 2mm thick, with all accessories e.g. long/short bends, tees, junction boxes etc. and clamps at every 450mm interval.

29. Data Cabling with Points.

Providing, storing & installing in position, effecting proper connection, testing and commissioning of Data Cabling Points on module plates. It shall have GI Pull Wire laid in PVC conduit pipe of required dia., concealed in wall/floor/panelling/partitions or above false ceiling. The work shall also include for cutting chases for conduits and moulded boxes, if required, in the wall/floor (without damaging the building) along with clamping the conduits at every 450mm interval and finally finishing the surface and matching the level with existing.

The rate shall include for all materials, labour, T&P, taxes, levies, scaffolding, shifting of furniture, carting away the debris and cleaning the floor etc. The job shall be complete, to the satisfaction of the Architect.

It shall have the following -

Wire - CAT – 5 (E), including termination/crimping at both the ends.

Makes -

Wire - Havell's/Rallison/Sky Tone/D-Link.

Telephone Socket - Anchor - Penta, Socket / Computer Jack (single) – RJ 45 with shutter (Model 95605) with required Modular Plates fixed on metal (for concealed) or PVC (for surface mounted) Moulded boxes

– Model – Tressa, Colour – White.

PVC Conduit – Bajaj/AKG, of required dia. and 2mm thick, with all accessories e.g. long/short bends, tees, junction boxes etc. and clamps at every 450mm interval.

PREAMBLE TO BILLS OF QUANTITIES

1.0 GENERAL

1. The contractor shall comply with all conditions as detailed in Volume – I.
2. Item description in bills of quantities is exhaustive but may not cover all items, trades, materials, labour, specifications, conditions etc. However contractor shall be responsible to read item description in conjunction with technical specifications, drawings and trade practices and is required to follow all requirements. Further description of item in BOQ, unless otherwise stated, includes, wherever necessary, conveyance and delivery handling, unloading, storing, fabrication, hoisting, scaffolding all labour for finishing to required shape and size, setting, fitting and fixing in position, straight cutting and waste, return of packings, disposal, cleaning and other incidental charges and/all applicable taxes and duties.
BOQ quantities are tentative and any changes will not allow the contractor to claim extra on the rates quoted.
3. Quantities stated in the item are not to be used for ordering of any material. Contractor shall verify quantities himself and order with suppliers shall be placed with required wastages. Copies of orders shall be forwarded to Incharge/Architect to verify date of order, supplier and materials ordered.
4. All materials to be used at the site shall be tested as per specifications or as per the IS. Testing shall be done at site and / or at approved laboratories as specified or as directed by the Incharge/Architect at the cost of contractor. Any defective or unapproved materials will be removed from site immediately at contractors' cost.
5. The contractor shall be responsible for protection of his own work and the work of other trades during the progress and till handover to the Employer..
6. The contractor shall note that space for storage at the site is limited and shall allow for phased delivery of material to site to overcome that problem.
7. Contractor shall provide, required rigid double legged steel scaffolding accessible at all locations with safety rails.
8. Area available at site is limited and contractor to organize himself for safe storage, handling, site offices, labour accommodation if any at his cost. No extra cost payable on this account.
9. Price of each item inserted shall be considered as self supporting and do not have any bearing on other items of the project.
10. The Contractor to take required insurance for safety of structures around.
11. The Works shall be measured as per method of measurement detailed in Technical Specification and preamble to Bills of Quantities of this contract. In absence of these details relevant SP 27 shall be followed or shall be measured as per instruction of the Incharge/Architect.

7.0 STRUCTURAL STEEL WORK

7.1 The rate shall include

- A. Preparing shop drawings based on architectural and structural drawings with required connections, all conforming to standards, code of practices, instructions of Structural consultant/INCHARGE/ARCHITECT.
- B. Take actual site measurement prior to fabrication and incorporate into shop drawings accordingly.

- C. Coordinating, scheduling and doing works as per site programme.
- D. Straightening, cutting, bolting, welding including layout and assembly.
- E. Erecting, aligning, making plum and leveling to correct position as per shop drawings including required site repairs/adjustments.
- F. Sand / shot blasting, priming with two coats of zinc rich primer and painting system if specified in BOQ.
- G. Work at all heights, leads, lifts and depths.

9.0 MASONRY WORK

9.1 All work as detailed in Volume-II and drawings. The rate shall include

- A. All materials, labours, wastages etc.
- B. Testing of Bricks/Blocks
- C. Mix of mortar shall be as specified and by using non shrink compound.
- D. Making bonds
- E. Patterns
- F. Forming arches
- G. Work at heights, depths and lead
- H. Racking out joints
- I. Curing
- J. Required double legged scaffolding
- K. Patli beam concrete
- L. Steel binding, placing etc.

10.0 PLASTERING WORK

10.1 Plastering work shall be carried out as detailed in technical specifications.

10.2 The work and rate shall include

- A. All materials, labours, wastages etc.
- B. Closely Hacking R.C.C. surfaces
- C. Racking out joints and deeply junctions of concrete and masonry.
- D. Chemical adhesive and scratch coat of plaster
- E. Grouting junction joint with polymer grout.
- F. Cleaning and wetting of surfaces
- G. G.I. chicken mesh, expanded metal, G.I. beads etc. as required and specified
- H. Providing level dabs
- I. Chamfering,
- J. Rounding of edges
- K. Making grooves, pattas
- L. Making drip moulds
- M. Finishing and making wattas
- N. Making ready surfaces finishing and for the next operation to receive finishes as per manufacturers requirements
- O. Finishing with cement where specified.
- P. Curing
- Q. Required double logged scaffolding.
- R. Work at all heights, leads, lifts and depths.

11.0 JOINERY WORK

11.1 Work shall be carried out as per specifications

11.2 The work and rate shall include

- A. All materials with wastage
- B. All timber shall be 2nd class good quality well seasoned, ant termite treated C.P. Teakwood.
- C. All ferrous materials like nails, screws etc. shall be galvanized.
- D. All jointing shall be glued with exterior quality adhesive
- E. G.I. holdfast grouted in concrete mix 1:2:4.
- F. Application of tar / bitumen on back of timber members in contact with masonry or concrete.
- G. Work at all heights, depths and lead

12.0 WATERPROOFING WORK

12.1 BOX TYPE WATERPROOFING

Rate shall include providing and fixing

Stone method

- A. Preparation of surfaces
- B. 20 mm thick cement sand mortar with waterproof compound
- C. Socket / pipes for pressure release
- D. 20 mm thick kota stone slabs for wall and 25 mm thick kota or similar stone of approximate size 600 x 600 mm.
- E. Protective screed 20 mm thick
- F. Grouting of joints, making champhers, wattas, etc.
- G. Sealing with sealant
- H. Grouting of pockets / pipes
- I. Testing
- J. Guarantee for 10 years on Rs. 100 stamp paper.
- K. Cleaning prior to handing over.
- L. Work at all heights, leads, lifts and depths.

12.2 Terrace waterproofing

Work and rate shall include

- A. Proprietary designing and installing
- B. Preparation of surface with required cleaning, chasing, grouting, etc. entire surface.
- C. Grouting with cementious grout coating system (Hydor-tight of M/s. Xypex or Kosetr's alkaline cement base crystalline NB system of M/s. Chowgule Industries Ltd. or equivalent approved) as per specification including providing protective screed.
- D. Brick bat coba of average 110 thick with cement mortar 1:4 (1 cement : 4 sand).
- E. Admixture
- F. Top finishing with china mosaic. (Mosaic not more than 40 x 40 mm size)
- G. Required slope
- H. Required treatment to wall as per instruction including wattas, tucking within parapet, etc.
- I. Protection
- J. Curing

- K. Testing by ponding with 200 mm deep water for 72 hours.
- L. Guarantee of 10 years in approved format on Rs. 100 stamp paper.
- M. Cleaning prior to handing over

12.3 Waterproofing for Basement Roof

Work and rate shall include

- A. Proprietary designing and installing
- B. Preparation of surface and require cleaning
- C. Grouting with cementous grout as per specification for cracks
- D. Perlite concrete of average 75 thick
- E. 4mm thick APP Polymer modified polyester reinforced torch on membrane (Garden Moply FP 4) of STP Texsa Ltd. or equivalent approved.
- F. 30mm thick protective screed with adding Polypropylene Fibermesh synthetic fibers as micro reinforcement with Microban for controlling microbial growth, to mortar in proportion recommended by the manufacturer.
- G. Laying to required slope
- H. Required treatment to wall as per instruction (minimum 300 mm above FFL)
- I. Protection
- J. Curing
- K. Testing
- L. Guarantee of 10 years in approved format on Rs. 100/- stamp paper.
- M. Cleaning prior to handing over

12.4 Crystalline Water proofing

Work and rate shall include

- A. Proprietary designing and installing
- B. Preparation of surfaces
- C. Sealing of surfaces including chasing, grouting, etc.
- D. Preparing wattas, junctions, edges, etc.
- E. Application of Crystalline water proof system of Xypex or Chowgule or equivalent approved
- F. Testing by ponding with water for 72 hours.
- G. Guarantee
- H. Cleaning prior to handing over

**CONTRACT CONDITIONS
LIST OF DRAWINGS**

SR.NO.	DWG NO.	NAME OF THE PLAN
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ARCHITECTURAL DRAWINGS

2	PL-02	LAYOUT PLAN
3	PL-03	GROUND FLOOR PLAN

* * * * *

**LIST OF MATERIALS OF APPROVED BRAND AND/OR
MANUFACTURE**

1.	Cement	1. Larsen & Toubro, 2. ACC 3. Birla Gold, 4. Gujrat Ambhuja, or approved
2	Steel	1. Sail, 2. Tisco or approved equivalent
3	Tile fixing Adhesive	1. Sika 2. Pidilite 3. Bal 4. Roff 5. Fosroc or approved
4	Plywood	1. Century 2. Greenply 3. Duro.
5	BWR grade phenol bonded plywood	1.Greenply 2. Century 3. Swastik, 4. Kit/Kenwood, or approved equivalent.
6	Particle Board Nova Teak Super	by Indian Plywood Mfg. Co. or approved equivalent
7	Block Board.	1. Century 2. Greenply 3. Mysore Mafatlal, 4. Galaxy or equivalent approved
8	Flush doors	1. Century 2. Green ply or approved
11	Laminates	1. Century Mica 2. Greenlam, 3. Kitmica 4. Neoluxe, or approved equivalent.
12	Handles	1. Dorma, 2. Hafele or approved equivalent.
13	Glass.	1. Saint (Asahi), 2. Modigaurd or approved equivalent
14	Screws	1. IW. nettle fold, 2. Oxidised or approved equivalent.
15	Hardware	1. Earl Bihari (EBCO), 2. Shalimar, 3. Hettich, Vijayan, 4. Sobbit or approved equivalent.
16	Adhesive for fixing laminate	1.Fevicol SH, 2.Araldite of Ciba Geigy, 3.Bal Endura or approved
17	Door Closers	1. Dorma 2. Everite,

		3. Godrej 4. Hyper 5. Hardwyn or approved
18	Locks	1. Godrej, 2. Vision/Vijayan or equivalent approved.
19	Wood preservative	1. Bison by British paints or equivalent approved
20	Glass Wool Fibre	1. Crown 2. Rock wool or approved equivalent
21	Cement Primer	1. Asian paints 2. Berger 3. ICI Dulux paints 4. Nerolac First quality
22	Acrylic Emulsion paints	1. Asian, 2. Berger 3. ICI Dulux, 4. Nerolac First quality
23	Enamel paints	1. Asian, 2. Berger 3. ICI Dulux 4. Nerolac First quality
24	Wood primer	1. Asian, 2. Berger 3. ICI Dulux, 4. Nerolac First quality
25	Aluminium sections	1. Hindalco/Jindal or equivalent approved
26	Cast Iron Pipes and fittings	Standard approved manufacturers of any brand of fittings having ISI marking.
27		
28	G.I. Fittings	Standard approved manufacturers of any approved brand of fittings having ISI marking
29	Gun Metal Valves	1. Leader Engineering Works, Calcutta 2. Bombay Metal Co., 3. Annapurna Metal Work, Calcutta
30	Brass Fittings	1. Leader Engineering Works, Calcutta, 2. L & K Mathura, 3. Annapurna Metal Works, Calcutta
31	C.P. Fittings	1. Jaquar 2. Plumber 3. Any approved equivalent BY Bank/architect
32	W.C. Pan Wash basin, Urinals E.I.D.	Hindware /Parry ware/cera

33	E.W.C. Seats	1. Parry ware/cera 2. Hindware or approved
34	Flushing Cisterns	1. /Parry ware/cera 2. Hindware or approved
35	Mirrors	1. Atul Glass Works, 2. Vallabh Glass Works, 3. Modi Glass.
36	Vitrified tiles	1. NITCO 2. HR Johnsons 3. EURO 4. Premium quality only be accepted
37	Ceremic tiles	Kajaria, HR Johnsons
38	Water Tank	Sintex or equivalent
39	Water Cooler	Voltas,Bluestar
34	RO	Kent model no-elite-II/equivalent
	<u>ELECTRICAL</u>	
	Panel (fabricated)	MDS/ L&T/ Siemens.
	Kit Kat	Havell's/Anchor
	Distribution Boards	L&T hager/MDS/ Siemens.
	MCB, CCB,ELCB,RCCB, Isolators	L&T hager/MDS/ Siemens.
	Contractors, O/L relay & HRC fuses	S&S (Protec)/MDS/ Havell's
	Indicating lamps & Push Buttons	L&T hager/ Siemens
	Amp./Volt. Meters	L&T hager
	Change over/Selector (Rotary) switches	L&T hager/ HPL
	CT's	L&T hager/ Kappa.
	Terminal blocks	Havell's Connectwell/Technology/Eknic.
	Wires (Copper/Aluminium)	Finolex/Polycab//Skyline
	M.S. conduit	BEC/Steel Kraft/AKG
	P.V.C. conduit	BEC/AKG/Diplast/Cap
	Switches & sockets	MK India/North West/ L&T
	A/C box	L&T hager/MDS/ Siemens
	Lighting fixtures & Luminaries	Philips/GE/C&S Electric Ltd
	Ceiling fans	Crompton Greaves/GEC
	Exhaust fans	Crompton Greaves/GEC
	Cables	Finolex/Skytone
	GI pipes	BST/Jindal
	Lighting fixtures & Luminaries	Philips/GE/C&S Electric Ltd
	Ceiling fans	Crompton Greaves/GEC
	Exhaust fans	Crompton Greaves/GEC
	Cables	Finolex/Skytone
	GI pipes	BST/Jindal
	<u>TELEPHONE, INTERCOM & LAN SYSTEM</u>	
	Telephone Wires (Copper/Aluminium)	Finolex/Polycab//Skyline

	M.S. conduit	BEC/Steel Kraft/AKG
	P.V.C. conduit	BEC/AKG/Diplast/Cap
	Switches & sockets	MK India/North West
	TAJ Block	Krone
	Key Telephone System	Samsung
	Telephone Hand Set	Tata/Betel
	Batteries	Exide

Note –

Contractor to submit sample of above makes and Architect/Bank will approve the sample and it will be binding on contractor to use approved materials only. If make of any material are not provided then BANK /architect will decide the make/brand of materials and decision in this regard will be final and binding on Contractor.

Premium quality only be accepted

PROFORMAS & ANNEXURES

ANNEXURE – A EMPLOYING CONTRACT LABOUR

ANNEXURE – B REGISTER OF CONTRACTOR/S

**ANNEXURE – C NOTICE OF COMMENCEMENT /COMPLETION OF
CONTRACT WORK**

ANNEXURE – D MONTHLY PROGRESS REPORT

ANNEXURE – E RECEIPT OF MATERIALS AT SITE (MONTHLY)

ANNEXURE – F MEASUREMENT BOOK

ANNEXURE – G RUNNING A/C BILL

ANNEXURE – H SECURED ADVANCE

ANNEXURE – I R. A. BILL CERTIFICATE

**ANNEXURE – J PROFORMA OF UNDERTAKING IN CONNECTION WITH
PAYMENTS OF ADVANCE ON MATERIALS BROUGHT BY THE
CONTRACTOR/S TO THE SITE**

ANNEXURE – K CERTIFICATE OF PAYMENT BY CONSULTANT

ANNEXURE – L HINDRANCE REGISTER

ANNEXURE – M EXTENSION OF TIME LIMIT

**ANNEXURE – N CONTRACTOR/S LIABILITY AND INSURANCE
SUMMARY**

Note –if any other register required same will be maintained as per approved Proforma by Bank

ANNEXURE – A

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 principle 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 Contractor/s and contract labour
 - a. names and address of the Contractor/s
 - 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 - B**PROFORMA OF REGISTER OF CONTRACTOR/S**

1. Name and Addresses of The Principle Employer

2. NAME and address of the establishment

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

**PROFORMA OF NOTICE OF COMMENCEMENT/ COMPLETION
OF CONTRACT WORK**

ANNEXURE - c

1. Name and principle 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
Principle
Employer

The Inspector,

ANNEXURE – D
PROFORMA OF MONTHLY PROGRESS REPORT

Name of work

Progress report for the month

Report No.

Sr. No.	Description of work	Details of location where works is done	Approximate quantity executed

Sr. No.	Description of work	Date of commencement	Percentage of progress achieved

ANNEXURE-E**RECEIPT OF MATERIALS AT SITE**

Sr. No.	Description of work	Opening Balance	Receipt during month	Consumption during month	Closing balance	Total received quantity till date

ANNEXURE – F**MEASUREMENT BOOK**

Item. No.	Description	Measurements No.			Quantity
		L	B	D / H	

Measurement Book shall be provided by the Employer through Architect. Suitable modification in Measurement book shall be carried out in consultation of Architect/ Consultant/ Bank

ANNEXURE – G**I – 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	tem	Description	Unit	Rate (Rs.)	As per Tender
1	2	3	4	5	6

Upto previous R/A Bill		Upto date till this Bill		Present Bill		Remarks
Qty.	Amount (Rs.)	Qty.	Amount (Rs.)	Amount (Rs.)	Qty.	
7	8	9	10	11	12	13

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

Net values since Previous bill

ANNEXURE – H**II – 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 Contractor/s 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 Contractor/s for use in the work in connection with the items for which rates of finished work have been agreed upon.

Dated signature of
 Site Engineer Consultant
 Preparing the bill

Designation _____

Dated signature of Bank's Architects

(Name of the Architects)

Dated signature of Contractor/s

ANNEXURE – I
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 (seal)

Signature and date of Consultant's
Representative

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

Architect

Consultant

Bank's Engineer

ANNEXURE – J

**PROFORMA OF UNDERTAKING IN CONNECTION WITH
PAYMENTS OF ADVANCE ON MATERIALS BROUGHT BY
THE CONTRACTOR/S TO THE SITE**

The undertaking made this _____ day of _____
2021 _____ between the
Manager/A.R.O D.A.V PUBILC SCHOOL Sector-18, indira nagar, lucknow
_____ and having
its _____ office at (hereinafter called the
Employer) of the one part and _____ (hereinafter
called the Contractor/s of the other part).

The Employer and the Contractor/s 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 Contractor/s will be paid an advance of 75 % of the cost of non-
perishable trade materials brought by the Contractor to the site for
consumption in the works at the discretion of the Employer.

The Contractor/s have applied to the Employer that they be 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.

Now this Letter of Undertaking witnesses that in consideration of the said
agreement and in consideration of the amount paid/ payable to the Contractor/s
by the Employer and/or any further advances as may be made to the
Contractor/s as aforesaid, the Contractor/s hereby agree with the Employer and
undertake as under:

i) The amount advanced by the Employer to the Contractor/s as aforesaid and
all or any further sum or sums advanced as aforesaid shall be employed by the
Contractor/s 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 Contractor/s 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/their own property and free from
encumbrances of any kind and the Contractor/s 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 Contractor/s solely in the execution of the said works in

accordance with the directions of Consultant of the Employer and accordance with the terms of the said agreement.

iv) That the Contractor/s 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 Contractor/s custody and on their own responsibility and shall at all times be open to inspection to the Employer's Engineers or any Officer authorised by the Employer. In the event of the materials or any part thereof being stolen, destroyed or damaged, the Contractor/s 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 Consultant of DAV Public School .

vi) That the advances made by the Employer shall be adjustable as far as possible towards the price payable to the Contractor/s for the above said works under the terms and the provisions of the said agreement provided that if any intermediate payments are made to the Contractor/s on account of work done, then on occasion of each such payment, the Employer will be at liberty to make a recovery from the Contractor/s 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 Contractor/s 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 Contractor/s 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 Contractor/s and the Contractor/s hereby covenant and agree with the Employer to repay and pay the same respectively to him/them accordingly.

viii) That the Contractor/s 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

ix) 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/they 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/s in accordance with the provisions in that behalf contained in the said agreement debiting the Contractor/s Account in this regard with the actual cost of effecting such completion and the amount due in respect of advances under these presents and crediting the Contractor/s Account with the value of work done as if he/they had carried it out in accordance with the said agreement and at the rates thereby provided. If the balance is against the Contractor/s, 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 Contractor/s 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 the General Manager whose decision shall be final and no appeal shall lie against his/their decision before any court, arbitrator or authority. The provision of this Undertaking shall be deemed to be supplemental to the said agreement.

IN WITNESS WHEREOF the Contractor/s have set their hands to these presents the day and year first hereinabove written.

Signed, sealed and delivered by the said Contractor/s in the presence of

Witness: Signature

Name

Address

(on Rs 100/- N J stamp paper)

ANNEXURE - K

PROFORMA OF CERTIFICATE OF PAYMENT BY CONSULTANT

Certificate No. Interim	Dated	
Client:	Project No.	Building Work/ Interior
	Particulars:	
Contractor:	Contract / Letter No.	Dated:
	Contract's Bill No.	Dated

This is to certify that the amount given below (*) is due to your Contractor/s 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 upto

Present Certificate (*)

Rupees _____

The cost of material supplied by you or payments made by you directly if any, and not covered herein above, should be adjusted before making the payment of the certified amount (*) Necessary Deduction U/S 194C of the Income Tax 1961 and sales tax may be made before paying the above certified amount. By a copy of this letter, we are intimating the Contractor/s to call on you for the necessary payment.

Remarks, if any

The details of insurance policy are enclosed.

Enclosures: Bill

Signature of Architect/Consultant

ANNEXURE – L**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	Remarks

Consultant/ Architect

ANNEXURE - M**APPLICATION OF PROFORMA FOR EXTENSION OF TIME LIMIT**

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. Period allowed for completion of work as per agreement.
7. Date of completion stipulated in Agreement.
8. Period for which extension of time has been given previously:
 - a) 1 extension vide Architects/ bank letter no. dtd, month, days st
 - b) 2 extension vide Architects/ bank letter no. dtd, month, days nd
 - c) 3 extension vide Architects/ bank letter no. dtd, month, days rd
 - d) 4 extension vide Architects/ bank letter no. dtd, month, days th
9. Total extension previously given.
 - a) Reasons for which extensions have been given (copies of the previous application should be attached)
10. Period for which extension is applied for:
11. Hindrances on account of which extension is applied for with dates on 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 is likely to last :
 - e) Period for which extension required for this particulars hindrance:
 - f) Overlapping period if any, with to item (e) above
 - g) Net extension applied for:
 - h) Remarks if any

12. Extension of time required for extra work

13. Details of extra work and amount involved:

a) Total value of extra work:

b) Proportionate period of extension time on estimated amount put tender

14. Total extension time required for 11 & 12 :

Submitted to the Consultant/Architects/Bank

Date:

Signature of contractor

ANNEXURE - N

CONTRACTOR'S LIABILITY AND INSURANCE SUMMARY

Sr No	Nature and Scope of Risk	Value of Insurance	Validity Period of Insurance	Name of the Insurer	Insurance Policy No.
1.	Loss of damage to works or any part thereof materials at site from any cause whatsoever including Fire (CAR)	100 % Contract Amount	The policy shall be valid till completion Period	The Policy shall be in joint names of Employer and Contractor	
2	Damage, Loss or Injury to any Person of the Employer or Consultants including their representatives and third Party	10.00 lacs per claim upto 3 claims	The policy shall be valid till completion Period	The Policy shall be in joint names of Employer and Contractor	
3	Claims under the Workmen's Compensation Act, 1923	As per Govt Rules	The policy shall be valid till completion Period	The Policy shall be in joint names of Employer and Contractor	

Signature of Contractor

Witnesses:

Address: